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Aging, Micro-entrepreneurship, and Digital Technology: Unraveling Barriers and Opportunities within the Informal Micro-enterprise Sectors from Thailand

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ABSTRACT

Although existing literature emphasizes digital technology adoption in later life for healthy aging and social well-being, it often overlooks the context of the swift demographic transition towards an aging workforce, which includes a substantial proportion of older adults actively engaged in informal micro-entrepreneurial activities. The extent to which aging intervenes in decision-making regarding the adoption or non-adoption of digital technologies in the informal micro-entrepreneurship context remains unclear, as do the distinctive barriers, particularly those triggered by aging, alongside opportunities that such adoption provides within this domain in minimizing aging-related limits. This qualitative study elucidates the aging-related determinants that influence older micro-entrepreneurs' adoption and non-adoption of digital technology within their entrepreneurial endeavors. Drawing upon semi-structured, in-depth interviews with older informal micro-entrepreneurs (aged 60-79) in Thailand, a data-intensive thematic analysis unveiled five major themes capturing participants' barriers to adopting digital technology: 'Refusal and resistance to change,' 'Low materialistic aspiration,' 'Digital preparedness disparity,' 'Digital multitasking-induced overstimulation,' and 'Digital paradoxical effects,' and three major themes that captured dynamic emerging opportunities: 'Optimizing spatial communication and stakeholder relationships,' 'Enhancing digital inclusion in entrepreneurial transactions,' and 'Fostering mobility in sourcing and customer growth.' Each theme and associated sub-themes are discussed in turn, followed by an exploration of the study's implications for theory and practice.

KEYWORDS: micro-entrepreneurship; informal economy; digital technology adoption; aging; older informal micro-entrepreneurs; sustainable development; economic empowerment.

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INTRODUCTION

In recent decades, digital technologies have been instrumental in transforming today's dynamic business environment, creating value for Micro, Small and Medium Enterprises (MSMEs) to boost productivity, marketing management capabilities, competencies, and economic sustainability (Rassool and Dissanayake, 2019). This is particularly pertinent for the informal micro-enterprise sectors, as the integration of digital technology drives productivity enhancements, providing a competitive advantage to informal micro-enterprises (Dutta et al., 2023).

In recent years, the rapid demographic transition towards aging of the workforce, as observed in many higher- as well as lower-income countries, is changing entrepreneurship on all levels (Kurek and Rachwał, 2011), where informal micro-enterprises are no exception. At the individual level, aging exerts considerable effects not only on individuals' deterioration of physical capabilities (Haigh, 1993), cognitive functioning (Hertzog et al., 2008), age discrimination and social exclusion (Walsh et al., 2016), and time allocation and utility (Kelley and Charness, 1995), but also declines in entrepreneurial activities, as a result of challenges for health and well-being. Although older adults face unique barriers to adoption that extend from physical challenges to a lack of confidence (Harris et al., 2022; Channuwong et al., 2022), recent studies have also highlighted older entrepreneurs'

active engagements, resistance, and negotiations with digital technologies in later life, which lead to expanded potential in shaping entrepreneurial competencies are often overlooked in the existing literature (Neves et al., 2018). Although there is research on the impact of digital technology on MSMEs, most studies tend to focus on the demographic of young entrepreneurs in informal settings (Miniesy, Shahin, and Fakhreldin, 2022). Furthermore, most existing research on older adults' adoption of digital technologies has predominantly focused on the domain of health and social well-being in later life and post-retirement, stressing quality of life while overlooking entrepreneurial engagement (Creaney et al., 2023). Studies thus far have shown limited acknowledgement of how aging influence in shaping digital technology adoption in the context of managing business activities among older entrepreneurs, who are actively engaged in informal micro-enterprise sectors. This disparity is significant, since they are relatively distinctive in terms of well-being, socioeconomic status, and digital technological expertise (Neves et al., 2018; Zafri et al., 2023; Rattananda et al., 2025). While population aging is a global phenomenon, it is progressing fastest in developing countries, including Thailand, and has become the 2nd most aged society in Southeast Asia (Anamwathana, 2024). Presently, with 13.64 million people aged 60 and above, comprising 19.5% of the population, Thailand is witnessing a consequential demographic shift. Furthermore, Thailand's workforce is rapidly aging, with over one-third of the country's people aged 60 and above remaining actively engaged in the workforce (Nation Thailand, 2024), with approximately 60% of them operating within the informal micro-enterprise sector (Gietel-Basten, 2019). Despite the fact that 60% of Thai SMEs are recalibrating their focus on digital technologies experiences (Jiradilok, 2022; Pansuwong et al., 2022), it remains unclear how older micro-entrepreneurs from the informal micro-enterprises perceive and experience the adoption of digital technology. Given that research addressing older micro-entrepreneurs' perspectives of digital technology from the informal micro-enterprises is still in its infancy (Gallistl et al., 2021), this article aims to investigate whether or not the proliferation of digital technologies changes informal micro-entrepreneurial activities within the context of aging and examines why, how, and under what conditions this leads to either the adoption or non-adoption of digital technology in entrepreneurial endeavors of older informal micro-entrepreneurs. This study intends to address the gap in the literature, where we are still ill-equipped, by answering questions such as: What are prevalent perspectives of older informal micro-entrepreneurs towards the adoption or non-adoption of digital technologies for their businesses? What distinctive barriers, particularly those exacerbated by aging, prevent them from adopting digital technologies to attain clear business benefits? And to what extent do digital technologies contribute to empowering these micro-entrepreneurs by navigating age-related difficulties? The study concentrates on developing countries, characterized as emerging economies, with Thailand serving as an intriguing instance to gain deeper insights into how aging shapes the barriers and opportunities influencing older micro-entrepreneurs adoption or non-adoption of digital technology within their micro-entrepreneurial activities.

LITERATURE REVIEW

Informal sector enterprises according to the International Labor Organization (ILO) are characterized by family business ownership, small-scale operations, labor-intensive methods, accessible markets, and the utilization of local resources (Swaminathan, 1991). In this context, ILO later extended the scope of the informal sectors that embodies the self-employed working on their own account, either alone or in partnership with unpaid family members, and whose businesses may employ less than ten employees (International Labour Organization, 2015). While informal economic activity contributes significantly to poverty alleviation at the bottom of the economic pyramid and propagates entrepreneurial endeavors, the great majority of MSMEs operate in the informal sectors (Shinozaki, 2022). For example, in 2022, approximately 3.19 million MSMEs in Thailand were informal micro-enterprises, accounting for 85.6% of these businesses and contributing 2.6% to the total GDP (OSMEP, 2023).

