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Accepted for publication in Small Enterprise Research

Research Repository link: <https://repository.essex.ac.uk/43741/>

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<https://doi.org/10.1080/13215906.2026.2671917>

Evaluating the Rationale Underpinning Digital Technology Integration among Tourism Micro-Enterprises in a Developing Country: Business Owners' Perspectives

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Structured Abstract

This study aims to examine the rationale underpinning the integration of digital technology among tourism micro-enterprises, focusing on how business owners adopt technological tools to optimise operations, strengthen customer engagement, and ensure long-term sustainability. An exploratory qualitative approach was employed, involving in-depth interviews with 18 micro-entrepreneurs across various tourism sub-sectors in Malaysia. Thematic analysis was used to identify key patterns and insights regarding motivations and strategies for technology adoption. Five core themes emerged from the analysis: market expansion, operational efficiency, enhanced customer experience, skill development and knowledge sharing, and revenue growth. While initial technology adoption was often driven by necessity, it evolved into a deliberate strategic response to industry volatility, changing consumer behaviour, and the rapid transition to a digital service economy. Micro-entrepreneurs are increasingly leveraging digital platforms to broaden their market reach, streamline operations, foster trust, personalise customer experiences, and adapt to social media-driven trends in the post-pandemic tourism landscape. This study contributes to the tourism and entrepreneurship literature by positioning technology integration as a critical mechanism for building resilience and driving innovation within micro-enterprises. By challenging traditional views of digital adoption as merely functional, the findings highlight its transformative role in enhancing adaptability and competitiveness in a dynamic tourism ecosystem.

Keywords: micro-business, technology, digital transformation, tourism, MSME, Malaysia.

INTRODUCTION

Tourism plays a significant role in capacity building by encouraging micro-enterprises to evolve, expand, and respond to the diverse needs of tourist consumers. As a catalyst for sustainable and localised development, the tourism industry has the potential to support local artisans, small businesses, and communities (Ammeran & Latip, 2024; Trupp et al., 2023). Within this context, micro-enterprises are especially important, as they can contribute to culturally meaningful exchanges and foster deeper connections between travellers and host destinations (Khan et al., 2021; Sio et al., 2024). Nonetheless, the COVID-19 pandemic reshaped tourism business operations and altered tourist behaviour patterns and lifestyles (May & Latip, 2021). This global disruption accelerated the adoption of digital tools and technologies, thereby driving businesses toward digitalisation and digital transformation (Asif & Fazel, 2024; Cheng et al., 2023).

Digital transformation is no longer merely an additional benefit for businesses but an important competitive strategy for enhancing operational efficiency and overall business performance (Zoppelletto et al., 2023). This shift not only contributes to more systematically driven and streamlined business operations but also expands customer reach, enabling businesses to connect with a broader audience. As businesses adapt to this new digital landscape, the ability to leverage technology effectively has emerged as a key determinant of success in an increasingly competitive market (Ammeran & Latip, 2024). Additionally, tourists are increasingly embracing digitalisation, with many expecting their travel experiences to be supported by technology-driven features. As travellers become more tech-savvy, there is a growing demand for seamless, digital experiences that enhance convenience, efficiency, and engagement throughout their journey (Sustacha et al., 2023). This shift towards digital solutions not only influences how tourists interact with destinations but also sets new expectations for businesses within the tourism industry to adopt and integrate advanced technological tools (Samad et al., 2024; Zanzaizman et al., 2024).

While larger organisations often possess the resources to adapt quickly, micro-enterprises in the tourism sector face unique structural barriers (Rupeika-Apoga & Petrovska, 2022). A micro-enterprise is formally defined as a business entity with an annual sales turnover of less than RM300,000 or a workforce of fewer than five full-time employees (SME Corporation Malaysia, 2013). Within this structure, the individual owner-manager is referred to as the micro-entrepreneur, whose personal agency drives the firm's strategic direction.

Unlike in developed economies, micro-enterprises in developing regions often operate within an informal or semi-formal economy, where access to stable high-speed internet, digital payment gateways, and formal credit is frequently limited (Ammeran & Latip, 2024). This inherently small scale, coupled with restricted financial buffers, makes the transition to technology-driven models exceptionally complex (Abueg et al., 2024). Furthermore, the seasonal nature of tourism in these regions, often dictated by monsoon cycles or specific cultural festivals, creates volatile income streams. Such instability directly affects the micro-enterprise's capacity to invest in and sustain long-term digital transformation initiatives (Trupp et al., 2024).

Micro-enterprises, which form the backbone of many local tourism economies, often find themselves in a precarious position due to limited financial resources and insufficient digital skills, making it challenging to adopt new technologies and keep up with the rising expectations of increasingly tech-savvy customers (Abueg et al., 2024). While much of the existing research has primarily focused on the challenges faced by micro-enterprises in relation to digital transformation (Anatan & Nur, 2023; Brunetti et al., 2020; Rupeika-Apoga & Petrovska, 2022; Trupp et al., 2024), there has been limited evaluation of the rationale behind why these businesses decide to adopt digitalisation and transformation. Subsequently, as Ammeran & Latip (2024) have inferred that focusing on micro-entrepreneurs' perceptions of the rationale for adopting digital technologies is crucial, as these perspectives influence the extent to which they are willing and ready to implement them.

Indeed, Nadkarni & Prügl (2021) underscore the importance of understanding the perspectives and lived experiences of tourism micro-enterprise owners, as these insights offer a window into the underlying rationale guiding their decisions to integrate digital technologies. By identifying and evaluating the specific advantages that owners anticipate (which in turn define the rationale for adoption), it becomes possible to unpack the underlying motivations and strategic considerations that shape their behavioural approaches and practices towards technology (Ammirato et al., 2022). Such understanding not only reveals what drives digital adoption among tourism micro-enterprises but also informs the development of more context-sensitive support systems, policies, and training initiatives tailored to their operational realities (Martínez-Peláez et al., 2023).

