IMPLEMENTATION OF DIGITAL INFORMATION SYSTEMS TO IMPROVE OPERATIONAL EFFICIENCY IN RETAIL SMEs

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ABSTRACT

This research aims to analyze the implementation of digital information systems in increasing operational efficiency in micro, small, and medium enterprises (UMKM) in the retail sector, by taking a case study at Indomaret Medan. Digital transformation becomes a vital need for MSMEs in the era of industry 4.0 to increase competitiveness and operational efficiency. The research method used is qualitative descriptive with data collection techniques through in-depth interviews and direct observation of the store's operational process. The research results show that the implementation of the digital information system at Indomaret covers various operational aspects, including digital cash register system, technology-based attendance system, human resource management system, and technical support through Electronic Data Processing (EDP). Research findings indicate that digitalization has a positive impact on operational efficiency, especially in transaction speed, data accuracy, and employee performance monitoring. However, there are technical obstacles faced, especially related to the stability of the internet connection that affects the smoothness of the system. This research provides a theoretical contribution in understanding the factors that determine the success of information system implementation in retail MSMEs and provides practical recommendations for business actors who want to do digital transformation.

Keywords: *Digital Information System, Operational Efficiency, Retail UMKM, Digital Transformation, Indomaret*

INTRODUCTION

The era of industrial revolution 4.0 has brought fundamental changes in the global business landscape, including the micro, small, and medium business sector (UMKM). Digital transformation is no longer an option, but a strategic need for business continuity and growth in the midst of increasingly competitive competition (Schwab, 2017). In the Indonesian context, MSMEs have a vital role in the national economy, contributing around 61% of the Gross Domestic Product (GDP) and absorbing more than 97% of the workforce (Ministry of Cooperatives and SMEs, 2023). However, the adoption rate of digital technology in Indonesian MSMEs is still relatively low, with only around 13% of MSMEs implementing a comprehensive digital information system (McKinsey & Company, 2022).

Digital information system has great potential in increasing the operational efficiency of MSMEs through business process automation, increasing data accuracy, and accelerating decision making (Laudon & Laudon, 2020). In the retail sector in particular, the implementation of information systems can provide a competitive advantage through improving the quality of customer service, optimizing inventory management, and the effectiveness of human resource management (Turban et al., 2018). Previous research shows that MSMEs that adopt digital technology experience an increase in productivity up to 40% and an average revenue growth of 26% higher compared to MSMEs that have not yet digitalized (World Bank, 2021).

Indomaret, as one of the largest franchise retail networks in Indonesia with more than 20,000 outlets spread throughout the archipelago, is an example of a medium to upper enterprise that has implemented a comprehensive digital information system. Indomaret's success in maintaining its position as the leader of the modern retail market cannot be separated from sustainable investment in information technology and digital transformation (Indomarco Prismatama, 2023). However, to what extent the digital information system contributes to operational efficiency and what aspects are the key factors for the success of its implementation still requires a deep empirical study (Gusty, Siregar, et al., 2025).

The research gap in this study is identified from the lack of empirical studies that analyze the implementation of digital information systems in retail MSMEs from an operational perspective at the outlet level. The majority of previous research focused on technology adoption at the strategic level of the company, while the understanding of implementation practices in the field, obstacles faced, and problem-solving strategies is still limited (Hartono, 2022; Rahayu & Day, 2021). Therefore, this research seeks to fill the gap by comprehensively exploring how the digital information system is implemented in Indomaret's daily operations, the challenges faced, and its impact on operational efficiency.

Theoretically, this research is expected to contribute to the development of management information system literature, especially in the context of digital technology implementation in the retail sector MSMEs. The results of this research can enrich academic understanding of the factors that affect the success of the implementation of information systems, as well as provide an analytical framework for similar research in the future.

Practically, this research provides valuable insights for MSMEs who plan to do digital transformation. Research findings can be used as a reference in designing an effective information system implementation strategy, anticipating obstacles that may arise, and optimizing the benefits of digital technology to increase business competitiveness. For Indomaret in particular, the results of this research can be an evaluation material for the

improvement of the existing system and the development of digitalization strategies in the future.