According to Onyima and Ojiagu (2017) and Channuwong et al. (2025) digital technology is an expansive term for gadgets, networks, and procedures used to generate, store, modify, and transmit information and data. It entails unifying communication and telecommunication advancements, including computers, mobile phones, the internet, software, audio-visual systems, and a myriad of other digitally empowered devices that benefit individuals in a multitude of forms. Furthermore, Nwaokolo (2022) discussed regarding its features and services, such as smartphones, internet services, website usage, social media, mobile money, ATMs, online business platforms, online payment platforms, and e-commerce mechanisms that facilitate exchange, communication, and relationships between individuals and businesses. In this regard, Swaminathan (1991) identified how informal sectors are recognized for utilizing indigenous digital technologies that are adapted to suit local context, family or self-proprietary, and exploitation of informal opportunities. For instance, Eekhout et al. (2023) found that, when leveraging the newest digital technologies, mobile phones have an incremental contribution to sales efficiency on the overall performance of informal MSMEs. Moreover, enhanced financial inclusion through digital technology is linked to poverty reduction in the informal economy.

While numerous prior studies have examined various barriers that older adults face in adopting digital technologies, the majority of this research has emphasized on issues related to health and social care in later life. For instance, studies undertaken by Nurgalieva et al. (2019) in healthcare settings demonstrated that older adults often experience physical and health related issues such as declines in motor abilities caused by a decrease in muscle strength and hand dexterity, visual impairment, color perception, and contrast discrimination, which eventually impact difficulty pressing, tapping, dragging, and zooming actions on touch-based digital devices, leading to mechanical difficulties in navigating these technologies. Similarly, in other studies with a narrow focus on healthcare context have identified that aging coincides with a general slowing of cognitive processes, decreased memory capacity, decreased attentional control, and difficulty in goal maintenance, which affect visual search ability, working memory, information gathering, visuo-spatial ability, and so on, making it harder for older adults to adopt digital technologies (Lin and Ho, 2020). Furthermore, Berner, Dallora, Berglund, and Anderberg (2022) found that aging-related decline in abilities can also

cause computer anxiety, aggravate older adult's susceptibility to technophobia, giving rise to social media fatigue and limited participation in digital social interactions. However, there is a distinct lack of literature on older adults who remain in the workforce, particularly those who manage an extensive variety of micro-entrepreneurial businesses. The ways in which aging-related determinants shape their adoption or non-adoption of digital technologies for business management have not been a central focus in existing analyses; thus, this remains to be explored in-depth.

Given the importance of the global demographic transition towards an aging workforce in the MSMEs sector (Musa and Hasan, 2018), there remains a significant paucity of research examining how aging influences informal micro-entrepreneurial activities, particularly when it pertains to the adoption of digital technologies in developing nations, where it creates employment opportunities for over half of the world's workforce and actively contributes to economic growth and alleviating poverty through job creation and income generation (Anthesis, 2023; Sutthadaanantaphokin, Channuwong, & Moolngearn, 2025). This oversight leads to poor policy-making and micro-entrepreneurial growth (Haq and Davies, 2020). However, when exploring the informal sectors, a handful of research examined the varied impacts of digital technology on micro-entrepreneurial activities mostly tended to concentrate on younger demographics. For instance, a study by Lichy, Farquhar, and Kachour (2020) focused on young micro-entrepreneurs explored that, how one of the crucial digital technology platforms, social media such as Facebook and WhatsApp, has facilitated new informal micro-entrepreneurial business and digital marketing opportunities through the leveraging of social networks. Similarly, Asiedu, Shortland, Nawar, Jackson, and Baker (2019) demonstrated that, how digital technology adoption through mobile devices not only engenders pride and emotional connectedness among young micro-entrepreneurs and provides informal micro-enterprises a competitive edge but also boosts business confidence. However, the complex nuances of aging-related predominant factors related to the adoption or non-adoption of digital technologies within the context of micro-entrepreneurship businesses are largely ignored in most existing literature (Ugargol and Parvathy, 2023). By investigating what aging-related predominant factors act as barriers and facilitate the adoption of digital technology within the informal micro-entrepreneurial settings from the perspectives of older micro-entrepreneurs in Thailand, a country recognized as experiencing one of the globally rapid aging rates, this study bridges the existing gap in the literature. The current study aims to understand the distinct needs, expectations, and persistent age-related barriers that impair the adoption of digital technologies, together with the opportunities that such adoption provides in curbing the limits resulting from aging within Thailand's informal micro-enterprise sectors, in order to provide empirical insights into how aging intervenes in the relationship between digital technology adoption and micro-entrepreneurship.

METHODOLOGY

3.1. Research Approach

This study is a qualitative inquiry, utilizing a phenomenological approach, to examine the perceptions and meanings of individuals in their contextual situations (Introna, 2005). By emphasizing older informal micro-entrepreneurs' perspectives and ongoing experiences, this study seeks to critically examine their relationship with digital technology. Conducting a qualitative study was deemed appropriate to achieve an in-depth understanding of these dynamics.

3.2. Sampling and Data Collection

The participants in this study are all older micro-entrepreneurs (60+) in the informal sectors who meet the study's inclusion criteria. The sampling approach used for the participants was both purposive sampling and snowball sampling, where the inclusion of selection criteria were: micro-entrepreneur minimum age of 60 or over, owner-managed, and less than ten employees. This study included 23 participants belonging to the age group of 60-79 years from three cities (Pathumthani, Ayutthaya, and Bangkok) in Thailand, 20 of whom were female (M = 62.15, SD = 6.14) and 3 were male (M = 70.33, SD = 6.65), representing the service, retail, and manufacturing sectors located in four different local *talat* (markets). This study was initially conducted in Wat Chedi Hoi Talat located in Pathumthani city, using purposive sampling based on the predetermined inclusion criteria, whereby the initial participants assisted the researchers by identifying other older micro-entrepreneurs operating informally in Talat Kao Kaeng located in Ayutthaya city, and Talat Bang khae and Talat Wang Lang located in Bangkok city. By utilizing both the purposive and snowballing techniques, this study overcame the challenges of identifying older informal micro-entrepreneurs who fulfilled all the inclusion criteria for the sample.