Thus, this study aims to evaluate the perspectives of micro-enterprise owners in the tourism industry, with a particular focus on understanding the rationale underpinning their decisions to integrate digital technologies into their operations. Rather than solely identifying challenges that previous scholars have primarily addressed (Brunetti et al., 2020; Rupeika-Apoga & Petrovska, 2022; Trupp et al., 2024), the research delves into how these entrepreneurs perceive the strategic value, necessity, and anticipated outcomes of digitalisation and transformation (Franco et al., 2021; Sivaiah & Vinodan, 2025). By foregrounding their justifications, the study offers a nuanced evaluation of how technology integration is rationalised as a means to achieve growth, adaptability, and long-term resilience, as supported by Nadkarni & Prügl (2021). In doing so, the study contributes to a contextualised understanding of digital transformation as a deliberate and strategic process within the evolving landscape of tourism micro-enterprises.

LITERATURE REVIEW

Tourism sector and digital technology

Digitalisation has significantly transformed the tourism industry, reshaping key areas such as marketing, communication, customer experiences, and operational efficiency (Bekele & Raj, 2025; Pencarelli, 2020). Digital marketing strategies, including social media engagement, have become crucial for promoting tourism businesses, particularly in the post-pandemic world, as they enhance business performance and expand market reach (Deb et al., 2024). It has been asserted that digitalisation improves the tourist experience by providing real-time information, personalised promotions, and seamless access to services, thereby reducing informational and logistical gaps in the tourism journey (Latip et al., 2025). Abueg et al. (2024) claim that

integrated marketing communication supports sustainable tourism development by leveraging digital technologies to promote local businesses, preserve cultural heritage, and encourage environmentally responsible tourist behaviour, thereby contributing to economic, socio-cultural, and environmental sustainability.

Digital transformation in tourism is increasingly shaped by innovations such as the Internet of Things (IoT), which facilitate personalised and interactive travel experiences, improve operational efficiency, and support the development of interconnected tourism ecosystems (Safonov et al., 2024; Trupp et al., 2024). For tourism micro-enterprises, the integration of such technologies presents strategic opportunities to enhance customer engagement, streamline operations, and strengthen competitiveness. As Pencarelli (2020) highlights, these innovations extend beyond customer service, promoting sustainability, improving quality of life, and generating social value, which are becoming increasingly influential factors in shaping business decisions and the rationale behind digital adoption in the tourism sector.

Moreover, the COVID-19 pandemic accelerated digital adoption, significantly altering consumer behaviour patterns and consumer expectations in tourism (Anton et al., 2023; Chiwaridzo & Masengu, 2023). Social media now plays a critical role in shaping travel decisions and destination marketing (Sotiriadis, 2017; Zanzaizman et al., 2024). Digital tools allow for personalised recommendations and seamless mobile experiences, transforming how travellers plan, experience, and share their journeys (Pencarelli, 2020). Furthermore, the increasing influence of online reviews and social media emphasises the importance of digital engagement strategies for tourism businesses, underscoring the need for these businesses to adapt to digital trends to maintain their competitiveness (Sotiriadis, 2017).

Micro-enterprises in the tourism sector

It has been emphasised that micro-enterprises are essential stakeholders of the tourism industry as they contribute to economic growth and can enrich community well-being (Trupp et al., 2024; Zoppelletto et al., 2023). These businesses often embody the cultural and traditional essence of their locations, offering unique, culturally rooted experiences that play a vital role in shaping a destination's appeal to tourists. In developing countries such as Malaysia, Indonesia, and Thailand, where tourism serves as a significant contributor to the national economy, micro-enterprises play a crucial role in job creation, particularly within the informal sector (Fafurida et al., 2024; Samad et al., 2024). By fostering local employment and promoting community-based tourism, these enterprises not only drive economic activity but also help preserve cultural heritage and traditions (Samad et al., 2024).

As tourism continues to expand, the increasing number of tourists creates new business opportunities while simultaneously intensifying competition (Asif & Fazel, 2024). This dynamic necessitates that micro-enterprises adapt strategically to remain relevant and competitive in the industry, with the intention of being flexible and adaptable to change. Typically characterised by having no more than five full-time employees or annual sales not exceeding MYR 300,000, these small-scale businesses face resource limitations that can hinder their ability to compete effectively (Ammeran & Latip, 2024). However, digital transformation presents a significant opportunity for micro-enterprises to overcome these challenges and capitalise on the benefits of enhanced operational efficiency, wider market reach, and improved customer engagement (Asif & Fazel, 2024; Pencarelli, 2020).

Micro-enterprises and digital transformation

Digital transformation has become a pivotal factor in enhancing the competitiveness and sustainability of tourism enterprises. It plays a significant role in improving the quality of services offered to tourists. For micro-enterprises, digital transformation is widely recognised as offering numerous potential benefits, including improved efficiency, enhanced customer engagement, and greater adaptability to market changes (Anatan & Nur, 2023). It enhances their ability to adapt to market changes and meet customer expectations by improving data application capabilities and reshaping organisational culture. Government support and a favourable digital environment are essential in driving this process (Ammeran & Latip, 2024). The adoption of such technologies as artificial intelligence and mobile solutions enables these enterprises to add value to tourism products and experiences, helping them stay competitive in local markets while also reaching broader audiences (Louw & Nieuwenhuizen, 2019; Safonov et al., 2024). Digital tools further empower micro-enterprises to co-create experiences that enhance tourist satisfaction (Rupeika-Apoga & Petrovska, 2022).

In addition to enhancing competitiveness, digital transformation contributes significantly to sustainability within micro-enterprises in the tourism industry. It enables the efficient use of resources, minimises waste, and facilitates the adoption of environmentally responsible practices. Technologies such as IoT and data analytics assist in improving inventory control, which is essential for small-scale tourism-related businesses seeking to reduce excess supply and spoilage (Bekele & Raj, 2025). Digital platforms support the transition to paperless operations and enable sustainable marketing strategies. Furthermore, e-commerce provides greater access to environmentally conscious markets, while the use of QR codes enhances transparency by offering detailed information about products or services. The integration of virtual services, including digital bookings and online customer support, also reduces reliance on physical resources and infrastructure, thereby promoting sustainable operational models (Asif & Fazel, 2024).

