FROM DIGITAL TRANSACTIONS TO BUSINESS RESILIENCE: EXPLORING POS TECHNOLOGY, DATA-DRIVEN DECISION-MAKING, AND DIGITAL LITERACY AMONG MSMES

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Abstract

This study explores how micro, small, and medium enterprises (MSMEs) utilize Point-of-Sale (POS) technology and transaction data to support business decision-making and strengthen business resilience. It focuses on digital literacy as an enabling capability that shapes MSME owners' and managers' ability to understand, interpret, and use digital business information. The study adopts a descriptive qualitative approach involving MSME owners and managers who use the QASIR POS platform in Indonesia. Participants are purposively selected based on their direct involvement in business management and their experience using QASIR for transactions and business information. The study will collect data through semi-structured in-depth interviews and, where relevant, support them with observation and business documentation voluntarily shared by participants. The study will analyze the data thematically through familiarization, coding, categorization, theme development, review, and interpretation. The study examines four interconnected areas: POS technology utilization, data-driven decision-making practices, digital literacy, and business resilience. Rather than assuming a direct technological effect, the study explores how MSMEs interpret transaction data and translate them into adaptive managerial action. This study shifts attention from whether MSMEs adopt digital technology to how they transform digital technology into managerial capability. It offers a process-oriented qualitative explanation of how POS-generated data, managerial interpretation, and digital literacy may jointly support MSME resilience.

***Keywords**: MSMEs, POS Technology, Data-Driven Decision-Making, Digital Literacy, Business Resilience, Qualitative Research.*

A. INTRODUCTION

Digital transformation has increasingly influenced how micro, small, and medium enterprises (MSMEs) conduct everyday business activities. Digital technologies enable smaller firms to record transactions, manage inventory, receive digital payments, monitor sales, and access business information more efficiently. For resource-constrained MSMEs, these technologies can improve operational visibility, responsiveness, and continuity. (Faiz et al., 2024). One increasingly accessible technology is the Point-of-Sale (POS) system. Contemporary POS

platforms are no longer limited to replacing conventional cash registers. They generate transaction records and business information that can potentially be used to understand sales performance, product movement, inventory conditions, and other operational patterns. POS technology can therefore serve as both an operational tool and an information infrastructure for managerial decision-making. However, the availability of digital information does not automatically mean MSME owners use it systematically. A business owner may use POS technology intensively to record transactions while still relying primarily on experience and intuition when making decisions about inventory, pricing, promotions, products, or business development. This distinction highlights the importance of data-driven decision-making (DDDM), which this study defines as using available business data to assess conditions, identify problems, evaluate alternatives, select actions, and monitor implementation.

This challenge aligns with evidence that data-related investments do not automatically reshape decision routines unless firms develop an analytical culture and use data systematically (Szukits & Móricz, 2024). The transition from digital transaction recording to data-informed management may depend on MSME owners' and managers' digital literacy. Digital literacy extends beyond the ability to operate an application. It includes the capacity to access, understand, evaluate, interpret, and effectively use digital technologies and information. Two merchants may use the same POS platform every day but derive different managerial value from it because they differ in their ability to interpret reports, recognize patterns, and connect digital information with business decisions. In MSMEs, digital literacy and related digital capabilities are increasingly viewed as important resources for extracting value from digital technologies (Noor & Sriyono, 2024).

These issues are particularly relevant to business resilience. MSMEs often operate with limited resources, shifting consumer demand, intense competition, and market uncertainty. Their ability to recognize changes, respond quickly, adjust business practices, and recover from disruptions is essential for continuity. POS-generated information may support these adaptive processes, but MSME actors themselves still do not fully understand the mechanisms through which it does so. Recent SME resilience research conceptualizes resilience through readiness, slack, problem-solving, flexibility, connectedness, adaptiveness, and proactiveness (Verreynne et al., 2023). Much of the digital adoption literature has relied on quantitative models to test relationships among technology adoption, capabilities, and performance outcomes. Such approaches establish statistical associations but offer less insight into how MSME actors use technology and data in everyday decision-making, why usage differs across merchants, and how digital practices connect to resilience. A qualitative approach can reveal these processes, meanings, and contextual differences in greater depth. Accordingly, this study adopts a descriptive qualitative approach to explore the experiences of MSME owners and managers using the QASIR POS platform in Indonesia.

