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Technology Adoption and Retail Innovation Among Malaysian SMEs: A Qualitative Exploration of Digital Transformation

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ABSTRACT

The increasing dominance of large retail chains poses significant challenges for small retailers, particularly in semi-urban areas such as Jempol, Negeri Sembilan. This study explores how small retail businesses leverage technology to remain competitive against larger retail players. Adopting a qualitative research design, semi-structured interviews were conducted with owners and employees of selected small retail stores in Jempol. The data were analysed using thematic analysis to identify recurring patterns related to technology adoption and competitive strategies. The findings reveal that digital marketing, online sales platforms, and basic data analytics play a crucial role in enhancing operational efficiency, expanding market reach, and strengthening customer relationships. Despite resource constraints and limited technological expertise, small retailers demonstrate adaptability by selectively adopting affordable and accessible technologies. The study highlights the importance of strategic technology utilisation, customer-centric approaches, and continuous innovation in sustaining competitiveness. This research contributes to the limited empirical literature on technological adoption among small retailers in small-town contexts. It provides practical insights for policymakers and practitioners seeking to support the digital transformation of small businesses.

Keywords: *Digital Marketing, Data Analytics, Consumer, Technologies, Increasing Market, Innovation, Agility, Small Shops, Jempol, Interview*

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INTRODUCTION

The retail industry in Jempol is experiencing significant transformation due to rapid technological advancement and changing consumer behavior. As a district characterized by cultural diversity and growing economic activity, Jempol provides an important context for examining the competitiveness of small retailers in the digital era. The expansion of e-commerce platforms, omnichannel retailing, artificial intelligence (AI), cloud computing, and data analytics has reshaped the retail landscape globally and locally (Sakrabani & Teoh, 2021). These technological developments have enabled retailers to improve operational efficiency, customer engagement, and market reach. However, while large retail corporations possess sufficient financial resources and technological expertise to implement digital strategies effectively, many small retailers continue to struggle with technology adoption and digital readiness (Haider & Maulan, 2025).

The increasing reliance on digital commerce has intensified competition within the retail sector. Consumers today demand convenience, personalized services, seamless online-offline shopping experiences, and faster transactions. Consequently, retailers are compelled to adopt advanced technologies to remain relevant and competitive (Febriani et al., 2025). Studies have shown that technology adoption among small and medium enterprises (SMEs) positively influences business growth, innovation capability, customer satisfaction, and long-term sustainability (Yusof, 2025). In Malaysia, digital transformation initiatives and the growth of e-commerce ecosystems have encouraged SMEs to integrate digital tools into their operations, although adoption rates remain uneven, particularly among rural and small-town retailers (Tajudeen et al., 2025).

Small retailers in Jempol face several challenges in competing with larger retail chains. These challenges include limited financial capital, inadequate technological infrastructure, lack of digital skills, and difficulties in managing omnichannel retail systems (Loo et al., 2025). Furthermore, larger retailers benefit from economies of scale, stronger brand recognition, integrated supply chains, and sophisticated data-driven marketing strategies. Such advantages create a competitive imbalance that threatens the sustainability of small local retailers. Previous studies indicate that inadequate digital readiness may reduce SMEs' ability to adapt to changing market conditions and consumer expectations (Haider & Maulan, 2025). Therefore, technological adoption is no longer optional but has become a strategic necessity for survival and competitiveness.

This study aims to investigate how technology can help small retailers in Jempol remain competitive with larger retailers. Specifically, the study examines the current level of technology adoption among small retailers, identifies the challenges encountered during digital transformation, and explores how emerging technologies such as AI, cloud computing, e-commerce systems, and data analytics can improve retail performance. Technologies such as AI-driven customer service, digital payment systems, and cloud-based inventory management have been recognized as effective tools for improving operational efficiency and customer experience among SMEs (Gupta, 2025). Additionally, omnichannel retail strategies have been found to strengthen customer loyalty and business resilience by integrating physical and digital retail channels (Asif, 2025).

The main problem addressed in this research is the inability of many small retailers to fully utilize technological innovations to compete effectively with larger retail organizations. Despite the availability of digital tools and government support programs, barriers such as implementation cost, technological complexity, and lack of technical knowledge continue to hinder adoption among small businesses (Kozikojoukian, 2021). This study, therefore, seeks to provide practical recommendations to help small retailers overcome these barriers and achieve sustainable competitiveness in the evolving retail environment.