Thus, evaluating the rationale underpinning technology integration in tourism micro-enterprises from the business owner's perspective is essential, as their challenges, capacities, and motivations often differ markedly from those of larger businesses (Anton et al., 2024; May et al., 2021). The work is particularly significant given that micro-enterprises are closely embedded in local tourism ecosystems, often playing a pivotal role in preserving and promoting authentic cultural heritage and community-based tourism experiences (Samad et al., 2024; Trupp et al., 2024; Zanzaizman et al., 2024).

METHODOLOGY

Traditional discourse on digital adoption is dominated by the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), with perceived usefulness and perceived ease of use as the primary determinants of behavioural intention (Davis, 1989; Venkatesh et al., 2003). However, scholars have increasingly argued that these models, while robust for predicting usage rates in structured corporate environments, often unable to capture the nuanced, strategic justifications of micro-entrepreneurs in informal or developing economies as supported by Nurqamarani et al. (2021). In the context of tourism micro-enterprises, the rationale for adoption is rarely a linear response (Trupp et al., 2024). Instead, it is a complex negotiation of resource scarcity, social capital, and environmental volatility. This study intentionally departs from TAM's and UTAUT's predictive approach to

offer a phenomenological exploration of adoption. By shifting the focus from predictors to rationales, this research unpacks how it is constructed through specific organisational needs, such as revenue resilience and community-based knowledge sharing, concepts that are frequently oversimplified or aggregated in quantitative survey instruments.

Therefore, a qualitative study was conducted using purposive sampling to explore the research objectives. Semi-structured, face-to-face interviews were employed to gather human-centric insights aligned with the study's aims. Data collection took place during the third and fourth quarters of 2024. In line with the study's focus on the tourism industry, four major tourism hubs in Malaysia were selected as fieldwork sites: Kuala Lumpur, Melaka, Pulau Pinang (Penang) and Selangor. These locations are renowned for their popularity among both local and international tourists. Moreover, conducting research across diverse locations helped mitigate regional bias, enhanced the study's generalizability, and enabled it to provide insights that are broadly applicable to micro-entrepreneurs across the tourism sector (Levitt et al., 2017).

The study population comprised micro-entrepreneurs (owners) aged 18 and above, whose businesses operate within the tourism sector in prominent Malaysian tourism hubs. To ensure the sample was representative of the broader tourism value chain, a purposive sampling technique was employed. This allowed for the selection of participants based on their direct engagement with the tourism economy, specifically focusing on sub-sectors such as Food and Beverage (F&B), Arts and Crafts, and niche travel services. As detailed in Table 1, the interviewees represented a diverse range of businesses that directly engage with tourists and are relevant to the tourism sector. Meanwhile, all informants owned businesses with five or fewer full-time employees and/or an annual turnover of RM300,000 or less, aligning with the definition of micro-enterprises as outlined by the SME Corporation Malaysia (SME Corporation Malaysia, 2013). A total of eighteen interviewees voluntarily participated in the study. This number was determined based on the clear attainment of data saturation, as no new themes or insights emerged from the later interviews. The collected data were both rich and comprehensive, providing sufficient depth and breadth to address the research objectives. In addition, the sample reflected a well-balanced representation in terms of gender and geographic distribution, covering key tourism hubs across Malaysia. This diversity strengthens the credibility and transferability of the findings. The adequacy of the sample size is supported by the concept of data saturation, which is often discussed in qualitative research. While Galvin (2015) suggest that data saturation can typically be achieved with approximately twelve interviews, it is important to note that the point of saturation depends on the study's context, research questions, and the richness of the data collected. In this study, saturation was assessed and deemed to have been achieved, as no new themes or insights emerged after the eighteenth interview.

Table 1. Summary of interviewees' demographic characteristics

ID	Interview Location	Age	Gender	Highest Education Level	Type of Business
IN1	Melaka	24	Male	High school	Horror-themed park
IN2	Melaka	44	Female	High school	Food and beverages
IN3	Melaka	Over 60	Female	Primary school	Art and craft

IN4	Melaka	45	Male	High school	Food and beverages
IN5	Melaka	49	Female	High school	Food and beverages
IN6	Melaka	45	Female	Diploma	Mobile reflexology massage
IN7	Penang	40	Male	High school	Trishaw riding service
IN8	Penang	40	Male	High school	Art and craft
IN9	Penang	32	Male	Diploma	Homestay business
IN10	Penang	60	Female	Diploma	Guided tour business
IN11	Penang	39	Male	Diploma	Food and beverages
IN12	Penang	29	Female	Degree	Art and craft
IN13	Penang	25	Female	Diploma	Art and craft
IN14	Kuala Lumpur /Selangor	58	Male	Diploma	Art and craft
IN15	Kuala Lumpur/ Selangor	48	Male	Certificate	Art and craft
IN16	Kuala Lumpur / Selangor	30 to 35	Female	Master	Guided tour business
IN17	Kuala Lumpur/ Selangor	40	Female	Degree	Homestay business
IN18	Kuala Lumpur/ Selangor	40	Male	Diploma	Food and beverages

The interview protocol was developed through an iterative process to ensure content validity. Initially, a draft was reviewed by three academic experts in the fields of tourism management and digital entrepreneurship to assess the clarity, sequence, and neutrality of the questions. Based on their feedback, several questions were simplified to avoid technical jargon to better suit the micro-entrepreneurial context. Prior to data collection, ethical approval was obtained from the institution. The protocol was designed to capture a detailed understanding of the rationale behind the integration of digital technology among tourism micro-enterprises. The study included a range of core questions (CQ) and probing questions (PQ) to guide the exploration of these perspectives. Table 2 shows some examples of the questions outlined in the study.

Table 2. Examples of the questions outlined in the study

Core Question (CQ)	Probing Question (PQ)
CQ 1: How did your business or your profit-making activities develop and change over time?	PQ a: Before and now?
CQ 2: What communication and technology do you currently use in your business or have access to in your area?	PQ a: When did you start using the mentioned technology?
	PQ b: Since when? Has it been used since you first started your business? Or along the way?
CQ 3: How important are these technologies for you and your economic activities?	PQ a: How does it benefit you?
CQ 4: How do you see the contribution of technology to your future business?	PQ a: What else do you want to achieve in the business that you think can be accomplished by integrating technology?
	PQ b: And how is it possible with technology?