Research on Indonesian MSMEs further suggests that entrepreneurial characteristics, technology utilization, and institutional support are important considerations in sustaining operations during disruption (Rosalin & Rachman, 2024). The study examines how POS technology is used, how transaction information is interpreted and incorporated into managerial decisions, how digital

literacy shapes these practices, and how participants perceive these processes' contribution to business resilience.

Accordingly, the study is guided by the overarching research question: How do MSMEs transform POS technology and digital transaction data into managerial practices that support business resilience? To address this question, the study formulates four interrelated research questions. First, how do MSME owners and managers utilize POS technology in their daily business operations? Second, how is POS-generated information interpreted and integrated into managerial decision-making processes? Third, how does digital literacy shape MSME owners' and managers' ability to understand, interpret, and utilize POS-generated business information? Fourth, how do MSME owners and managers perceive the contribution of POS utilization and data-driven decision-making to business resilience? Collectively, these research questions provide a comprehensive framework for exploring how digital technology use and data interpretation translate into managerial practices, while highlighting the role of digital literacy in enabling informed decision-making and strengthening MSMEs' capacity to adapt, respond, and sustain operations in dynamic business environments.

B. LITERATUR REVIEW

A study of a cloud-based POS application for Indonesian MSMEs reports that digitized transaction processing and timely sales reporting can support operational efficiency and managerial decisions (Rony & Anggraeni, 2024). Evidence from Indonesian SMEs indicates that data analytics can improve operational efficiency and support managerial decision-making (Ekawaty et al., 2025).

POS technology provides MSMEs with digital infrastructure to record and manage transactions. Its functions may include recording sales, managing products, monitoring inventory, processing digital payments, and generating business reports. This study emphasizes not simply whether MSMEs have adopted POS technology, but how it is embedded in actual business practices. The analysis therefore considers usage patterns, frequently used features, perceived benefits, changes in business processes, difficulties encountered, and the transition from transaction recording toward managerial utilization. Recent evidence from innovative SMEs also shows that technology adoption is shaped by technological, organizational, and environmental conditions, including digital culture, human resources, and top-management support (Faiz et al., 2024).

1. POS Technology in MSMEs

POS technology provides MSMEs with digital infrastructure to record and manage transactions. Its functions may include recording sales, managing products, monitoring inventory, processing digital payments, and generating business reports. This study emphasizes not simply whether MSMEs have adopted POS technology, but how it is embedded in actual business practices. The analysis therefore considers usage patterns, frequently used features, perceived benefits, changes in business processes, difficulties encountered, and the transition from transaction recording toward managerial utilization. Recent evidence from innovative SMEs also shows that technology adoption is shaped by technological, organizational, and

environmental conditions, including digital culture, human resources, and top-management support (Faiz et al., 2024).

2. Data-Driven Decision-Making

Data-driven decision-making refers to the systematic incorporation of data and analytical information into managerial decisions. Szukits and Móricz (2024) describe DDDM across multiple stages of decision-making, including assessing current conditions, identifying problems, exploring and evaluating alternatives, selecting actions, planning implementation, communicating decisions, and monitoring implementation. In this qualitative study, these dimensions are treated as sensitizing concepts rather than quantitative indicators. The central concern is how and why MSME owners use, ignore, combine, or reinterpret POS-generated data when making business decisions. Studies of digital decision-support tools and accounting information systems likewise highlight the value of timely financial and operational information, although these technologies are not equivalent to POS systems (Santoso et al., 2026; Sandi et al., 2026).

3. Digital Literacy

Digital literacy concerns the capacity to access, understand, evaluate, and effectively use digital technology and information. In the MSME context, digital literacy may be reflected in an owner's ability to operate applications, understand digital reports, evaluate information usefulness, solve technology-related problems, and learn new digital functions. This study positions digital literacy as an enabling capability rather than a statistical moderator. It may explain why merchants using the same technology differ in their ability to convert transaction records into managerial insight and action. Digital literacy can therefore be treated as an enabling capability that shapes how business actors access and make use of digital information (Noor & Sriyono, 2024). Qualitative research on Indonesian entrepreneurs also suggests that financial and digital capabilities can support informed decisions, digital engagement, and resilience (Nuraisyiah et al., 2025).