LITERATURE REVIEW

Digital Information System

Information system can be defined as a set of interrelated components that collect, process, store, and distribute information to support decision making, coordination, and control in an organization (Laudon & Laudon, 2020). Digital information system is an evolution of conventional information system that utilizes digital technology as its main infrastructure. According to O'Brien & Marakas (2021), a digital information system consists of five main components: hardware, software, data, procedures, and humans. The superiority of digital information systems lies in their ability to automate business processes, increase data accuracy, accelerate information access, and facilitate collaboration between departments.

In the context of retail business, digital information systems play a crucial role in various operational functions. Point of Sale (POS) system is a core component that integrates the sales transaction process with inventory management, finance, and customer relationship management (Turban et al., 2018). In addition, digital information systems also support back-office functions such as human resource management system (HRMS), supply chain management (SCM), and business intelligence for data analysis and strategic decision making (Chaffey & White, 2019).

Operational Efficiency

Operational efficiency refers to the organization's ability to minimize the use of resources in achieving the desired output (Krajewski et al., 2019). In retail business, operational efficiency can be measured through various indicators, including: transaction process speed, inventory accuracy, employee productivity, operational error rate, and customer satisfaction (Levy et al., 2021). The implementation of digital information systems is proven to have a positive impact on operational efficiency through several mechanisms.

First, business process automation reduces the need for manual intervention, thus minimizing human error and speeding up process time (Davenport, 2018). Second, data integration between systems allows faster and more accurate real-time monitoring and decision-making (McAfee & Brynjolfsson, 2017). Third, digital information systems facilitate the standardization of operational processes, which in turn increases the consistency of service quality (Barney & Hesterly, 2019). Fourth, data analytics generated by information systems provide insights for continuous improvement and optimization of business processes (Provost & Fawcett, 2021).

Digital Transformation in UMKM

Digital transformation is defined as a fundamental process in integrating digital technology into all business areas, which results in fundamental changes in the way organizations operate and provide value to customers (Westerman et al., 2020). For MSMEs, digital transformation is not just technology adoption, but a holistic change that includes strategic, operational, and organizational cultural aspects (Verhoef et al., 2021). Research shows that MSMEs that successfully carry out digital transformation have certain characteristics, namely: strong leadership commitment, adaptive organizational culture, adequate resource availability, and structured implementation strategies (Matt et al., 2015).

However, MSME also face various challenges in the digital transformation process. The study conducted by OECD (2021) identified several main obstacles, including: limited capital for technology investment, lack of digital competence in human resources, resistance to

change, and inadequate technology infrastructure. In Indonesia, additional challenges faced by MSMEs include limited access to financing, low digital literacy, and a digital ecosystem that is still growing (Bank Indonesia, 2022). To overcome these challenges, a gradual approach is needed in implementation, investment in human resource development, and support from the business ecosystem including the government and accompanying institutions (Nambisan et al., 2019).

Technology Acceptance Model (TAM) Theory Framework

Technology Acceptance Model (TAM) developed by Davis (1989) is one of the most widely used theoretical models to explain the acceptance and use of information technology. This model suggests that technology acceptance is determined by two main factors: perceived usefulness and perceived ease of use. Perceived usefulness refers to the user's level of trust that using a certain system will improve their performance, while perceived ease of use refers to the user's confidence level that the system is easy to use and does not require excessive effort (Venkatesh & Davis, 2000).

In the context of this research, TAM is used as an analytical framework to understand how Indomaret employees receive and adopt digital information systems in their daily operations. If employees perceive that the digital system used provides real benefits in making their work easier and easy to operate, then the level of acceptance and actual use of the system will be high. On the other hand, if the system is perceived to be difficult to use or does not provide added value, then resistance to the use of the system will appear. Understanding these factors is important to design an effective implementation strategy and ensure the success of technology adoption (Venkatesh et al., 2016).

RESEARCH METHODS

This research uses a descriptive qualitative approach with a case study design. The qualitative approach was chosen because it allows researchers to explore the phenomenon in depth and understand the context and meaning behind the implementation of digital information systems (Creswell & Creswell, 2018). The case study is seen as appropriate because this research focuses on one specific analysis unit, namely the operation of Indomaret Medan, with the aim of gaining a comprehensive understanding of the practice of implementing digital information systems in the field (Yin, 2018).