The duration of each interview ranged from 30 to 60 minutes, with the participants' consent being obtained for the recording of information. The recordings were then transcribed verbatim for detailed analysis (Aspers & Corte, 2021). NVivo 15 software was used for data analysis, supporting a systematic thematic approach that organised and integrated the key themes from

the interview data. This in-depth analysis provides valuable insights into the experiences of micro-entrepreneurs in tourism and their approach to navigating digital transformation.

Data analysis

A rigorous thematic analysis was conducted, following the six-phase framework outlined by Braun & Clarke (2021). The process began with data familiarisation, where all transcripts were carefully read multiple times to gain a deep understanding of participants' responses. Initial coding was performed using NVivo 15 software, identifying recurring words, phrases, and ideas across the interviews. Each meaningful text segment was assigned a code, capturing both explicit statements and underlying meanings. Similar codes were then grouped to form preliminary themes, ensuring each theme represented a distinct aspect of participants' experiences and perceptions. These themes were subsequently reviewed and refined, with overlapping or vague themes redefined for clarity. During this stage, connections between themes were carefully examined to ensure internal consistency and clear distinctions. Finally, the themes were interpreted in light of existing literature to validate and contextualise the findings. This iterative process provided a structured yet flexible approach to understanding the study context while ensuring the validity and reliability of the analysis.

The findings were rigorously validated through a twofold process involving expert review and member checking. Subject matter experts critically evaluated the identified themes to ensure their accuracy, relevance, and methodological rigor. Concurrently, member checking was conducted with participants to verify that the findings authentically represented their experiences and perspectives. This comprehensive validation approach significantly enhanced the credibility and trustworthiness of the analysis, ensuring the results were both robust and closely aligned with the study's research objectives.

Findings

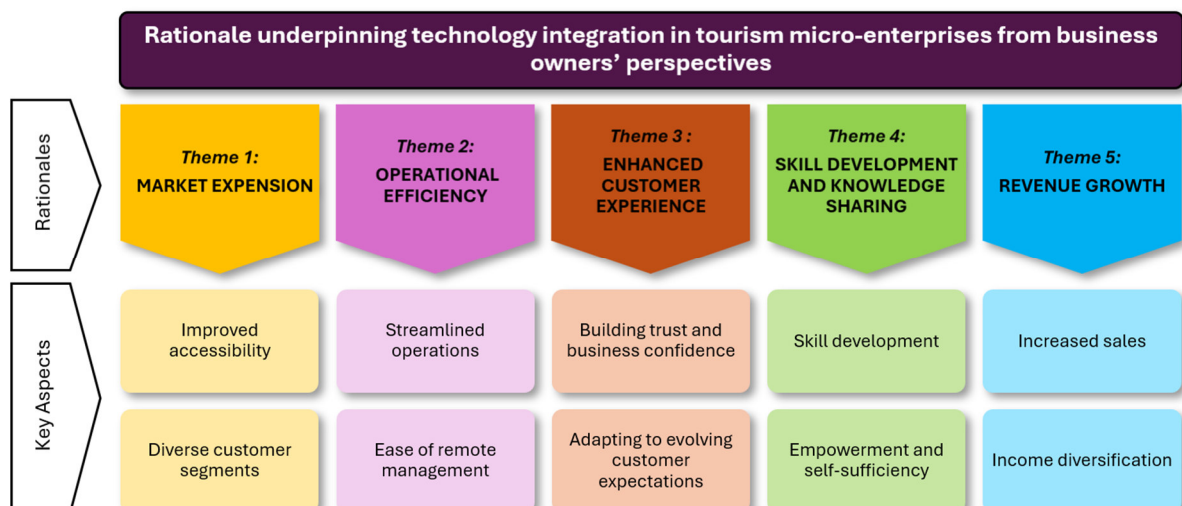


Figure 1 Key Themes Underpinning Technology Integration in Tourism Micro-Enterprises

The thematic analysis identified five key rationales underpinning technology integration in tourism micro-enterprises from the business owners' perspectives (Figure 1). These include: (1) market expansion, (2) operational efficiency, (3) enhanced customer experience, (4) skill development and knowledge sharing, and (5) revenue growth. These themes highlight the potential for micro-entrepreneurs to thrive in an increasingly dynamic and competitive market.

Theme 1: Market Expansion

The findings directed attention to how technology opens doors for micro-entrepreneurs as they have more access to untapped markets and diverse customer bases. By embracing tools like social media and digital marketing, businesses can extend their visibility far beyond traditional geographic and demographic boundaries. These platforms serve as a bridge, connecting entrepreneurs with both local communities and global audiences while fostering meaningful customer relationships.

Social media serves as an essential platform for micro-businesses to extend their market reach. **I2**, for instance, uses a Facebook business page to maintain her business's visibility, emphasising:

We have our own Facebook business page for the kitchen. We promote there, but I'm not very diligent about it.

While **I2** still relies on word-of-mouth, her minimal use of Facebook illustrates how community-driven electronic word-of-mouth (eWOM) can enhance online visibility at no direct cost. This organic engagement helps potential customers find her business more easily, often leading them to her shop. However, despite these benefits, the reliance on platforms like Facebook also presents limitations such as the need to pay for wider reach and limited control over platform algorithms. This reflects an ongoing tension between opportunity and dependency in digital engagement among tourism micro-entrepreneurs. Similarly, **I4** benefits from customer-generated content that promotes its business online. He recalls: "Tourists from Indonesia did some filming, shooting videos while eating cendol", thereby illustrating how organic content shared by customers can amplify visibility far beyond his immediate location.

Consequently, social media can empower businesses to tap into larger and more diverse audiences. **I10** emphasises the impact of TikTok on her business, noting:

When I post on TikTok, I can reach so many people. It works, and I can go all out for business on this platform.