4. MSME Business Resilience

In a literature-based examination of MSMEs in Malang during the COVID-19 pandemic, Rosalin and Rachman (2024) identified entrepreneurial characteristics, technology use, and government support as relevant elements of business resilience. More recently, Rosalin et al. (2026) examined the relationships among managerial capability, digital marketing capability, competitive advantage, and business resilience in Indonesian startups. These studies help situate resilience within both managerial and digital capability perspectives, although neither directly establishes the effects of QASIR-generated transaction data.

Business resilience refers to an enterprise's ability to anticipate, respond to, adapt to, and recover from disruptions while maintaining essential business functions. For MSMEs, resilience may be expressed through readiness, flexible operations, rapid problem-solving, adaptation to changing customer demand, use of external relationships, resource adjustment, and proactive responses. The qualitative perspective allows resilience to be examined as an organizational process

experienced by the organization rather than only as a measured outcome. Verreynne et al. (2023) identify seven strategic dimensions of SME organizational resilience: readiness, slack, problem-solving, flexibility, connectedness, adaptiveness, and proactiveness. Evidence from Indonesian SMEs associates digital transformation with operational resilience through organizational agility and dynamic capabilities (Rodiansjah et al., 2026).

5. Proposed Analytical Perspective

Recent research on SMEs suggests that digital transformation can contribute to resilience through technology-enabled practices, organizational adjustments, and business model innovation (Zhou, 2025). This supports examining adaptive mechanisms rather than assuming that POS adoption itself produces resilience. Longitudinal case evidence suggests that digital capabilities, including data-driven decisions, can facilitate crisis adaptation (Browder et al., 2023).

The study adopts a process perspective in which POS technology creates digital transaction information, but managerial value emerges only when managers interpret and incorporate that information into decisions. Digital literacy is expected to enable this transformation, while business resilience is explored through the adaptive actions and continuity practices described by participants. The preliminary analytical sequence proposed in this study illustrates how digital technology use may progressively contribute to MSME business resilience. The process begins with POS Technology Utilization, in which MSME owners and managers use POS systems to support routine business activities, such as recording sales, managing products and inventory, processing payments, and monitoring transactions. The continuous use of POS technology then creates the Availability of Transaction Data, providing merchants with structured information on sales performance, product movement, inventory conditions, and other operational activities. However, transaction data alone does not necessarily create managerial value. MSME owners and managers must interpret and transform such data through data-driven decision practices, identifying business conditions, recognizing problems, evaluating alternatives, and incorporating digital evidence into managerial decisions. These decision practices may then lead to Adaptive Business Actions, including adjustments in inventory levels, product offerings, promotional strategies, pricing, and operational processes in response to changing market and business conditions. Through these adaptive actions, MSMEs may strengthen their Business Resilience, reflected in their capacity to respond to disruptions, adapt to environmental changes, maintain business continuity, solve emerging problems, and recover from adverse conditions. Thus, the proposed sequence conceptualizes business resilience not as an automatic consequence of POS technology adoption, but as the outcome of a gradual process in which digital technology generates transaction data, managers transform that data into insights and decisions, and those decisions enable adaptive business actions. As this is a qualitative study, the sequence serves as a preliminary analytical framework rather than a predetermined causal model and will be refined according to the patterns and relationships emerging from the empirical interview data. This sequence is not treated as a causal model for statistical testing; it serves as an initial analytical lens that may be revised as themes emerge from the data.

C. METHOD

This study employs a descriptive qualitative research design to gain an in-depth understanding of MSME owners' and managers' experiences using POS technology and transaction data. A qualitative approach is appropriate because the study seeks to understand practices, experiences, meanings, and processes rather than statistically test causal relationships. The study focuses on four interrelated analytical domains: POS technology utilization, data-driven decision-making, digital literacy, and MSME business resilience. This design is appropriate when the objective is to understand participants' experiences, meanings, and practices rather than estimate statistical effects.