Ultimately, this research contributes to understanding digital transformation in small-town retail by focusing on the context of Jempol. The findings are expected to provide valuable insights for retailers, policymakers, and business support agencies on strategies to strengthen SME competitiveness through technology adoption. By embracing digital innovation, small retailers may enhance operational performance, improve customer relationships, and secure long-term sustainability in an increasingly competitive marketplace.

LITERATURE REVIEW

Triple Bottom Line (TBL)

The Triple Bottom Line (TBL) framework, introduced by Elkington (1997), is a widely recognised concept in sustainability and business studies. The framework emphasises that organisational performance should be evaluated not only in terms of economic outcomes (profit) but also in terms of social (people) and environmental (planet) dimensions. By integrating these three dimensions, the TBL framework promotes a more holistic understanding of business sustainability beyond short-term financial performance.

Subsequent studies have expanded and refined the application of the TBL framework across various industries. Tseng et al. (2020), in their comprehensive literature review, highlight the growing relevance of TBL in addressing sustainability challenges, particularly following major environmental and economic crises. Their review also identifies gaps in existing research, especially concerning the integration of social and technological dimensions within the TBL framework. This suggests that while TBL has been widely adopted, its application in operational and technological contexts remains underdeveloped.

Importantly, Tseng et al. (2020) emphasise the need to bridge the gap between theoretical discussions of TBL and practical business implementation. This includes exploring how technological innovation can support sustainable practices and improve business performance across economic and social dimensions. In the context of retail businesses, technology adoption can be viewed as a mechanism that supports economic sustainability through efficiency gains and enhances social value through improved customer engagement and community interaction.

In this study, the TBL framework provides a useful theoretical lens to examine how small retailers leverage technology to balance competitiveness and sustainability. By focusing primarily on the economic and social dimensions of TBL, the framework helps explain how technology adoption contributes to business survival and competitiveness in small-town retail environments.

The Role of Sustaining the Business Competition with Larger Retailers in Small Towns

Small retailers operating in small towns such as Jempol often face intense competition from larger retail chains with superior financial resources, economies of scale, and established brand recognition. To remain competitive, small businesses must strategically utilise their unique strengths, including close customer relationships, local market knowledge, and operational flexibility.

The literature highlights the critical role of technology in enhancing the competitive capacity of small retailers. Digital tools such as e-commerce platforms, social media marketing, and customer communication applications enable small businesses to extend their market reach and strengthen customer engagement. Community participation, in particular, has been identified as a key differentiating factor for small retailers, as it fosters customer loyalty and long-term relationships within local markets (Sleitere, 2023).

E-commerce further enhances competitiveness by offering convenience and access to customer data, allowing small retailers to tailor their offerings and marketing strategies more effectively (Breadstack, 2023). Through personalised interactions and targeted promotions, small retailers can improve customer satisfaction and retention, which are essential for sustaining competitiveness against larger retailers.

Another important strategy is niche market positioning. By focusing on specialised products or services for specific customer segments, small retailers can differentiate themselves in crowded retail markets (Hoang, 2022). This differentiation reduces direct competition with large retailers and strengthens brand identity within targeted segments.

Overall, the literature suggests that technology-enabled customer engagement, community-based strategies, and niche positioning are critical mechanisms through which small retailers can sustain competitiveness in small-town retail environments.

The Challenges in Sustaining the Business Competition with Larger Retailers

Despite the potential benefits of adopting technology, small retailers face significant challenges in competing with larger retailers. Resource disparities remain a major constraint, particularly in terms of financial capital, technological expertise, and operational capacity. Larger retailers benefit from strong brand recognition and consumer trust, making it difficult for small businesses to attract and retain customers in competitive markets.

Previous studies indicate that small and medium-sized businesses (SMBs) encounter multiple barriers to technology adoption, including limited financial resources, lack of skilled personnel, and difficulties integrating new technologies into existing operations (Evans, 2023). These challenges are particularly pronounced in small-town contexts, where access to training and technical support may be limited.

Nevertheless, digital technology has emerged as a significant enabler for SMBs, offering cost-effective solutions to overcome some of these limitations. Technologies such as e-commerce platforms and digital marketing tools allow small retailers to reach broader markets and compete more effectively with larger firms (Wham, 2023). The adoption of omnichannel strategies has further enabled SMBs to enhance operational efficiency and customer reach without substantial capital investment.