This observation underscores the platform's effectiveness in driving engagement and making the business more accessible to a broader audience. Likewise, **I11** highlights the success of targeted digital strategies, stating:

We've seen results through influencer marketing and TikTok... it has attracted a lot of new customers.

By leveraging social media trends and collaborating with local influencers and content creators, **I11** formed informal partnerships with individuals who had an established following in the tourism niche. These collaborations, often based on product exchanges or modest payments, helped the business reach its target audiences and increase visibility and credibility online.

Encouraging customer interaction on social media is another effective strategy for micro-entrepreneurs. **I13** involves her customers in promoting her business. She explains that because she proactively asks tourists to follow her on Instagram and share her stories, such actions help to “attract more people”. By combining word-of-mouth promotion with social media engagement, **I11** effectively connects with both local and international audiences, significantly expanding her reach. Even those who have yet to fully embrace digital tools recognize their potential. **I16**, for example, reflects:

I’ve been thinking for a long time that I should have social media to promote myself... it would definitely open more business opportunities.

This perspective highlights how digital tools can unlock new growth avenues and extend market reach. However, discussions around long-term digital strategies, data analytics, or efforts to build owned digital assets such as websites or mailing lists were notably absent in the respondents' accounts. These silences suggest that while current use of digital tools focuses on immediate visibility and sales, there remains untapped potential in more sustained and data-driven digital engagement. This gap presents a valuable opportunity for capacity-building initiatives and support mechanisms that aim to help micro-entrepreneurs transition from basic digital adoption to strategic digital transformation.

Theme 2: Operational Efficiency

The research findings indicate that the integration of technology into daily operations has enabled micro-entrepreneurs to streamline processes and respond more efficiently to changing business demands. From cashless payment systems to automated tools, these innovations minimise manual work, improve accuracy, and provide the flexibility required to adapt to customer and market needs. Accordingly, the adoption of cashless payment methods has been a significant step toward operational efficiency for the micro-entrepreneur respondents. **I2** highlights the ease introduced by QR codes, emphasising:

Before QR payments, if someone wanted to pay online, they would just do a direct bank transfer. I would give them my account number.

The shift from manual to digital processes simplifies payment interactions and minimizes in-person involvement. Similarly, **I3** adopted Touch ‘n Go payments to meet customer preferences, explaining that an over-reliance on cash payments was too limiting and that the COVID-19 pandemic had accelerated the use of this facility due to widespread consumer demand. This adaptation reflects the growing reliance on cashless systems to retain customers and meet safety expectations. **I4** also finds cashless systems advantageous, stating:

It’s better if everyone uses QR—it’s much easier...sometimes we don’t have small change.

This response demonstrated how digital payments resolve transaction challenges and streamline cash management.

Beyond payment systems, automation plays a crucial role in improving operational processes. **I11** indicates how machinery has enhanced food preparation efficiency, claiming: “I use machines for making products... it makes the process much faster and consistent”. By automating tasks such as syrup-making and cooking, the company achieved speed and

uniformity in production, which proved beneficial. **I12** further emphasises the benefits of technology in logistics, explaining, “I get my materials online; it saves time and resources, especially with bulk orders.” Online sourcing reduces time spent on procurement and improves inventory management.

Technology also supports flexibility in customer interactions and workforce management. **I6** uses WhatsApp Business to handle inquiries and bookings remotely, emphasising that “it’s easier to get customers through online platforms like WhatsApp.” This tool allows her to manage customer communication efficiently without needing to be physically present. Correspondingly, **I9** relies on a combination of Facebook, Google, and direct communication to streamline bookings and avoid overcrowding. He explains:

I ask for all the details like names, how many adults and children, how many cars... this way, I can manage expectations.

Therefore, such applications infer ways in which appropriate forms of technological applications can help to simplify guest management practices and enhance operational planning. Digital communication tools have also enabled adaptive workforce models. **I10**, for example, moved away from utilising full-time employees in favour of employing project-based staffing. She explains:

Now everything is online... so, for example, when there’s a group (tourist for group tour), I’ll bring in friends as guides on a project basis.

This point highlights how technology facilitates on-demand staffing while reducing fixed costs. By the same token, **I13** utilises Instagram to manage sales and customer interactions, stating:

I sell through Instagram... customers message me to reserve products, and sometimes they pick up or I deliver.

From the interviews, it was ascertained that the use of social media streamlines customer engagement and enhances operational efficiency by handling inquiries and orders digitally.

Theme 3: Enhanced Customer Experience

The study findings underscore the importance of how technology encourages micro-entrepreneurs to positively interact with their customers, helping to build trust, confidence, and satisfaction; although this is also dependent on the extent to which the product and/or service meets and exceeds consumer expectations. Nonetheless, digital engagement through social media, online reviews, and personalised communication allows businesses to meet evolving customer expectations and deliver services tailored to their preferences.

Trust is considered to be fundamental for building lasting relationships, and technology has proven to be an effective tool for enhancing credibility. **I7** underscores the importance of customer reviews in shaping its business reputation. He announces:

Customers can share their feedback about my service, but some people might give negative feedback, which could hurt my image.

Consequently, this response reveals both the opportunities and challenges posed by online reviews. For **I9**, repeat customers and authentic recommendations drive loyalty and trust. He declares:

Most of my guests are repeat customers who come back and recommend us on WhatsApp status.

This response demonstrates the effectiveness of word-of-mouth marketing in sustaining and growing the micro-business. Indeed, customer reviews also play a pivotal role in attracting new customers. **I11** actively encourages feedback, disclosing:

We encourage customers to leave reviews... this has helped increase our visibility on platforms like Google.

These positive testimonials not only boost the business's reputation but also draw in a wider audience. Similarly, **I16** highlights the value of customer tagging on social media, explaining, "Tourists can tag me or mention me in their posts... this would help me a lot." This demonstrates how digital platforms amplify visibility and enhance customer trust.