The research will involve MSME owners and managers in Indonesia who use the QASIR POS platform. Participants will be selected using purposive sampling. Eligible participants should: (1) be an owner or manager directly involved in business decision-making; (2) have used QASIR for at least six months; (3) use QASIR in regular business operations; and (4) be willing to participate in an in-depth interview. The initial target is approximately 15-25 participants, with the final number determined by information sufficiency and thematic saturation. Variation in business sector, business age, size, and duration of QASIR use will be sought to capture diverse experiences.

The primary data collection method will be semi-structured in-depth interviews. This approach provides a consistent thematic framework while allowing the researcher to probe unexpected experiences and meanings. Interviews may be conducted face-to-face during field visits or online when necessary. With participants' informed consent, the researcher will audio-record and transcribe interviews. Supporting evidence may include researcher observations and relevant business documents or screenshots voluntarily demonstrated by participants, particularly when these materials help explain how POS information is used in business management. The reporting of interview procedures will be guided by the Consolidated Criteria for Reporting Qualitative Research (COREQ) (Tong et al., 2007).

The data will be analyzed using thematic analysis. The process will include familiarization with interview transcripts, initial coding, grouping related codes into categories, developing candidate themes, reviewing and refining themes, defining themes, and interpreting their relationships. Four deductive domains will provide an initial coding orientation: (1) POS Technology Utilization; (2) From Transaction Data to Business Decisions; (3) Digital Literacy as an Enabling Capability; and (4) Building Business Resilience through Digital Practices. Coding will remain open to emergent themes, including possible issues such as trust in data, entrepreneurial intuition, employee capability, digital anxiety, platform dependency, or other patterns supported by participant accounts. The analysis will follow a reflexive thematic analysis orientation, emphasizing iterative engagement with the data and coherent theme development rather than mechanical coding alone (Braun & Clarke, 2021).

The study will address trustworthiness through credibility, dependability, confirmability, and transferability. Credibility will be strengthened through probing, cross-participant comparisons, and, where feasible, member checking of key interpretations. Dependability can be supported through an audit trail documenting

interview procedures, coding decisions, and theme development. Confirmability will be enhanced through researcher reflexivity and documentation of analytical decisions. Transferability will be supported by providing sufficiently detailed descriptions of participants, business contexts, and technology-use settings. The COREQ checklist may be used as a reporting guide for the interview-based qualitative study. The reporting of researcher reflexivity, sampling, data collection, analysis, and supporting quotations will also be aligned with COREQ where applicable (Tong et al., 2007).

D. RESULTS

1. Theme 1. From Digital Cash Register to Business Management Tool

The first theme explores how MSME owners and managers use QASIR in everyday business activities and how POS use extends beyond basic transaction recording. The study will focus on the features merchants use most often, such as sales recording, payment processing, inventory management, product management, transaction history, and business reporting. The analysis will identify patterns of POS utilization and determine whether QASIR is perceived as a digital substitute for a conventional cash register or as a broader business management tool. An important aspect of this theme is the potential variation in how deeply MSMEs use technology. Some merchants may use QASIR primarily to facilitate transactions and maintain sales records, while others may actively use reports, dashboards, inventory information, or historical transaction data to monitor business performance. Such variation may indicate different levels of digital technology integration into managerial routines. The analysis will therefore examine how the role of POS technology evolves within MSMEs, including whether continued use encourages merchants to recognize the value of digital records beyond their administrative function. This theme may initially explain how operational technology gradually becomes a source of managerial information and a foundation for more data-oriented business practices.

2. Theme 2. Turning Transaction Records into Business Insights

The second theme will investigate how merchants transform transaction records into meaningful business information. The availability of digital data alone does not necessarily mean MSME owners can interpret or use it effectively. Therefore, this theme will focus on how participants read, interpret, and assign managerial meaning to information generated through QASIR. The analysis may explore how sales records are used to identify high- and low-performing products, recognize changes in sales patterns, monitor inventory movement, evaluate promotional activities, or determine purchasing requirements. Attention will also be given to whether merchants periodically review their transaction information or only access such information when a specific problem arises. More importantly, this theme will examine the transition from data availability to actionable business insight. Transaction data become strategically meaningful only when merchants can connect numerical information to specific business conditions and translate that interpretation into managerial action. This process may include identifying declining sales, anticipating inventory shortages, evaluating product performance, or