The literature suggests that strategic and selective adoption of technology is key to overcoming resource constraints and sustaining competitiveness. Rather than replicating the advanced technological systems of large retailers, small businesses benefit from adopting technologies that align with their operational capabilities and immediate business needs. This approach not only addresses short-term competitive challenges but also supports long-term business sustainability in the retail sector.

METHODOLOGY

This study employed a qualitative research approach to investigate how small retailers in Jempol utilise technology to compete with larger retail chains. A qualitative design was considered appropriate because the study aimed to explore participants' experiences, perceptions, and business strategies in depth within their real-life context (Creswell & Creswell, 2018). Qualitative methods are widely used in retail and SME research to understand behavioural patterns, decision-making processes, and technology adoption practices among small business operators (Lincoln & Guba, 1985).

The study was conducted in Jempol, Negeri Sembilan, focusing on small retail businesses operating in a competitive local market. Participants were selected through purposive sampling, as this approach enables researchers to identify individuals with relevant knowledge and direct experience related to the research objectives (Patton, 2015). Two representatives from small retail businesses participated in the study because they were actively involved in daily retail operations and had experience using technology in their businesses.

Data collection was conducted via semi-structured interviews conducted via Google Meet. Semi-structured interviews were chosen because they provide flexibility for participants to elaborate on their experiences while allowing the researcher to maintain consistency across interviews (Saunders et al., 2019). Each interview lasted approximately 30 to 45 minutes. The interview questions focused on four key areas: (1) types of technology used in business operations, (2) perceived benefits of technology in improving competitiveness, (3) challenges encountered during technology adoption, and (4) future digital transformation plans.

With participants' consent, all interviews were audio-recorded and transcribed verbatim to ensure data accuracy and completeness. The collected data were analysed using thematic analysis following the framework proposed by Braun and Clarke (2006). The analysis process involved several stages, including data familiarisation, initial coding, theme identification, theme refinement, and interpretation of findings. This systematic approach enabled the researcher to identify recurring patterns and meaningful themes related to technology adoption and retail competitiveness.

To ensure trustworthiness and research quality, several qualitative validation procedures were applied. Credibility was enhanced through consistent interview protocols and careful transcript verification. Dependability was supported through systematic documentation of the data collection and analysis process. Confirmability was

maintained by ensuring that interpretations were grounded in participants' responses rather than the researcher's assumptions. Although the sample size was limited, the study provides rich contextual insights into the experiences of small retailers operating in small-town retail environments.

FINDINGS AND DISCUSSION

Overview of Data Collection and Analysis

This study adopted a qualitative research approach to examine how small retailers in Jempol leverage technology to remain competitive against larger retail chains. Data were collected through semi-structured interviews with employees from two small retail businesses—Nen Mart and Moon Trading—located in Jempol, Negeri Sembilan. Participants were selected using maximum variation sampling to capture diverse operational perspectives and experiences related to technology use in small retail contexts.

All interviews were conducted online via Google Meet to ensure accessibility and flexibility. Each interview lasted approximately 30–45 minutes and was audio-recorded with participants' consent. The recordings were transcribed verbatim and analysed using thematic analysis. The analytical process involved data familiarisation, initial coding, categorisation, and theme development. This systematic approach enabled the identification of recurring patterns and meaningful insights related to technology adoption, operational efficiency, and adaptive strategies among small retailers.

Key Empirical Findings

The thematic analysis revealed three key themes explaining how small retailers in Jempol utilise technology to remain competitive in a retail environment dominated by larger players.

Adoption of Digital and Online Technologies

The findings indicate that small retailers actively adopt basic digital and online technologies such as social media platforms, online messaging applications, and simple e-commerce channels. These technologies are primarily used for product promotion, customer communication, and maintaining market visibility.

Participants emphasised the importance of social media platforms, particularly Facebook and WhatsApp, in engaging customers and supporting daily business operations. One participant explained:

"Nowadays, if we do not update on Facebook or WhatsApp, customers think our shop is not active. Posting online helps us stay connected with them." (Participant 1)

Another participant highlighted the role of online platforms in extending market reach beyond the physical store:

"We only have one shop here in Jempol, but online we can reach customers from other areas. It helps us compete even though we are small." (Participant 2)

These findings suggest that digital and online technologies function as cost-effective tools that enable small retailers to enhance visibility and customer engagement without requiring the extensive resources typically available to larger retail chains.