Another emerging theme from the data highlights the ability of micro-entrepreneurs and their businesses to adapt to shifting customer preferences through the adoption of technological applications. This adaptive capacity is particularly significant in the context of the post-pandemic recovery period, where micro-businesses have been compelled to reconstruct operations and strategies in response to intense market competition and substantial economic disruptions between 2020 and 2022. Such technological responsiveness not only supports business continuity but is also a critical mechanism for enhancing customer experience and staying relevant in a rapidly evolving tourism landscape. From the interviewee responses, it can be deduced that social media trends significantly influence how micro-entrepreneurs need to meet evolving consumer demands. Accordingly, **I10** asserts:

With all the TikTok trends, customers want to follow them. We have to adapt and meet current demands.

By aligning her offerings with popular trends, **I10** maintains relevance and customer satisfaction. For **I14**, adapting to digital tools has improved customer convenience. He comments:

These days, I just send a picture of the artwork over WhatsApp. If they agree, I will send it directly through Grab.

This response illustrates how virtual communication enables a micro-entrepreneur to efficiently cater to customer needs. This flexibility not only ensures smoother operations but also strengthens customer relationships by offering personalised service.

Theme 4: Skill Development and Knowledge Sharing

The interview data points to how technology has become a transformative force in enabling micro-entrepreneurs to develop essential skills and share knowledge, fostering both individual growth and operational independence. By accessing formal training, engaging in self-directed learning, and seeking collaborative input, entrepreneurs have enhanced their digital capabilities, improving their marketing strategies and business management practices. These advancements highlight the dual role of technology as both a learning tool and an enabler of self-sufficiency.

Consequently, skill development emerges as a key focus for many micro-entrepreneurs who recognise the importance of digital marketing and content creation in today's competitive environment. **I6**, for example, credits structured training programs like those offered by the

National Institute of Entrepreneurs (INSKEN) for the provision of vital marketing skills. This point highlights the value of formal education in building confidence and expertise. Similarly, **I14** took advantage of a course administered by the National Entrepreneurial Group Economic Fund (TEKUN) to learn about tools like Google ads and social media marketing, stating: “I learned about Google ads and how to make my gallery appear in searches”.

For others, self-education has been a primary avenue for skill-building. **I8**, who relies heavily on YouTube and TikTok tutorials, explains: “I learned everything on YouTube and TikTok tutorials. This point underscores the accessibility of digital resources for learning new techniques. Likewise, **I4** has independently mastered tools like CapCut, Canva, and TikTok.. This point demonstrates a proactive approach to the acquisition of IT-related skills. Despite the progress they have made in adopting digital technologies, some micro-entrepreneurs acknowledge gaps in their knowledge and express a desire to learn more. **I2** admits, “*I know about Facebook ads... I’m just not very good at checking the results*”, which reflects the challenges of mastering analytics for effective promotion. **I9**, who is eager to refine his content creation skills, states:

I’d like to learn video editing and content creation... that way, I could post more attractive ads on Facebook and Instagram”.

This issue infers a forward-looking approach to marketing innovation. **I11**, who has ventured into influencer marketing, claims:

I’m still learning about influencer marketing... choosing the right person has been a challenge”.

This point indicates **I11**’s commitment to improving customer engagement through the formation of through collaborations with local influencers who actively promote the business on platforms like TikTok and Instagram. While not formally institutionalised, such arrangements demonstrate how **I11** strategically leverages social capital to expand digital reach and connect with younger, tech-savvy audiences.

Empowerment and self-sufficiency also emerge as critical outcomes of leveraging technology. For **I1**, the ability to independently manage social media marketing has reduced his reliance on external support. He thus declares: “I don’t have to hire anyone just for posting; I can do it myself now”. This interviewee expresses a sense of empowerment that comes with mastering essential tools. Similarly, **I13** handles most aspects of her business independently, though she occasionally seeks advice from her boyfriend for social media approaches and strategies. Her own approach demonstrates the importance of striking a clear operational balance between self-reliance and collaborative problem-solving.

Theme 5: Revenue Growth

The study findings indicate that technology provides micro-entrepreneurs with the critical support necessary to stabilise income and foster financial resilience. By enhancing sales, optimising operations, and creating opportunities for income diversification, digital tools enable businesses to navigate financial uncertainties while sustaining long-term growth. These economic benefits demonstrate technology's potential to strengthen financial outcomes and ensure business continuity.

A focus on increasing revenue and improving profit margins is evident in how participants use digital platforms to tailor offerings and attract customers. **I12** emphasised the importance of aligning her products with customer preferences by using social media trends, such as TikTok challenges and seasonal product aesthetics, to attract and engage customers, expressing:

I try to follow trends as much as possible... social media is there to teach you what trends are there.

I12's proactive approach helps maintain relevance in the digital space while catering to customer interests. Thus, **I15** views technology as essential for competitiveness and global expansion, explaining:

If we keep up with technology, we can expand internationally... It's necessary even if it's challenging.

These strategies illustrate how participants not only retain customers but also enhance profitability through targeted digital marketing and adaptability. The potential for income diversification has also encouraged participants to explore innovative ways of generating revenue. **I3** reflects on missed opportunities in online sales due to a lack of skills, stating:

Some people say, 'I want to buy a lot, I'll pay, and you can post it, but I tell them, I don't know how to do that.'

While **I3** experience reveals barriers to fully utilising digital tools, others, like **I9**, realise the importance of using technology to fill revenue gaps during low seasons. He states, "During the off-season, technology is definitely needed to fill up bookings", explaining how strategic digital marketing can address fluctuations in demand and stabilise income streams.

Digital platforms also enable new approaches to financial sustainability. **I14** highlights the success of digital sales models, inspired by his child's use of TikTok for business. He explains:

One day, we won't even need a physical shop. I see how my daughter sells sambal through TikTok from home".

This observation reflects an openness to embracing a fully digitised operation as a viable revenue source. For **I16**, leveraging technology to build professional networks has proven critical to sustaining her business. Accordingly, she claims:

With technology, we are all part of different groups. If you work with one travel agency, they might add you to their group... that's how job offers come in.

I16 emphasises the role of digital communication in creating consistent work opportunities.