recognizing changing customer demand. Accordingly, the theme explains how POS-generated information moves through a potential data sequence. Data represent the transaction records generated through POS activities, such as sales volume, product performance, inventory movement, and transaction patterns. These data become meaningful through interpretation, in which MSME owners and managers examine patterns, compare performance, identify changes, and relate the information to their specific business context. This interpretive process produces insights, referring to a clearer understanding of business conditions, emerging problems, potential opportunities, and areas requiring managerial attention. These insights then support decision-making, enabling business owners to choose appropriate actions on inventory, products, pricing, promotions, resource allocation, or operational adjustments. Therefore, the sequence shows that the value of POS-generated data does not come from data availability alone, but from MSME owners' and managers' ability to interpret digital information, derive actionable insights, and translate those insights into informed business decisions. The findings may reveal that the strategic value of POS technology lies not simply in its capacity to record transactions but in MSME owners' ability to derive relevant knowledge from those records.

3. **Theme 3. Balancing Data and Entrepreneurial Intuition**

The third theme will examine the relationship between digital evidence and entrepreneurial intuition in MSME decision-making. Although data-driven decision-making emphasizes systematic data use, MSME owners may not rely solely on quantitative information when making business decisions. They may also incorporate personal experience, customer knowledge, market observations, intuition, and contextual understanding developed through years of managing the business. This theme will therefore explore whether participating MSMEs are genuinely data-driven or whether their managerial practices are better described as data-informed. A data-informed approach recognizes the importance of digital evidence while keeping managerial experience and contextual knowledge central to decision-making. Particular attention will be given to situations in which transaction data support the merchant's intuition as well as circumstances in which data contradict previous assumptions. For example, an owner may believe a particular product is popular because customers frequently ask about it, while transaction records show another product generates higher sales. How merchants respond to such discrepancies may reveal how much digital evidence influences managerial judgment. This theme may be important for understanding MSME decision-making because adopting POS technology may not eliminate entrepreneurial intuition. Instead, digital data may complement, validate, challenge, or refine intuitive judgments. The emerging pattern may therefore show a hybrid decision-making process in which data and entrepreneurial experience work together rather than compete as sources of knowledge.

4. **Theme 4. Digital Literacy as the Bridge between Technology and Decisions**

The fourth theme will focus on digital literacy as a capability that may explain differences in how merchants benefit from the same POS technology. Access to QASIR does not necessarily lead to the same level of utilization among MSMEs.

Differences may arise from merchants' ability to navigate digital features, understand reports, interpret numerical information, evaluate the relevance of available data, and translate digital information into practical business actions. Digital literacy will therefore be examined not merely as technical proficiency in operating an application but as a broader managerial capability. A digitally literate merchant may be more willing to explore different QASIR features, interpret reports, troubleshoot basic technological problems, and incorporate digital information into routine business management. The interviews may also reveal how such literacy develops. Merchants may acquire digital capabilities through self-learning, experimentation, tutorials, employee support, assistance from platform providers, or peer learning from other business owners. Conversely, limited confidence in using digital technologies or difficulty understanding business reports may restrict merchants to basic transactional functions. From this perspective, digital literacy can be conceptualized as a bridge between technology availability and managerial utilization. POS technology generates information, but digital literacy may enable merchants to recognize, understand, and transform that information into managerial action. This theme may consequently explain why similar access to technology can generate different levels of business value across MSMEs.

5. **Theme 5. Data-Enabled Adaptation and Business Resilience**

The fifth theme will examine how POS-generated information and data-informed decisions contribute to MSMEs' capacity to adapt to changing business conditions. This study will examine business resilience through participants' experiences of responding to market changes, operational difficulties, declining sales, inventory problems, changing customer preferences, competitive pressures, and other disruptions. The analysis will seek to identify specific examples in which digital information supports adaptive action. For instance, sales data may encourage a merchant to reduce inventory of poorly performing products, increase stock of products with growing demand, adjust promotional strategies, modify product offerings, or reorganize operations. Such actions show how information can enable faster, evidence-informed responses to business challenges. This theme will also examine whether digital information improves merchants' ability to recognize changes before they become more significant problems. If transaction information lets MSMEs identify declining performance or shifting customer behavior earlier, POS technology may support not only reactive problem-solving but also proactive adaptation. The analytical focus will therefore move beyond whether POS technology directly produces resilience. Instead, the study will explore how technology generates data, how data support decisions, how decisions facilitate adaptation, and how adaptation contributes to business resilience. This process-oriented explanation may be one of the study's central theoretical contributions.