The research was carried out at one of the Indomaret outlets located in Medan, North Sumatra. The choice of this location is based on the consideration of accessibility and representativeness of the outlet as a standard operational unit in the Indomaret network. Data collection was carried out in November 2025 with a research duration of one week, including observations on various operational shifts to get a comprehensive picture of the implementation of information systems in various operational conditions.

The key informant in this research is Saudari Husna, an Indomaret employee who has direct experience in operating digital information systems in daily operational activities. The selection of informants is carried out purposively with the criteria: having at least one year of work experience, directly involved in the use of digital systems, and willing to provide information openly. In addition, observations were carried out on various aspects of store operations including the cashier system, attendance, and employee shift management.

Data collection in this study uses two main methods: Semi-structured interviews are conducted using pre-arranged question guides, but still provide flexibility to dig deeper into information according to the informant's response. Interview questions include aspects: organizational structure and HR management, implementation of digital information systems in various operational functions, technical obstacles faced, problem-solving strategies, and

perceptions of the impact of digital systems on operational efficiency. The interview is recorded in the form of a video with the consent of the informant for the purposes of documentation and data analysis.

Observations are carried out in a passive participatory manner, where researchers observe the store's operational process without being directly involved in the activity. Aspects observed include: the use of digital cashier system, employee attendance process, handling customer transactions, coordination between shifts, and response to technical obstacles that arise. Field notes are made systematically to document the observation findings which are then used for data triangulation with the interview results.

Data analysis is carried out using the thematic analysis method with the following steps: First, data transcription and coding, where interview recordings are transcribed verbally and the data is organized systematically. Second, the identification of themes and patterns, namely identifying the main themes that emerge from data related to the implementation of digital information systems and operational efficiency. Third, comparative analysis between empirical findings with theoretical literature to identify the suitability or gap between practice in the field with theoretical concepts. Fourth, triangulation of data from various sources (interviews, observations, and documentation) to increase the validity of research findings (Miles et al., 2020).

To ensure the validity of the data, this study applies several strategies. Data credibility is guaranteed through source triangulation (interview and observation) and member checking, where the interview transcript is confirmed back to the informant to ensure the accuracy of the interpretation. Transferability is strengthened by providing a deep description (thick description) about the research context so that it allows readers to assess the extent to which the findings can be applied to other contexts. Dependability is maintained through systematic documentation of the entire research process, including interview recordings and observational field records. Confirmation is confirmed through a clear audit trail, showing how the research conclusion is derived from the collected data (Lincoln & Guba, 1985).

RESULT AND DISCUSSION

Indomaret is one of the largest franchise retail chains in Indonesia engaged in the modern minimarket business. Founded in 1988, Indomaret now has more than 20,000 outlets spread throughout Indonesia and employs more than 150,000 employees. The Indomaret outlet which is the object of this research is located in Medan, North Sumatra, and is a representation of the standard operational unit in the Indomaret network. This stall operates 24 hours with a shift system that divides the working time into several periods. Each shift is managed by a team consisting of shift leaders and subordinates who work synergistically to ensure the smooth operation of the store.

The organizational structure at the outlet level is designed to ensure efficiency and accountability in daily operations. Based on the interview results, every operational shift always consists of at least two employees, namely the shift leader and subordinates. Shift leaders are responsible for operational coordination, tactical decision making, and supervision of subordinate performance. Meanwhile, subordinates are in charge of carrying out operational activities such as serving customers at the cashier, arranging goods, and maintaining store cleanliness. This clear division of roles facilitates effective coordination and ensures continuity of service to customers.

Implementation of Digital Information System in Indomaret Operations Digital cash register system or Point of Sale (POS) is the heart of operations in modern retail business. The research results show that Indomaret has implemented an integrated digital POS system to manage sales transactions. As revealed by the informant, this digital cash register system has

completely replaced the manual recording method. The POS system used not only functions to record transactions, but is also integrated with the inventory management system, so that every sales transaction automatically reduces the stock of goods in the database. This allows real-time monitoring of product availability and facilitates decision-making regarding stock replenishment (Naldi et al., 2025).