Discussion

This study aimed to critically evaluate the rationale underpinning technology integration in tourism micro-enterprises from the perspective of business owners. The findings reveal that technology adoption transcends a mere facilitative function, instead emerging as a strategic imperative shaped by complex and interrelated factors for both survival and growth of micro-entrepreneurs. Through thematic analysis, five primary rationales for technology integration were identified, each reflecting distinct yet interconnected motivations driving digital transformation in this sector as restated below:

1. Market expansion
2. Operational efficiency
3. Enhanced customer experience

4. Skill development and knowledge sharing
5. Revenue growth and financial resilience

First, technology acts as a critical instrument for market expansion. Micro-entrepreneurs recognise that digital tools enable them to overcome geographic constraints, connect with broader audiences, and increase brand visibility beyond their physical locations. This extends their reach to potential customers globally, a vital advantage in the tourism sector where foot traffic alone is insufficient. This finding supports the empirical evidence presented by Trupp et al. (2024), who emphasise the growing importance of the online presence for microbusiness competitiveness. Social media platforms facilitate direct consumer engagement, foster brand loyalty, and thus serve as powerful channels for business growth, as noted by Rupeika-Apoga & Petrovska (2022). Microbusinesses can benefit from community-driven electronic word of mouth, which provides valuable free promotion through customer sharing and recommendations. At the same time, paid promotions and advertising represent a promising approach to further expand reach and target specific audiences, although these require financial investment from the business.

Second, technology is pivotal in enhancing operational efficiency within tourism micro-enterprises. Adopting automation tools, digital payment systems, and artificial intelligence enables business owners to streamline routine administrative tasks and customer service interactions, significantly reducing manual workloads. This increased efficiency accelerates response times to customer inquiries and elevates the overall customer experience, a critical factor for fostering sustained engagement and loyalty. These technological advancements allow micro-entrepreneurs to allocate resources more effectively, focusing on strategic activities rather than day-to-day operational bottlenecks. Supporting this, Safonov et al. (2024) emphasise that technology integration is a key driver of smoother and more efficient business operations, ultimately contributing to micro-enterprises' resilience and scalability. In the context of tourism, where customer expectations for timely and personalised service are rising, such operational improvements are essential for maintaining competitiveness and building long-term customer relationships.

Third, this study illuminates how technology actively facilitates enhanced customer experiences in tourism micro-enterprises by fostering trust, engagement, and adaptability in a competitive and evolving market. Through digital platforms such as social media, online reviews, and personalised communication channels, micro-entrepreneurs can meet and often exceed customer expectations, thereby building lasting relationships grounded in credibility and satisfaction. The findings reveal a significant duality in online reviews. While positive feedback and customer recommendations bolster reputation and attract new clientele, entrepreneurs remain aware of the reputational risks posed by negative comments. Notably, this study highlights the decisive role of community-driven electronic word-of-mouth (eWOM) in sustaining business growth, as seen in repeat customers' authentic endorsements via WhatsApp and social media tagging, which amplifies visibility and trust organically. Furthermore, the research underscores the critical importance of technological responsiveness, especially in the post-pandemic recovery context, where entrepreneurs adapt swiftly to shifting consumer preferences and trending platforms such as TikTok, as supported by Ammeran & Latip (2024). This agility enables micro-businesses to remain relevant, enhance customer convenience, and deliver personalised services efficiently. By emphasising these dynamic, practice-driven insights, this study contributes original knowledge about how digital engagement shapes customer experience as a strategic resource for micro-enterprises.

Fourth, digital integration is strongly driven by the need for continuous skill development and knowledge sharing, which are essential for micro-entrepreneurs navigating the dynamic tourism sector. Findings highlight the importance of acquiring digital competencies, particularly in marketing, content creation, and customer engagement, to sustain visibility and market relevance. Many pursued informal learning through accessible platforms such as YouTube and TikTok, while others benefited from peer collaboration or formal training when available. This self-directed upskilling reflects an effort to achieve greater autonomy in managing digital tasks and maintaining brand identity. However, persistent gaps in areas such as data analytics and paid digital campaigns indicate that digital literacy remains uneven. In a sector characterised by seasonality and fluctuating demand, the ability to adapt quickly through digital learning is not merely supportive but constitutes a core rationale for integrating technology to ensure long-term sustainability and competitiveness, as supported by Samad et al. (2024).

Lastly, digital integration plays a crucial role in supporting revenue growth and enhancing financial resilience among tourism micro-enterprises. The findings illustrate that entrepreneurs use digital platforms to diversify income streams, optimise sales strategies, and strengthen customer loyalty through more responsive and personalised service delivery. Given the fluctuating nature of the tourism industry, where sales can vary according to seasonality and external disruptions, technology offers a means of stabilising income and expanding market opportunities through e-commerce and digital marketing. These practices reflect a strategic rationale for adopting digital tools, as they enable micro-entrepreneurs to respond flexibly to market changes, retain competitiveness, and sustain business operations. Nevertheless, some participants noted that limited skills in areas such as content marketing and data analytics constrain their ability to maximise the potential of online sales fully. This highlights that while digital technology could significantly enhance business revenue, its benefits are closely linked to the level of digital proficiency, echoing the insights of Asif & Fazel (2024) regarding technology's contribution to micro-enterprise sustainability.

In summary, this study provides an enlightening understanding of technology integration in tourism micro-enterprises by unpacking the rationale that drives digital adoption from the business owners' own perspectives. This study reveals how micro-entrepreneurs actively negotiate complex and interrelated motivations ranging from market expansion to operational autonomy that reflect their lived realities within a highly volatile and competitive tourism sector. The findings provide fresh insights into the strategic intentionality behind technology use, illustrating not only how digital tools are employed to overcome geographic and economic constraints but also how community-driven, organic electronic word-of-mouth and the strategic balance of paid and unpaid digital engagement uniquely shape these microbusinesses' online presence. Furthermore, this research exposes critical gaps in digital skills and strategic knowledge that, if addressed, could unlock greater potential for innovation and resilience. By foregrounding micro-entrepreneurs' voices and contextualising their digital practices within the fluctuating dynamics of tourism, this study contributes a grounded, context-sensitive framework that enriches existing theoretical understandings of digital transformation in small-scale tourism enterprises.