Technology for Operational Efficiency

Beyond marketing and communication, technology was found to play an important role in improving operational efficiency. Participants reported using basic digital tools for inventory recording, sales tracking, and digital payment systems. These tools helped streamline daily operations, reduce manual workload, and minimise errors.

One participant noted the operational benefits of adopting simple digital tools:

"Before this, we wrote everything manually. Now with simple apps and online banking, it is faster and easier to track sales." (Participant 1)

Another participant explained how technology contributed to smoother daily operations:

"Using digital payment and stock records helps us avoid mistakes. It saves time, especially during busy hours." (Participant 2)

Although advanced technologies such as artificial intelligence or fully automated systems were not widely adopted, participants perceived basic digital solutions as sufficient to meet their operational needs. This selective approach reflects a practical response to financial and technical constraints while still achieving meaningful efficiency gains.

Challenges and Adaptive Strategies

Despite recognising the benefits of technology, participants identified several challenges associated with technology adoption. These challenges include limited digital skills, financial constraints, and a lack of access to technical support or formal training.

One participant expressed concerns regarding digital competency:

"Sometimes we want to try new systems, but we are not confident because we do not really understand how to use them." (Participant 1)

Financial limitations were also highlighted as a significant barrier:

"Some systems are too expensive for small shops like us. We need to think carefully before spending money on technology." (Participant 2)

To address these challenges, small retailers adopted adaptive strategies such as self-learning, gradual technology adoption, and reliance on free or low-cost digital applications. These strategies enabled them to continue improving their operations without placing excessive strain on limited resources.

Discussion of Findings

The findings of this study demonstrate that technology plays a significant role in strengthening the competitiveness of small retailers in Jempol. The results are consistent with previous studies, which argue that technology adoption among small and medium-sized enterprises (SMEs) improves operational performance, customer engagement, and business sustainability (Sakrabani & Teoh, 2021; Yusof, 2025). Although most small retailers in Jempol lack advanced technological infrastructure comparable to larger retail chains, the study found that even adopting basic digital tools can positively impact business performance when implemented in line with operational needs and customer expectations.

One of the key findings relates to the growing importance of digital marketing and online customer engagement. Small retailers increasingly utilise social media platforms such as Facebook, WhatsApp, Instagram, and TikTok to communicate directly with customers, promote products, and maintain customer loyalty. This supports earlier research, which found that digital communication platforms enable SMEs to establish closer and more personalised relationships with consumers despite limited financial resources (Febriani et al., 2025). Through these platforms, small retailers can improve customer interactions, respond quickly to inquiries, and promote products at relatively low cost. As a result, technology helps reduce some of the competitive disadvantages that smaller businesses traditionally face when competing against larger retailers with stronger brand recognition and broader marketing capabilities.

In addition, the findings reveal that technology adoption among small retailers is largely practical and incremental rather than highly sophisticated. Most retailers prioritise affordable, easy-to-use technologies that deliver immediate operational benefits, such as digital payment systems, inventory management applications, online

ordering platforms, and cloud-based communication tools. This finding aligns with the argument by Loo et al. (2025) that SMEs typically adopt technology based on cost efficiency, ease of implementation, and direct business relevance. Rather than pursuing complex technological transformations, small retailers focus on solutions that improve efficiency, reduce operational burdens, and support day-to-day business activities.

The study also found that operational efficiency is an important motivation for technology adoption. Retailers reported that digital systems assist with inventory tracking, transaction management, customer record-keeping, and communication with suppliers. Previous studies have similarly noted that digital technologies, such as cloud computing and AI-supported systems, can streamline business operations and improve decision-making among SMEs (Gupta, 2025). However, the findings suggest that most small retailers in Jempol are still in the early stages of digital transformation and have yet to fully utilise advanced technologies such as predictive analytics, artificial intelligence, and integrated omnichannel systems.

Despite the positive contribution of technology, several challenges continue to limit its adoption among small retailers. Financial constraints, lack of technical expertise, inadequate training, and limited awareness of available digital solutions remain major barriers. This finding is consistent with research by Haider and Maulan (2025), who identified digital readiness and technological capability as significant determinants of SME competitiveness in Malaysia. Furthermore, some retailers expressed concerns about implementation costs, cybersecurity risks, and the difficulty of adapting to rapidly changing technological trends. These barriers indicate that successful technology adoption requires not only access to digital tools but also continuous support, training, and strategic guidance.