Table 1: Profile and overview of the participants.

ID Code	Age	Gender	Business profile (Business type/Business age/ Location)	Form of ownership/ No. of employees	Adoption status	Form of digital technology adoption
OM-1	69	Female	Street food vendor (Noodles)/4 years/Pathumthani	Sole proprietor/No employees	Non-adopter	X

OM-2	60	Female	Amulet vendor/10 years/Pathumthani	Sole proprietor/No employees	Non-adopter	X
OM-3	65	Female	Street food vendor (Chicken rice) /5 years/Pathumthani	Sole proprietor/No employees	Non-adopter	X
OM-4	61	Female	Greengrocer vendor/ 2 years/Pathumthani	Partnership/No employees	Non-adopter	X
OM-5	60	Female	Stationary fruit vendor/15 years/Pathumthani	Sole proprietor/No employees	Adopter	Line message application, QR code payment
OM-6	67	Female	Toy vendor/20 years/Pathumthani	Partnership/No employee	Non-adopter	X
OM-7	62	Female	Homemade fruitcake vendor/10 years/Ayutthaya	Sole proprietor/No employees	Non-adopter	X
OM-8	63	Female	Shoe vendor/12 years/ Ayutthaya	Sole proprietor/One employee	Adopter	E-commerce platform, QR code payment,
OM-9	66	Female	Handmade bag vendor/10 years/ Ayutthaya	Sole proprietor/No employees	Adopter	Mobile voice call and SMS, QR code payment
OM-10	64	Female	Homemade snack vendor/3 years/Ayutthaya	Partnership/one employee	Adopter	Mobile voice call and SMS, QR code payment
OM-11	62	Female	Greengrocer vendor/ 3 years/Bangkok	Sole proprietor/No employees	Adopter	Line message application, QR code payment
OM-12	62	Female	Clothing vendor/10 years/Bangkok	Sole proprietor/one employee	Adopter	Line message application, QR code payment

(Continued)

ID Code	Age	Gender	Business profile Business type/Business age/ Location)	Form of ownership/ No. of employees	Adoption status	Form of digital technology adoption
OM-13	65	Female	Clothing vendor/20 years/Bangkok	Sole proprietor/No employees	Non-adopter	X
OM-14	63	Female	Cosmetic vendor/10 years/Bangkok	Partnership/No employee	Non-adopter	X

OM-15	75	Female	Clothing vendor/10 years/Bangkok	Sole proprietor/No employees	Non-adopter	X
OM-16	79	Female	Flower vendor/8 years/Bangkok	Partnership/No employee	Non-adopter	X
OM-17	74	Female	Street food vendor (Dumpling)/10 years/Bangkok	Sole proprietor/No employees	Non-adopter	X
OM-18	65	Female	Clothing vendor/20 years/Bangkok	Sole proprietor/two employees	Adopter	Line message application
OM-19	72	Male	Street food vendor (Soy Milk)/30 years/Bangkok	Sole proprietor/No employees	Non-adopter	X
OM-20	63	Female	Souvenir vendor/20 years/Bangkok	Sole proprietor/No employees	Non-adopter	X
OM-21	63	Male	Farm vendor/3 years/ Bangkok	Sole proprietor/No employees	Adopter	QR code payment
OM-22	68	Female	Clothing vendor/20 years/ Bangkok	Partnership/Two employees	Non-adopter	X
OM-23	76	Male	Homemade snack vendor/40 years/Bangkok	Sole proprietor/No employee	Non-adopter	X

Among 6 participants from Pathumthani city, 4 from Ayutthaya city, and 13 from Bangkok city, the study revealed a dichotomy: only eight older micro-entrepreneurs actively adopted different forms of digital technologies in their informal business operations, while the other fifteen did not incorporate any forms of digital technology in their micro-entrepreneurial endeavors. Table 1 indicates the detailed profile and overview of the interviewed participants.

The face-to-face semi-structured interviews carried out in this study contained open-ended questions with probes to retrieve more in-depth information on the experiences and perceptions of older informal micro-entrepreneurs concerning the barriers and opportunities that would encourage or limit the adoption and utilization of digital technologies within their businesses (Galletta and Cross, 2013). Subsequently, a pilot interview was conducted to get insight into validating the interview questions before conducting formal interviews (Malmqvist et al., 2019). The pilot interview led to some minor adjustments to the interview questions and they have been excluded from the analysis. The interviews were conducted during the months of August, September, and October 2024, each lasting approximately 35 to 40 min. A written informed consent was taken from all the participants before the interview, and they were briefed on the details of the study, including their voluntary participation and their right to anonymity. All of the interviews were audio-recorded and performed in Thai, the language spoken in the study area, and then translated into English with the assistance of a local bilingual research assistant.

3.3. Data Analysis

Following the interviews each day, the responses from the audio-recorded files were transcribed. To assess accuracy and validity, the researchers cross-checked the transcripts with the original audio data and the field notes acquired throughout the interview procedure. The data were analyzed using Braun and Clarke (2006), six-phase thematic guide, illustrated in Figure 1. The purpose of taking this analytical tool was "A process for ensuring rigorous and systematic engagement with data, to develop a robust and defensible analysis, that is independent of any predetermined particular theoretical framework or cluster of other design considerations" (Terry, Hayfield, Clarke, and Braun 2017, 28). During the data analysis process, an inductive approach followed, through which codes, sub-themes, themes, and main themes were discerned from the interview data. After analyzing the gathered

data from around twenty-two interviews, researchers observed a repetition of the themes derived from the data. To ensure the results, one more interview was conducted, and the study's previous results were corroborated, so researchers concluded that it had reached the saturation point (Islam et al., 2021). Ethical approval was obtained prior to the fieldwork.

3.4. Methodological Rigor

The 'Four-Dimension Criteria': credibility, dependability, confirmability, and transferability (Lincoln et al., 1985) were applied to assess the study's methodological rigor. To ensure credibility, pilot interview was conducted for refining the semi-structured interview questions for clarity and comprehensiveness. The audio recordings and, member checking further enhanced the creditability of the data. Both transferability and dependability were collectively achieved through a rich explanation of the research's procedures. Meanwhile, data saturation was attained to further enhance the transferability to other similar settings. Finally, confirmability of the data was achieved through reflexivity, where all researchers provided their input and feedback on the data interpretation, leading to the formation of the themes.