6. **Theme 6. Barriers to Becoming a Data-Driven MSME**

The final theme examines the barriers that prevent MSMEs from fully turning digital transaction data into managerial knowledge and action. Although POS technology can provide extensive information, merchants may face organizational, individual, technological, and resource constraints that limit its strategic use.

Potential barriers may include limited time to review reports, difficulty interpreting business information, inadequate digital literacy, employee capability gaps, inconsistent data entry, concerns regarding data accuracy, limited awareness of available features, established habits of relying on manual records, or perceptions that sophisticated analysis is unnecessary for small businesses. Platform-related factors may also emerge, including usability issues or limitations in how information is presented. However, these barriers should not be treated as predetermined findings. They should only be reported when supported by interview evidence. The qualitative analysis should remain open to unexpected barriers that emerge from participants' experiences, including factors not anticipated in the initial conceptual framework. This theme will also examine how merchants attempt to overcome these challenges. Strategies may include learning through trial and error, asking employees for assistance, consulting platform support, participating in training, combining POS information with manual records, or selectively using only the features perceived as most relevant to their businesses.

This study's findings offer a process-oriented understanding of how POS technology may contribute to MSME digital transformation and business resilience. Rather than conceptualizing digitalization as a direct relationship between technology adoption and organizational outcomes, the findings indicate that the strategic value of POS technology emerges through a progressive transformation of technological resources into managerial capabilities. This perspective suggests that the strategic value of digital technology does not necessarily emerge from technology adoption itself, but from the processes and capabilities through which MSME owners and managers transform technological resources into meaningful managerial practices. This interpretation extends Faiz, Le, and Masli's (2024) perspective, which emphasizes the importance of digital technology adoption in strengthening SMEs' innovative and competitive capacity. The present study suggests that adoption is only the initial stage of digital transformation, whereas value realization depends on how deeply digital technology is embedded in managerial routines and used as an information resource. In the context of QASIR, POS technology may initially serve transactional functions, including sales recording, payment processing, inventory management, and transaction documentation. However, as MSME owners increasingly use reporting, sales monitoring, inventory information, and other analytical features, POS technology can evolve from an operational instrument into a managerial resource. This distinction matters theoretically because access to a digital platform does not necessarily mean MSMEs derive equivalent strategic value from using it. Research on Indonesian MSMEs suggests that digital readiness creates value through innovation and ecosystem adaptation rather than through adoption alone (Sitorus et al., 2025).

The proposed interpretation also complements Rosalin and Rachman (2024), who discuss technology utilization and entrepreneurial characteristics in MSME resilience, and Rosalin et al. (2026), who investigate managerial and digital marketing capabilities in relation to startup resilience. The present study differs by exploring the intermediate processes through which POS transaction records may become managerial insights and adaptive actions.

The process begins with POS Technology Utilization, which reflects how MSME owners and managers integrate QASIR into their daily business activities. At its most basic level, the POS system may function primarily as a digital transaction-recording tool, replacing conventional cash registers or manual bookkeeping. Merchants may use the system to record sales, process payments, manage product information, monitor inventory, and maintain transaction histories. However, the proposed analysis expects that the role of POS technology may differ considerably across MSMEs. While some merchants may restrict its use to transaction processing, others may gradually incorporate reporting, inventory monitoring, sales analysis, and other information-related features into their managerial routines. This variation matters because it shows that technology adoption and utilization are not necessarily equivalent. This finding aligns with Szukits and Móricz (2024), who argue that data-driven decision-making depends not only on data availability but also on organizational practices and capabilities that enable organizations to incorporate data into decision processes.