Overall, the findings suggest that technology functions as a strategic enabler rather than a replacement for traditional retail practices. Technology enhances efficiency, supports customer engagement, and strengthens business adaptability, but the success of small retailers still depends heavily on personalised service, customer trust, and local community relationships. In highly competitive retail environments such as Jempol, combining traditional retail strengths with appropriate digital technologies may provide small retailers with a sustainable competitive advantage. Therefore, technology adoption should be viewed as a complementary strategy that enhances existing business practices while supporting long-term growth and resilience.

Trustworthiness and Validity

Several measures were undertaken to ensure the trustworthiness and validity of this qualitative study. In qualitative research, trustworthiness is essential to ensure that the findings accurately represent participants' experiences and perspectives (Lincoln & Guba, 1985). Accordingly, this study applied multiple strategies to enhance credibility, dependability, confirmability, and transferability throughout the research process.

Credibility was strengthened through consistent semi-structured interview protocols and careful verification of interview transcripts. Each interview was conducted using the same core questions to ensure consistency across participants while still allowing flexibility for detailed responses. In addition, transcript checking was performed to minimise recording errors and ensure the accuracy of the collected data. The researcher also engaged in prolonged interaction with participants to gain a deeper understanding of the retail environment and technological practices adopted by small retailers in Jempol.

Dependability was supported through systematic documentation of the data collection and analysis procedures. The research process, including interview scheduling, coding procedures, theme categorisation, and interpretation methods, was carefully recorded to ensure transparency and consistency. By maintaining a clear audit trail, the study enables future researchers to understand how the findings were developed and interpreted.

Confirmability was addressed by maintaining neutrality throughout the analysis and minimizing researcher bias. Coding decisions and thematic development were documented systematically, and interpretations were based directly on participant responses rather than personal assumptions. This approach ensures that the findings are grounded in the actual experiences and perspectives shared by the participants.

Transferability was enhanced by providing detailed contextual descriptions regarding the research setting, participant backgrounds, and analytical procedures. By providing sufficient context, readers can assess the relevance and applicability of the findings to other small retail environments with similar characteristics. Although

the study focuses specifically on Jempol, the challenges and opportunities identified may also be relevant to other rural or semi-urban retail communities facing increasing digital competition.

Through these measures, the study provides credible and reliable insights into how small retailers in Jempol utilise technology to compete with larger retail chains while adapting to ongoing digital transformation.

CONCLUSION

This study examined how small retailers in Jempol, Negeri Sembilan, leverage technology to remain competitive in a retail environment dominated by larger chains. The findings demonstrate that technology plays an important role in shaping the competitive practices of small retailers, particularly through digital marketing, online communication, and basic operational technologies. These tools enable small businesses to enhance customer engagement, improve operational efficiency, and extend market reach despite limited resources.

The study highlights that technology adoption among small retailers is largely incremental and strategic rather than technologically sophisticated. Small retailers prioritise affordable and accessible digital solutions that address immediate business needs, reflecting a pragmatic approach to digital transformation. In addition, collaboration, customer-centric strategies, and adaptive learning emerged as important factors that support competitiveness alongside the use of technology.

From a practical perspective, the findings suggest that small retailers can strengthen their competitive position by selectively adopting digital tools that align with their operational capabilities and customer expectations. Policymakers and business support agencies may also use these insights to design targeted training and support programmes that enhance digital skills among small retailers, particularly in semi-urban and rural contexts.

Overall, this study contributes to the limited empirical literature on technology adoption among small retailers in small-town settings. While the findings are context-specific, they provide a useful foundation for future research to explore technology-driven competitiveness across different retail environments and to examine how small businesses can sustain growth in an increasingly digital retail landscape.

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CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in the paper.

AUTHOR CONTRIBUTION STATEMENT

Author 1 contributed to the conceptualization, research design, and writing of the original draft.
Author 2 was responsible for data collection, analysis, and validation of the results.
Author 3 provided supervision, critical review, and editing of the final manuscript.
All authors have read and approved the final version of the manuscript.

ETHICS STATEMENT

This research was conducted in accordance with the ethical standards of Universiti Poly-Tech Malaysia and in accordance with the principles outlined in the Declaration of Helsinki. Ethical approval was obtained from the

Review Board under reference number EJ260. All participants were informed about the purpose of the study and provided written informed consent prior to participation. Participants' privacy and confidentiality were strictly maintained, and the data collected were used solely for academic purposes.

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