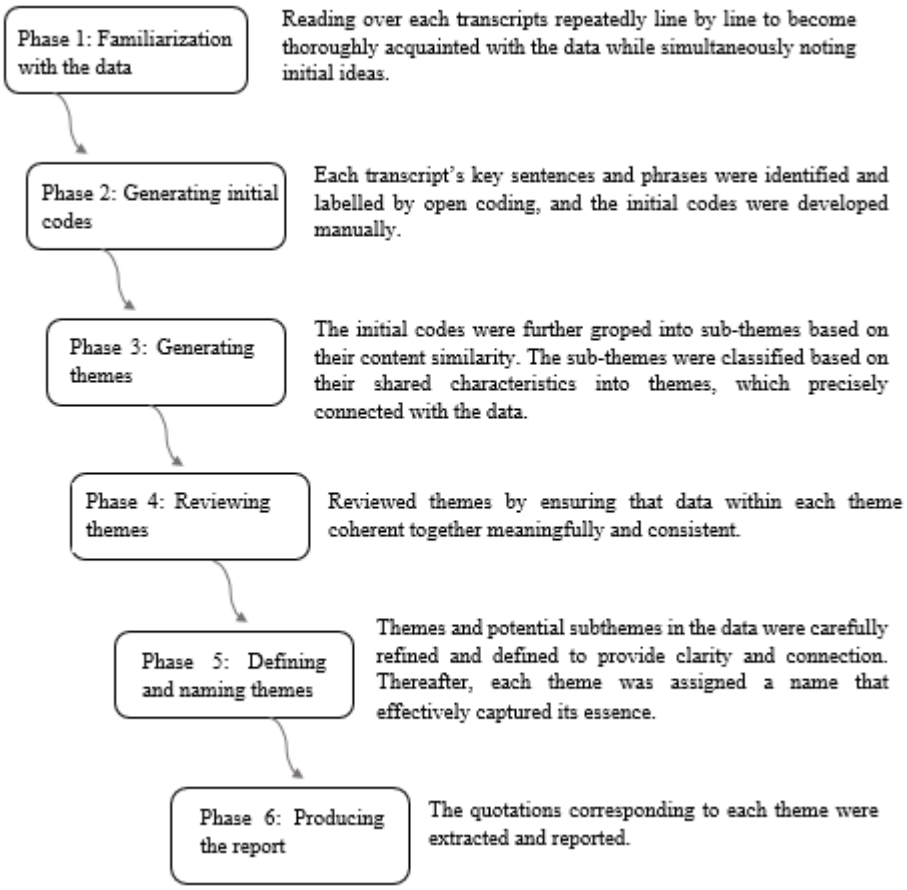

Figure 1: Braun and Clarke's (2006) Six-Phase Thematic Analysis.

RESULTS

To investigate the perspectives of older micro-entrepreneurs in adopting or not adopting digital technology in their informal micro-entrepreneurial activities, two main themes were identified:

1) *Digital tech barriers for older informal micro-entrepreneurs*: This main theme embodies five themes, and eleven sub-themes emerged from participants who have not adopted any form of digital technology for their businesses.
2) *Digital tech opportunities for older informal micro-entrepreneurs*: This main theme encompasses three themes, and six sub-themes emerged from participants who have adopted some forms of digital technology for their businesses.

These main themes, themes, and sub-themes have been explained in detail and a thematic map (Figure 2) was created.

4.1. Digital Tech Barriers for Older Informal Micro-entrepreneurs

This main theme reflected contend related to why older micro-entrepreneurs from informal micro-enterprise sectors did not adopt digital technology for their business operation as well as explored distinct patterns how aging influences the barriers to embracing digital technology incorporated into their businesses, diverging generally observed findings from health and social care settings. From participants' discussion, emerged themes and sub-themes have been detailed further.

4.1.1. Refusal and Resistance to Change. When discussing why participants had not adopted any forms and uses of digital technology in their micro-entrepreneurial actions, aging acted as a predominant factor influencing their refusal and resistance to changing micro-enterprise operations through adopting digital technology, which is further detailed and evident in the following

sub-themes:

Inclination toward Conventional Selling. Strikingly, participants of this study often expressed a strong preference for holding onto to their conventional forms of sales and felt more at ease with their long-established selling practices like in-person sales, face-to-face negotiations, and cash-only transactions and refused any form of digital technology integration into their business operations, even if they were offered the opportunity to adopt it. For example, an older chicken rice vendor stated his refusal for his business operations as follows:

It's really not bothered me at all. I don't care. Even if someone helps me to use some app for selling, I won't use it. Because ever since I started the business, I have been selling like this. It's been 5 years. I like to sell like this. It's comfortable for me to talk with customers face-to-face. (OM-3)

Some participants in this study, although expressing a positive attitude towards digital technology adoption, simultaneously exhibited resistance to altering their existing practices and integrating them into their business operations immediately, as stated by an older flower vendor:

I will consider using it (digital technology) when my time is convenient. If it will be necessary in the future for my business, I have to learn about it. I don't dislike it. But right now, I won't do it. At this moment I am ok to sell this way (in-person sales). (OM-16)

Life-stage Pessimism. Participants in this study often expressed a limited future time perspective, which shaped their lack of enthusiasm toward adapting to or learning digital technology. They did not perceive it as a worthwhile change to their existing micro-entrepreneurial business practices given their envisioned remaining life expectancy. As stated by an older clothing vendor:

No more, no more learning. Let's say we'll be alive for a year or two. In the future, I will probably sell like this. I am not afraid to use it (digital technology). But it's just that I don't like these types of things. I know I can learn. But I don't want to use it for selling, so I am not interested. (OM-15)

Perceived Burden of Digital Dependency. According to the participants, given the present-day extensive dependency on digital technology, notably among younger consumers, steered them to question whether digital technology adoption is necessary in all aspects of business operations. They perceived this dependency as burdensome, as an older cosmetic vendor stated:

If customer want to use QR code payment for paying just 5 bath, 10 bath, it's annoying. I even sometimes scolded them. At least 10 baht, 20 baht you should keep in your wallet. It's not good to scan for paying just 5 baht. I don't like it at all. Because at my age, it's really hard to handle. (OM-14)

4.1.2. Low Materialistic Aspiration. The majority of participants demonstrated age-driven low materialistic value orientation. The influence of lower degree materialistic aspiration, tied to their lifespan trajectory, acted as barriers to adopting digital technology. This low materialistic aspiration theme was two-pronged, relating to complacency and generational preferences.