Practical Implications

The practical implications of this research highlight the transformative potential of technology for micro-entrepreneurs, particularly within the tourism sector. The findings underscore the need for targeted digital literacy programs to enhance the skills of entrepreneurs who may be

unfamiliar with or underutilising technology. Training initiatives should focus on key areas such as social media marketing, content creation, e-commerce tools, and analytics, which are essential for expanding reach, increasing sales, and optimising operations. Additionally, micro-entrepreneurs should be encouraged to embrace diverse digital platforms to overcome geographical constraints and engage a broader customer base.

Moreover, the study reveals that technology can foster financial resilience by enabling income diversification and stabilising revenue streams, especially during low seasons. Thus, practical interventions should aim to provide entrepreneurs with the necessary tools and knowledge to harness technology for more effective marketing, online sales, and customer engagement. Policymakers and support organisations could consider offering financial incentives or grants to facilitate technology adoption and digital infrastructure development among micro-entrepreneurs, particularly those in the early stages of digital transition.

Moreover, micro-businesses can benefit from collaborative knowledge-sharing networks facilitated by digital platforms. Encouraging collaboration between entrepreneurs, training centres, and industry experts could foster a culture of continuous learning and innovation. By doing so, micro-entrepreneurs can improve their operational efficiency, customer retention, and long-term growth potential, ensuring that they remain competitive in an increasingly digital economy.

Academic Implications

This research contributes to the growing body of knowledge on digital transformation within the context of tourism and hospitality (Cheng et al., 2023; Pencarelli, 2020), particularly in relation to micro-enterprises. (By focusing on the perspectives of micro-entrepreneurs, the research provides a nuanced understanding of the rationale underpinning technology adoption, moving beyond the functional benefits to explore its strategic and transformative potential. While the challenges of digital transformation in micro-enterprises are well-documented in the literature (e.g., Rupeika-Apoga & Petrovska, 2022; Brunetti et al., 2020), this study shifted the focus to understanding the rationale underpinning technology adoption.

This study highlights the critical role that technology plays in enabling skill development, revenue growth, and operational efficiency for micro-entrepreneurs, providing valuable insights into the specific digital tools and strategies that foster business sustainability. Notably, the study's focus on income diversification and financial resilience presents an opportunity for a deeper investigation into how digital tools can help businesses manage economic uncertainty and seasonal fluctuations, particularly in niche industries such as tourism. This way, the study engages with debates on the role of intentionality in digital transformation. While much of the existing literature focuses on external pressures, such as market competition, consumer expectations, and technological advancements (Ammeran & Latip, 2024; Trupp et al., 2024), this research highlights the importance of internal drivers, including the and adaptive capacity of micro-entrepreneurs. This perspective complements the work of Martínez-Peláez et al. (2023), who highlight the interplay between stakeholder capabilities and digital adoption in achieving sustainability.

Furthermore, the research highlights the interplay between formal training and self-directed learning in skill acquisition, encouraging further inquiry into the effectiveness of various

training models and the role of informal learning environments in enhancing entrepreneurial capabilities. This dual role of formal training and self-directed learning resonates with the work of Louw & Nieuwenhuizen (2019), who emphasise the importance of accessible and context-sensitive educational resources for small businesses. However, this research also identifies persistent gaps in digital literacy, particularly in areas such as data analytics and long-term digital strategies, which warrant further investigation.

Study limitations and future research directions

This study has limitations that should be addressed in future research. Its generalizability is limited due to the focus on only tourist destinations in Malaysia. While the study highlights the advantages of digital adoption, it does not sufficiently explore challenges such as budget constraints, cybersecurity risks, and gaps in digital literacy. Additionally, the research lacks a long-term perspective on digital transformation and does not explore emerging technologies such as blockchain or artificial intelligence, which are becoming increasingly relevant in the digital landscape.

Future research could address these gaps by employing larger-scale quantitative studies that provide more generalizable insights across a broader sample. It should also investigate the barriers micro-entrepreneurs face in adopting technology, including financial and educational constraints, and explore the impact of emerging technologies on the tourism sector. Longitudinal studies that track the evolution of digital transformation over time would offer valuable insights into how micro-businesses adapt and sustain growth. Furthermore, examining the role of government support, exploring customer perceptions of digitally transformed businesses, and expanding the study to rural areas or other countries would provide a more comprehensive understanding of the digital transformation of micro-enterprises in the global tourism industry. Such research could offer actionable recommendations for policymakers, businesses, and support organisations aiming to foster the digital adoption and growth of micro-entrepreneurs in tourism.

CONCLUSION

This study highlights the substantial advantages of digitalisation and transformation for tourism micro-enterprises, including increased market reach, improved operational effectiveness, enhanced customer satisfaction, skill development, and revenue growth. Even if there are benefits to digital adoption, the challenges that micro-entrepreneurs experience still persist, for instance: a lack of funds, gaps in digital skills, and resistance to change. To help micro-entrepreneurs fully utilise technology, the findings highlight the need for focused assistance, such as government incentives, training courses, and easily accessible digital tools. Microbusinesses can become more resilient and competitive in the evolving tourism sector by adopting digital methods and rigorously experimenting with ways in which digital tools and applications can enable the diversification of revenue streams, ultimately becoming financially resilient in the long term. To further encourage sustainable digital adoption, future studies should examine long-term effects, new technology, and the efficacy of policies.

DECLARATIONS

Ethics approval and consent to participate

All informants have agreed to participate in the study voluntarily. Approval of ethics from XXX University research ethics committee has been obtained before data collection with ethics identification number of XXX 2024/047

Funding statement

To be reported after acceptance of a paper to prevent bias.

Acknowledgement

We thank all informants for their contributions and willingness to participate voluntarily in the study.

Data availability

No data set to be enclosed.

Competing interest

No conflict of interest is to be reported.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the author(s) used Grammarly (v.1.2.127.1581) and ChatGPT (free version 3.0) to check grammar and improve sentences which align with the journal's policy. After using this tool/service, the author(s) reviewed and edited the content as needed and took full responsibility for the publication's content.

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