The strategic relevance of POS technology may depend on how deeply the technology becomes embedded in business management practices. Ongoing POS use then generates transaction data. Routine digital transactions create structured records concerning sales volume, product performance, inventory movement, payment activities, transaction frequency, and potentially other operational indicators. Compared with informal records or reliance on memory, digitally generated transaction data can provide MSME owners with more systematic visibility into business activities. Nevertheless, the existence of transaction data should not automatically be interpreted as evidence of data-driven management. Data may remain underutilized when merchants do not regularly access reports, do not understand the information presented, or do not perceive such information as relevant to their managerial decisions. Thus, data availability represents an important resource, but not necessarily a business capability in itself. Evidence from Vietnamese manufacturing SMEs also links technology-enabled decision-making and organizational capabilities to supply-chain resilience, although these findings concern AI rather than POS technology (Roux et al., 2023; Dey et al., 2023).

At the data stage, merchants have access to raw or summarized information generated through POS activities. During interpretation, MSME owners and managers try to understand what these records mean by identifying patterns, comparing current and past performance, spotting unusual changes, and linking numbers to real business conditions. Interpretation can reveal insights such as declining demand for a particular product, stronger sales periods, potential inventory shortages, the effectiveness of promotions, or products that contribute disproportionately to revenue. These insights can inform decisions on how much inventory to purchase, which products to prioritize or discontinue, when to run promotions, whether prices need adjustment, and how to allocate available resources. Importantly, this process may reveal that MSME decision-making is not necessarily purely data-driven. Instead, participants may demonstrate a data-informed approach that combines digital evidence with entrepreneurial experience, intuition, customer knowledge, and contextual understanding. MSME owners often possess tacit knowledge developed through direct customer interactions and long-

term market experience. Consequently, POS-generated information may confirm, challenge, or refine existing managerial judgments rather than replace them entirely. For example, transaction data may confirm an owner's perception that a particular product is becoming more popular, while in other circumstances the data may contradict assumptions based on anecdotal customer interactions. The interaction between digital evidence and entrepreneurial intuition therefore plays an important role in transforming transaction records into managerial knowledge. This interpretation aligns with the organizational resilience framework developed by Verreynne, Ford, and Steen (2023), which emphasizes readiness for change, problem-solving capacity, flexibility, adaptability, connectedness, and proactiveness as key characteristics of resilient SMEs.

The resulting decisions may subsequently be translated into Adaptive Business Actions. This stage moves from understanding business conditions to implementing concrete responses. Based on insights from POS-generated information, MSME owners may adjust inventory levels, modify product assortments, change pricing strategies, redesign promotional activities, alter purchasing schedules, reallocate resources, or reorganize operational processes. Adaptive action therefore links data use to business outcomes. Even accurate information and high-quality managerial insights may generate limited business value if they are not translated into timely and appropriate action. These adaptive actions matter especially when MSMEs face changes in customer demand, competitive pressures, supply disruptions, declining sales, inventory problems, or broader market uncertainty. Timely access to transaction information may help business owners identify emerging changes earlier and respond before problems worsen. In this context, POS technology's strategic contribution may extend beyond operational efficiency by supporting MSMEs' ability to recognize changes, evaluate possible responses, and adjust their activities accordingly. Through repeated cycles of monitoring, interpretation, decision-making, and adaptation, MSMEs may strengthen their Business Resilience. In this framework, resilience refers not simply to surviving a crisis but to the broader capacity to anticipate changes, respond to disruptions, maintain essential business activities, solve emerging problems, adapt to changing market conditions, and recover after adverse events. The proposed framework therefore conceptualizes resilience as the cumulative outcome of ongoing adaptive practices rather than as a direct consequence of adopting digital technology. POS technology may contribute to resilience when the information it generates enables MSME owners to make more informed and timely adjustments to their businesses.

Across these stages, Digital Literacy is expected to operate as an enabling capability rather than as an isolated technological skill. Digital literacy may influence whether MSME owners can effectively navigate POS features, locate relevant information, understand reports, evaluate the credibility and usefulness of digital information, identify meaningful patterns, and translate those patterns into business decisions. Two MSMEs may access the same POS platform and similar transaction information but derive substantially different managerial value from it because they differ in their ability to understand and use digital information. Digital literacy may therefore help explain the shift from simple technology use to more sophisticated,

data-informed management. At the same time, several barriers may constrain the transformation process toward becoming a data-driven MSME. These barriers may occur at individual, organizational, data, and technological levels. At the individual level, merchants may have limited digital skills, struggle to interpret reports, or prefer established, intuition-based decision practices. Organizational constraints may include limited time, insufficient employee capability, competing operational priorities, and resource limitations. Data-related barriers may include incomplete records, inconsistent data entry, or concerns about data quality. Technology-related barriers may include platform usability issues, limited awareness of available features, or difficulty translating dashboard information into actionable recommendations. These barriers can interrupt the transformation process at different stages, so technology use does not always lead to meaningful managerial outcomes.