Sense of Complacency. Throughout the interviews, non-adopter participants in this study revealed a lack of desire to enhance their sales growth by adopting digital technology as well as emphasized on their own sense of happiness and fulfillment regardless of the extent of existing material possessions they owned, and perceiving digital technology as superfluous. As expressed by an older noodle vendor:

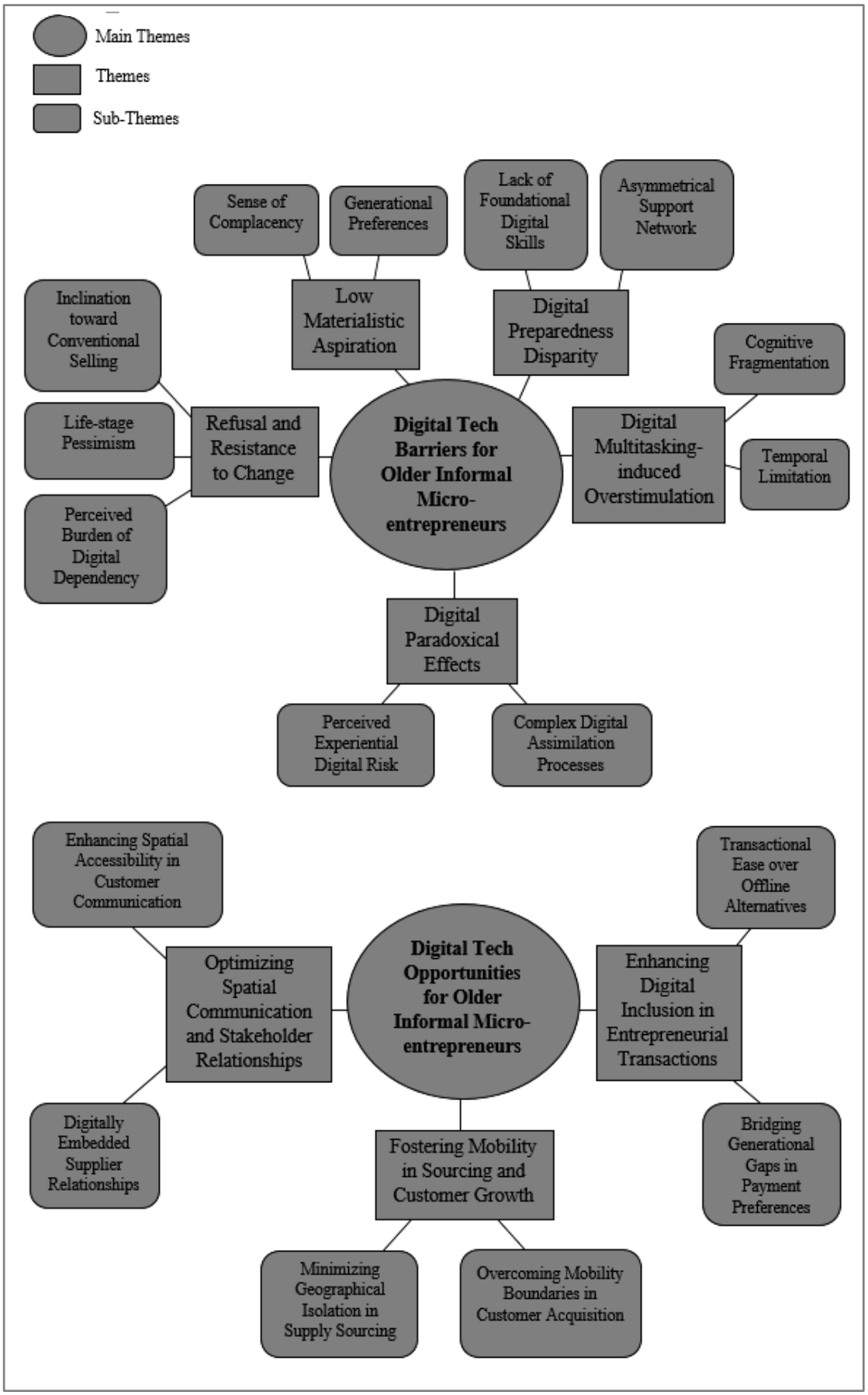

Figure 2: Thematic analysis map.

We are not worried about it because we just live day by day. At this age, what's the big deal? We are not greedy, right? We just

need to sell enough for eating. It doesn't affect us at all even if we don't use any digital technology to improve our sales. Just be happy every day. (OM-1)

Generational Preferences. Some participants in this study felt clashes between their preferences for maintaining conventional business practices, which have been passed down through generations, and instead opted to leave this responsibility to future generations, whom they believe should learn and adopt digital technology to stimulate sales as the older chicken rice vendor mentioned:

I avoid getting involved with these types of things (digital technology) because I am old. Let our children learn about it if they want more sales. Personally, I don't like it. (OM-3)

4.1.3. Digital Preparedness Disparity. The degree of lack of preparedness to engage with digital technology stemmed from a lack of basic digital skills and asymmetrical support network within their digital environment on how these technologies can be adopted in micro-enterprise business practices and revealed disparities in digital readiness across the participants.

Lack of Foundational Digital Skills. Although some participants possessed limited experiences with digital technology, such as using basic non-smart mobile phones, these devices were solely used for personal calls and text messaging. For the most part, the participants lacked foundational digital knowledge or experience of how to utilize digital technologies for promoting and selling their products and services. For instance, an older souvenir vendor stated,

I have thought about selling my products on TikTok. But I don't know how to open an account on TikTok. I don't even know how to use a touchscreen phone and move it up and down. (OM-20)

Asymmetrical Support Network. The lack or inconsistent assistance from family, friends, communities, and government for specific assistance concerning the challenges of aging in relation to meeting immediate and multifaceted needs in adopting digital technology for business facilitation reveals an asymmetrical support network. For instance, an older clothing vendor expressed her frustration when she did not get support from her family members when needed to help boost sales through digital platforms:

In the past, my daughter sold clothes with me until she quit and left for another job. Then I was interested in increasing my clothes sales on the Lazada or Shopee platform. But I needed help with things like taking pictures and uploading products online. But nobody helped me. My daughter didn't help me either. (OM-13)