Transaction process speed is one of the important indicators of operational efficiency in retail business. The informant stated that the digital system accelerates the transaction process, noting that optimal performance is highly dependent on the stability of the internet connection. When the internet connection is in good condition, the barcode scanning process, total spending calculation, and receipt printing can be completed in seconds. This speed not only increases cashier productivity, but also increases customer satisfaction through reduced waiting time. However, dependence on the internet connection is also a weakness of the system, as will be discussed further in the technical constraints sub-chapter (Gusty, Wulandari, et al., 2025).

Data accuracy is another advantage of the digital POS system. The automatic system minimizes human errors that often occur in manual recording, such as calculation errors or negligence in recording transactions. All transaction data is accurately recorded and stored in a centralized database, which facilitates the audit process, financial reconciliation, and sales analysis. This data integration also facilitates data-based decision making, such as best-selling product identification, sales trend analysis, and sales performance evaluation per period.

Employee presence management is a crucial aspect in human resource management. The results of the interview show that Indomaret has implemented a digital attendance system that replaces manual methods such as attendance books or attendance cards. This system allows automatic and real-time employee attendance recording, which is then integrated with the payroll system and performance evaluation. The implementation of this digital attendance system is in line with the trend of digital transformation in human resource management which emphasizes the automation of administrative processes to increase efficiency (Armstrong & Taylor, 2020).

Attendance data has significant implications for employee performance assessment. As revealed by the informant, the delay in attendance was sanctioned by the company. The digital system allows objective and transparent monitoring of employee discipline. Every delay is recorded automatically with an accurate timestamp, thus eliminating the potential for data manipulation or subjectivity in the assessment. Attendance data is also used as one of the parameters in periodic performance evaluation, which in turn affects decisions regarding incentives, promotions, or disciplinary sanctions.

From a managerial perspective, the digital attendance system provides convenience in scheduling shifts and monitoring employee attendance. Supervisors can access attendance data in real-time to ensure the adequacy of personnel on each shift. In case of absence or delay, the manager can quickly adjust the schedule or call a backup employee. Analysis of attendance data also helps identify attendance patterns, such as the level of absence on a certain day or period, which can be used for scheduling system improvement or more proactive HR intervention.

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The implementation of digital information systems has a significant impact on improving operational efficiency at the outlet level. One of the most visible impacts is the acceleration of the work process. With the support of a stable internet connection, transactions at the cashier can take place in seconds, attendance is recorded automatically, and stock information can be accessed in real-time. This speed not only increases employee productivity, but also reduces customer waiting time so that it has an impact on increasing satisfaction and loyalty. In the framework of operational efficiency theory, reducing process time is the main indicator of service performance improvement. The implementation of digital information systems has a significant impact on improving operational efficiency at the outlet level. One of the most visible impacts is the acceleration of the work process. With the support of a stable internet connection, transactions at the cashier can take place in seconds, attendance is recorded automatically, and stock information can be accessed in real-time. This speed not only increases employee productivity, but also reduces customer waiting time so that it has an impact on increasing satisfaction and loyalty. In the framework of operational efficiency theory, reducing process time is the main indicator of service performance improvement.

In addition to speed, accuracy and reliability of data also increase through the use of digital systems. Transaction calculation is done automatically so as to minimize human error, while all data from transactions to attendance is stored centrally and backed up periodically. This minimizes the risk of data loss and facilitates the audit process and management monitoring in real-time.

The digital system also encourages the standardization of operational processes in all outlets. With uniform procedures, Indomaret can maintain consistency of service and brand experience in every location. This standardization is an important foundation for quality assurance and continuous improvement, because it facilitates the identification of deviations, analysis of the cause of the problem, and benchmarking between outlets .

In the aspect of human resource management, digital information systems help increase the effectiveness of employee management. Automatic recorded attendance supports more accurate scheduling and makes administrative processes easier such as salary calculation and performance evaluation. The recorded operational data can be used for productivity analysis per shift, preparation of incentive programs, to identification of training needs. This data-based approach has the potential to increase employee engagement and overall organizational performance.