This process-oriented perspective offers a more nuanced understanding of MSME digital transformation by shifting attention from whether MSMEs adopt digital technology to how they transform it into managerial and adaptive capability. In this sense, POS adoption marks the beginning, not the end, of digital transformation. The technology's potential strategic value emerges through a chain of activities involving data generation, interpretation, knowledge creation, managerial decision-making, and adaptive action. Business resilience can therefore be understood as an outcome that may develop when MSMEs successfully convert digital resources into sustained managerial practices and adaptive capabilities. Nevertheless, because the present study adopts a qualitative approach, treat this framework as a preliminary analytical interpretation rather than a predetermined causal model. Refine the final process configuration, including possible additional mechanisms, barriers, feedback loops, or alternative pathways, based on patterns emerging from the empirical interview data. Within this process, digital literacy serves as an enabling capability, while entrepreneurial intuition and contextual knowledge complement digital evidence in managerial decision-making. However, the final configuration of these relationships should emerge from the empirical data rather than be imposed on participants' experiences. Related research indicates that change management and dynamic capabilities can strengthen MSME organizational agility (Munandar, 2025).

E. CONCLUSION

The findings provide a process-oriented understanding of how POS technology may contribute to MSME business resilience. POS technology initially supports operational activities such as transaction recording, payment processing, inventory management, and sales monitoring, while its continuous use generates transaction data that can serve as an important informational resource. However, data availability alone does not automatically create managerial value. The findings therefore indicate that POS adoption should be seen as the beginning, not the end, of MSME digital transformation, as the strategic value of technology ultimately depends on business owners' ability to convert digital information into meaningful managerial practices.

The findings further suggest that MSME decision-making is better characterized as data-informed rather than purely data-driven, because digital evidence does not necessarily replace entrepreneurial intuition, experience, customer knowledge, and contextual understanding. Instead, POS-generated information may complement these existing forms of managerial knowledge by confirming assumptions, identifying previously unnoticed patterns, or challenging intuitive judgments. This interaction between digital information and entrepreneurial knowledge becomes particularly important when decisions must translate into adaptive business actions, such as adjusting inventory levels, modifying product offerings, revising pricing and promotional strategies, or reorganizing operations in response to changing market conditions. In this process, Digital Literacy enables MSME owners to navigate POS features, understand reports, interpret transaction patterns, evaluate relevant information, and convert digital insights into managerial action. Differences in digital literacy may therefore explain why MSMEs using the same POS platform can derive different levels of strategic value from the technology. At the same time, limitations in digital skills, time, employee capabilities, data quality, established managerial habits, and platform functionality may interrupt this process, indicating that MSMEs can occupy different levels of digital maturity despite having access to similar technologies.

From a broader theoretical perspective, these findings suggest that MSME business resilience emerges through repeated cycles of information utilization, managerial learning, decision-making, and adaptation rather than directly from technology adoption. POS-generated data may enable business owners to recognize changes in sales, inventory, customer demand, and operational performance; interpretation transforms these signals into business insights; and informed decisions facilitate adaptive responses to emerging challenges and opportunities. These actions then generate new transaction data, creating a potential feedback loop through which MSMEs can monitor the effectiveness of previous decisions and continuously refine their strategies. This perspective conceptualizes digital transformation as an iterative learning process in which technology, data, digital literacy, entrepreneurial judgment, and adaptive capability interact to strengthen business resilience. Consequently, the study's main contribution shifts attention from digital technology adoption to digital resource conversion, showing that the strategic value of POS technology emerges when MSMEs can transform transaction data into knowledge, knowledge into decisions, and decisions into adaptive actions. In this sense, business resilience reflects the cumulative outcome of an ongoing process that integrates digital resources with human capabilities and entrepreneurial knowledge to support continuous adaptation and business continuity.

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