4.1.4. Digital Multitasking-induced Overstimulation. When it comes to coping with the digital multitasking requirements, such as engaging in texting while viewing videos, responding to multiple customer queries, managing orders during live streaming, using online selling and delivery applications and switching between apps on a smartphone, most participants voiced their discomfort related to simultaneous engagement in multiple digital tasks due to cognitive overload and temporal constraints for the effect of aging and specified as follows:

Cognitive Fragmentation. Participants of this study reported that due to the feelings of exhaustion and lack of energy late in their lives exacerbated their ability to multitask with digital technology. They believed that adopting digital technology would overwhelm them because of the abundance of digital information and rapid task-switching, eventually unsettling their business concentration and attention. An older soy milk vendor articulated this barrier, stating:

If I want to sell my food in the Grab or Food Panda app, I would have to work more. But I am tired, really tired, do you understand? My food is low-priced, and sales are also not good, but it's easier to manage to sell like this way (in-person). (OM-19)

Temporal Limitation. According to participants, the temporal constraints of aging in this study were reflected in motor control deficit, particularly when digital multitasking required a variety of fundamental physical activity transitions, involving switching from the execution of one action to another in a sequence and within the shorter time course. As narrated by an older greengrocer vendor:

All day long, from morning until evening, I am already working. I sell only to people from this area. If I used a delivery application like Grab, maybe I could find more customers, but I probably wouldn't be able to prepare on time. It's not worth rushing. I like to do it slowly, and I need time to take rests. (OM-4)

4.1.5. Digital Paradoxical Effects. From the perspectives of participants' accounts, this study revealed that aging intensifies the paradoxical relationships with adopting digital technology, which is designed for a particular benefit but delivered negative experiences among older informal micro-entrepreneurs. This barrier is further detailed and evident in the following sub-themes:

Perceived Experiential Digital Risk. Attention decline with aging, coupled with participants lived experiences of transactional fraud risk, served as antecedents contributing to the low frequency of digital technology adoption within their micro-entrepreneurial activities. For example, an older toy vendor expressed her frustration with the negative experiences of using mobile banking applications in her business, stating:

I don't use the mobile banking app for transferring money from customers anymore. Some customers didn't confirm in the app when they transferred money. I had been tricked before. Some customers came to buy and pretended to confirm in the app but didn't press the button properly. At this age, it's difficult to notice everything. Some sellers have employees take pictures when transferring money. But for us, there's none to help us check. (OM-6)

Complex Digital Assimilation Processes. The intricate nature of user interfaces and the lack of user-friendly designs in digital technologies, often overlooking aging-related limitations, left participants in this study feeling unfamiliar with the digital assimilation procedures and confused about how to adopt these technologies in their micro-entrepreneurial activities. In this context, the older souvenir vendor conveyed her sense of helplessness when faced with the complicated procedures required to use digital platforms for live sales, stating:

> *I don't know how to sell live even if I want to. In case, I press the button to go live, next how do I set up the screen? What else do I need to do? Now, how do I send the product to customers after someone orders during the livestream? I need to follow up on everything if I want to sell live. If I try to do this, I am afraid I won't be able to follow the process.* (OM-20)

4.2. Digital Tech Opportunities for Older Informal Micro-entrepreneurs

This main theme illustrates how the study's participants, who have adopted certain forms of digital technologies into their businesses, bridge the gap of constraints posed by aging and seize micro-entrepreneurial opportunities. From the participants' discussion, emerged themes and sub-themes have been discussed in further depth.

4.2.1. Optimizing Spatial Communication and Stakeholder Relationships. The findings of this study reveal that participants who adopted certain forms of digital communication technology into their businesses acknowledged the efficiency in operational communication and greater flexibility in building relationships with customers, suppliers, and other stakeholder. Such adoption minimized spatial and mobility-related barriers related to aging, within the informal microenterprise sector. This theme is further detailed and evident in the following sub-themes:

Enhancing Spatial Accessibility in Customer Communication. By using messaging apps like Line, mobile voice calls, and short message service (SMS) to respond to pre-purchase queries and confirm orders, participants in this study reported improved; interactive communication and experiences with their customers that transcended geographical and mobility limitations related to aging. They also obtained mobile payment receipts as digital evidence of transactions through messaging apps. In this context, the older stationary fruit vendor stated,

> *I have some regular customers who order in my Line message. They first confirm with me how many kilos of fruit they want to buy: 5 kilos, 10 kilos, or 15 kilos. After confirming the order, they transfer the money and send me the receipt in the message. Then I deliver the products to them.* (OM-5)

Digitally Embedded Supplier Relationships. Participants in this study reported that adopting digital communication technologies, such as the Line messaging app and SMS, fosters a closer, reciprocal relationship with suppliers by consolidating access to inventory availability, purchase details, order confirmations, and logistics inquiries, which ultimately reinforces efforts to alleviate spatial distance barriers to communication associated with aging. For instance, an older greengrocer vendor in this context mentioned,

> *There are some regular shops at the talat (market) from which we order our vegetables and herbs. We personally go to pick them up. But, before that, we order our products via the group chat with our supplier in the Line messaging app to check if they have stock or not. Once confirmed, we head to the talat (market) to collect our orders. It's easy and convenient.* (OM-11)

4.2.2. Enhancing Digital Inclusion in Entrepreneurial Transactions. As reflected in the interview data, with a desire to make it easier for customers to pay for their products and services, study participants balanced between traditional cash payments and integrating digital payment services to meet the diverse needs of different age groups of customers, which are further grouped into two facets:

Transactional Ease Over Offline Alternatives. Participants of this study who have adopted certain tools of digital technology for their business transactions mostly emphasized the benefits of using quick-response code (QR code) payment via their mobile banking applications. Some also printed QR codes and displayed them in front of their vendor carts or stalls, which linked with their bank account for transferring money from their customer for ease of use to navigate, as stated by the older greengrocer vendor of this study:

> *Sometimes I do not have cash with change. Then QR scanning helps us. Some customers have 1000 bath bills, but I do not have change for that. So they just scan the QR code and pay only the exact price; that's it. It is convenient when I am not prepared to change cash.* (OM-11)

Bridging Generational Gaps in Payment Preferences. Participants of this study emphasized the potential of digital technology by integrating diverse payment options, such as mobile banking transfers and QR codes along with cash, into their daily in-cart transactions, enabled them to meet the preferences and needs of different generations of customers. For instance, an older shoe vendor stated:

> *Sometimes customers want to pay with cash, sometimes they transfer to our bank account, and sometimes they scan QR codes. We accept both cash and QR code payments. Some customers don't like to carry cash. So we let them scan and made it convenient for them to purchase.* (OM-8)

4.2.3. Fostering Mobility in Sourcing and Customer Growth. Based on the interview data, this study revealed that several participants minimized their age-induced mobility limitations by adopting diverse e-commerce platforms for procurement of resources and expanding their potential customer base beyond their local region and community through digital communication

channels like messaging apps for their businesses. These findings are further grouped into two facets:

Minimizing Geographical Isolation in Supply Sourcing. Participants of this study reported that whenever they faced internal supply shortfalls within their local network, adopting various e-commerce platforms like Lazada, shopee, and TikTok, along with social commerce platforms like Facebook, served them as external supply sourcing resources and offered them to deal with logistical and connectivity difficulties often tied to aging and geographic isolation. The older shoe vendor in this context stated:

> *Sometimes we order our shoes from Lazada if there are any pairs that we don't have in stock, we order immediately from online platforms. It depends.* (OM-8)

Overcoming Mobility Boundaries in Customer Acquisition. Participants of this study identified that adopting different forms of digital communication tools, such as Line messaging applications, mobile voice calls, and SMS, has reduced their dependence on a small number of customer settings, which were confined to the local area only. Some participants also display the QR codes of their shop's Line ID at vendor carts and stalls to leverage the potential for new customers to scan it and establish contact for future purchases, thereby minimizing mobility-related constraints often faced by older micro-entrepreneurs. As stated by an older clothing vendor:

> *Sometimes our regular customers share our Line ID with others and recommend they call us to buy our clothes. Sometimes customers who pass by our shop take our phone number and add us in the Line application to make the purchase later.* (OM-12)

DISCUSSION

This study contributed by exploring an in-depth understanding of the barriers and opportunities of digital technology adoption from the perspectives of older informal micro-entrepreneurs and examined factors shaping their decisions of adoption or non-adoption of digital technology in their entrepreneurial practices. Although the theme of refusal and resistance to change is consistent with previous research (Pena et al., 2021), our findings demonstrated that how aging shapes such refusal and resistance beyond personal disposition, embedding it deeply in the entrepreneurial business practices. Rather than expressing discomfort or anxiety toward digital technology commonly observed in health and social care settings (Berner et al., 2022), in this study participants' refusal stemmed from deeply held beliefs that, they had been accustomed to the conventional methods of selling, for majority of their lives, which they regarded as sufficient for business practices without perceiving the need to adopt digital technology. Moreover, this study illustrates in entrepreneurial environment how life-stage pessimism influence non-enthusiasm towards the adoption of digital technology in ways previously not examined. Furthermore, participants view on the mounting dependence on digital technologies to serve younger consumers (Mkalama et al., 2022; Zafri et al., 2024) in all stages of micro-entrepreneurship activities as burdensome and redundant, leading to their decision to refuse adopting digital technology.

The theme of low materialistic aspiration offers novel perspectives from non-adopter participants, indicating that age-related alterations in life circumstances, health status, and societal positions influence being less materialistic. This stands in juxtaposition with earlier research in social and healthcare environments where older adults' adoption of digital technology often guided by necessity (Creaney et al., 2023). A distinct aspects emerged in the informal micro-entrepreneurial environment, where participants' engaged in mental trade-off between the strong sense of complacency which reflecting uncritical self-satisfaction with their material well-being, diminishing their drive for business improvement through digital technology adoption. The tendency to avoid adopting digital technology because of familiarity with the long-established generational business practices despite minimal sales is further exacerbated by the low level of materialistic aspiration.

Although previous research has revealed older persons' limited digital skills and confidence in adopting digital technology (Schirmer et al., 2022), this study goes a step further by understanding how the theme of digital preparedness disparity barrier is compounded within the more intricate nature of informal micro-entrepreneurship. Furthermore, a lack of encouragement from family, friends, and the community, combined with limited access to private learning environments and professional digital skills training actions that carter to age-specific needs, was a significant predictor of digital technology non-adoption.

While prior research has documented how multitasking related overstimulation impairs attention control and critical thinking among adolescents and young adults within social media environment (Fayize, 2025), this study extends the understanding by uncovering how the pervasive influence of aging imposes substantial challenges for digital multitasking. In particular, aging-related cognitive decline and issues with temporal precision, in conjunction with digital multitasking, prompted overstimulation that hindered the ability to maintain business focus and attention control, eventually leading to the non-adoption of digital technology in informal micro-entrepreneurial practices.

This study identified paradoxical outcomes and the conflicting yet interdependent tensions influenced by aging when participants attempted to adopt digital technology. This study exhibit that age-related cognitive decline impaired participants' ability to detect fraud risks based on prior experiences, driving to negative evaluations of digital technology adoption. This dynamic dimension is distinct because prior research overlooking the financial risk and business identity vulnerabilities pertinent to aging workers in informal micro-entrepreneurial settings (Frik et al., 2019). Moreover, in line with previous research where perceived difficulties of usability and learning of contemporary digital technological procedure identified as challenges in sociological domain (Neves and Mead, 2020), this study extends this insights by demonstrating how such barriers are magnified in informal micro-enterprises, where business innovation requires age-sensitive technological design and operational procedures.

The study findings also illustrated entrepreneurial opportunities derived from the adoption of digital technologies that minimize aging-related barriers within a business-specific context. The theme of optimizing spatial communication and stakeholder relationships captured how older informal micro-entrepreneurs who adopted digital communication technologies such as messaging applications, mobile voice calls, and SMS into their operations were able to navigate both physical mobility constraints and geographical barriers in their communications with customers, suppliers, and other business stakeholders. This study deepen our understanding into the informal micro-enterprise domain, how such adoption enables real-time operational coordination and improved spatial accessibility in customer engagement. This study's findings demonstrated that adopting digital communication technology substantially minimizes the interpersonal communication barriers associated with aging, allowing older informal micro-entrepreneurs real-time information exchange and processing to communicate with key business stakeholders, such as suppliers, without the need for physical exertion.

The theme of enhancing digital inclusion in entrepreneurial transactions highlighted how older informal micro-entrepreneurs adopted digital payment services such as QR codes, mobile banking, and payment apps to facilitate financial transactions and address age-related digital exclusion. Consistent with prior research which highlights how younger consumers prefer digital payment methods for transactions (Lavanya and Shrivastava, 2024), implementing a spectrum of digital payment options allows older micro-entrepreneurs the opportunity to serve a wider range of customers with different generational preferences and bridges the gap in payment practices, ultimately shapes customer satisfaction.