Research findings show that the practice of using digital information systems in Indomaret is very consistent with the theory. In accordance with the Technology Acceptance Model (TAM), system adoption is supported by high perceived usefulness—because the system

accelerates operations—as well as perceived ease of use which is helped through training and technical support. This makes it easier for employees to accept and use technology.

The positive impact such as increased process speed, data accuracy, and operational standardization are also consistent with the literature on digital transformation in the retail and UMKM sectors. This research provides more detailed evidence of how the benefits appear in daily operational activities. The challenge in the form of dependence on internet connection is also in line with previous research, but the existence of a responsive EDP team shows that Indomaret has a good mitigation mechanism. However, internet instability can still reduce ease of use, and the literature suggests that there is an offline/hybrid feature for the POS system, which has not been confirmed in this study.

The research results provide several recommendations for Indomaret and other retail players. First, a reliable digital infrastructure, especially a stable internet connection, must be a priority so that operations are not disrupted. Companies also need to have a backup provider (redundancy) to anticipate disruption. Second, fast and competent technical support is very important. Strengthening the EDP team and the use of remote diagnostic tools can speed up problem handling. Third, employee training needs to be carried out continuously, including updating materials and evaluating their effectiveness. Fourth, companies need to utilize operational data optimally for analytics and strategic decision making. Investment in business intelligence and improving data analytics capabilities can increase the value and benefits of digital information systems.

CONCLUSIONS

Based on the research conducted at Indomaret Medan, the following conclusions can be drawn:

The implementation of digital information systems—such as POS, digital attendance, and integrated data management—has improved operational efficiency by accelerating transactions, increasing data accuracy, and standardizing store procedures. Employee performance monitoring also became more effective, contributing to better service quality. Before digitalization, operations were slower and more prone to human error, while after implementation, processes became more efficient and consistent.

Technical challenges, particularly unstable internet connectivity, still occur; however, these issues can be managed with support from the Electronic Data Processing (EDP) team. The success of system adoption is further reinforced by continuous employee training, which enhances user readiness in accordance with the Technology Acceptance Model (TAM). System-generated data also supports operational decisions, although its use for advanced analytics remains limited.

Several suggestions can be offered: MSMEs adopting digital systems should strengthen infrastructure, improve employee digital skills, and ensure the availability of responsive technical support to optimize the benefits of digital transformation.

RECOMMENDATIONS

1. Recommendations for Indomaret

Indomaret is encouraged to improve the reliability of its digital infrastructure by implementing backup connections or systems capable of offline operation to minimize disruptions caused by unstable internet. Structured and continuous training programs should be expanded for both new and existing employees to ensure they remain updated with system features and capable of using them effectively. Indomaret should also enhance the use of system-generated data for advanced analytics and business intelligence to support stronger

strategic decisions. Additionally, the company may consider extending digitalization to other operational areas—such as integrated supply chain systems, customer relationship management, and predictive inventory optimization—to further strengthen efficiency and service quality.

2. Recommendations for Other Retail MSMEs

Retail MSMEs planning digital transformation should begin with a comprehensive needs assessment to identify priority areas that provide the highest impact and return on investment. A phased implementation approach is recommended to reduce risks and allow gradual adaptation. Sufficient digital infrastructure, particularly stable internet connectivity or hybrid systems capable of operating offline, must be ensured before system adoption. Investment in human resource development is equally important; effective training can reduce resistance to change and ensure optimal system use. MSMEs should also prepare adequate technical support—either through internal teams or external technology partners—to ensure quick resolution of operational issues.

3. Recommendations for Future Research

Future research should involve multiple Indomaret branches or various retail outlets to obtain broader and more representative perspectives. Quantitative approaches could be applied to measure the impact of digital information systems more objectively, such as through ROI analysis, employee productivity, or customer satisfaction metrics. Further studies may also explore change management and organizational culture in digital transformation processes. Comparative research between Indomaret and competitors or between digitalized and non-digitalized MSMEs could provide deeper insights into best practices. Longitudinal studies that track digital system implementation over time would also help understand the long-term effectiveness and sustainability of digital transformation.

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