The final theme of fostering mobility in sourcing and customer growth highlights diverse digital e-commerce and social commerce platforms expanded business supply networks and adjust sourcing needs without the need to physically travel or relocate in person to procure goods or services. Furthermore, consistent with prior findings, which indicate that by leveraging digital technology, businesses can enhance their customer reach (MacCrory et al., 2024), the finding of this study broaden our understanding by showing how digital technology adoption reduced mobility constraints, which often limit the ability of older informal micro-entrepreneurs to reach new customers outside of their immediate geographic area, led to opportunities to transcend generational divides and interact with an array of age groups of potential customers.

IMPLICATIONS, LIMITATIONS AND SCOPE FOR FUTURE RESEARCH

6.1. Implications for Theory

Firstly, to the best of our knowledge, this is the first investigation examining the nexus of aging, technology, and entrepreneurship within this specific context. While existing body of the literature narrowly focused on older adults' adoption of digital technologies for health and social well-being in later life and post-retirement settings (Creaney et al., 2023), this study extends the extant knowledge by addressing the entrepreneurial context. It uncovers a new theoretical perspectives that explains how aging influences the decision-making process surrounding the adoption or non-adoption of digital technologies in the informal micro-entrepreneurship, pointing out barriers and opportunities distinct in nature from those previously recognized in the health and social care domains. Consequently, this study's empirical evidence highlights how older informal micro-entrepreneurs, through the effective integration of digital technologies, can offset the limitations associated with aging while capitalizing on emerging business opportunities. These insights can inform theoretical approaches on how to foster greater interest and decrease attrition of other older informal micro-entrepreneurs who may not yet have adopted or continued with digital technology. Secondly, research until now predominantly focuses on the adoption of digital technologies for small and medium enterprises (SMEs) (Vrontis et al., 2022), with a lesser extent on older micro-entrepreneurs operating in informal sectors. Therefore, this study adds value to the current literature by deepening the understanding of how aging can act as a determinant influencing digital technology adoption in informal micro-entrepreneurial endeavors. The implications of these findings are applicable to older entrepreneurs engaged in informal micro-entrepreneurial ecosystems in other developing countries that share comparable socioeconomic, cultural, behavioral, and lifestyle characteristics with Thailand (Yeung et al., 2018).

6.2. Implications for Practice

First of all, it would be beneficial to develop digital engagement training programs that prioritize empowering older informal micro-entrepreneurs' mental wellness that fosters intrinsic motivation and encourages active participation, ensuring that the training aligns with their personal goals and life circumstances. It is advisable to involve family and community members in these interventions since older adults are sensitive to their influence. Secondly, there is a scope for policymakers and developers to consider involving older informal micro-entrepreneurs in the design and development process of digital technologies tailored to support the entrepreneurial process. This approach would ensure that the digital technologies align with their actual needs and interests, enabling more pertinent and effective business solutions. Thirdly, policymakers and governments should prioritize the development of digital literacy training programs that are tailored to older micro-entrepreneurs in the informal sectors. These programs should concentrate on building requisite technological skill sets for older adults with limited or no prior exposure to digital technologies, ensuring that the training is accessible, practical, and relevant to their needs as informal micro-entrepreneurs. Finally, it is recommended that policymakers and governments implement awareness and confidence-building campaigns aimed at educating this demographic on critical financial and business transaction safety and privacy practices like identifying scams, avoiding fraud in mobile payment systems, and using secure passwords to develop awareness. Moreover, connecting them to their community members who have effectively adopted digital technology into their informal business endeavors would serve to foster confidence and trust.

6.3. Limitations and Scope for Future Research

This study does have limitations that may provide impetus for further research. First, although the study's sample size was

sufficient to undertake this exploratory qualitative research, the results are based on a sample specific to the country, which limits the generalization of findings. This limitations open a scope for future studies addressing older informal micro-entrepreneurs' experience of digital technology adoption based on broader samples from different countries, which would allow for a wider appreciation of the topic as such. Second, this study concentrated primarily on the informal micro-enterprise sectors. In Future investigations, question should be addressed as to how aging influences the adoption of digital technology across diverse SME sectors, facilitating cross-sector comparisons and yielding deeper insights.

CONCLUSION

There has often been a lack of in-depth understanding regarding the effect of aging on informal micro-entrepreneurial activities, particularly with a focus on digital technology adoption, which is critical to business outcomes and economic growth (Ruiu and Breschi, 2019). This empirical study is indispensable as it sheds light on the aging-related factors that play into digital technology adoption within the informal micro-enterprise sectors in the settings of Thailand. Based on the findings attained, this study identified that older informal micro-entrepreneurs faced age-induced barriers to digital technology adoption into their businesses. However, it also showcases how some older micro-entrepreneurs to minimize these aging-related constraints proactively leverage digital technology adoption. In summary, this study offers meaningful insights that can be used as a basis for intervention attempts at fostering digital technology adoption in this underrepresented entrepreneurial demographic. By recognizing the distinct barriers and opportunities that older micro-entrepreneurs experience when it comes to digital technology adoption, policymakers can make well-informed decisions tailored to the informal micro-enterprise sectors to maximize their efficacy and long-term sustainability.

REFERENCES

1. Anthesis. 2023. "Social Impacts in the Informal Economy | Anthesis Group." *Anthesis*, December 14. https://www.anthesisgroup.com/insights/social-impacts-in-the-informal-economy/.
2. Anamwathana, Panarat. 2024. "Thailand's Ageing Society and Young Thais' Changing Views and Expectations." *ISEAS – Yusof Ishak Institute*, April 15. https://www.iseas.edu.sg/articles-commentaries/iseas-perspective/2024-28-thailands-ageing-society-and-young-thais-changing-views-and-expectations-by-panarat-anamwathana/.
3. Asiedu, E. M., S. Shortland, Y. S. Nawar, P. J. Jackson, and L. Baker. 2019. "Supporting Ghanaian Micro-Entrepreneurships: The Role of Mobile Technology." *Journal of Entrepreneurship in Emerging Economies* 11 (3): 306–27.
4. Berner, J., Ana Luiza Dallora, Johan Sanmartin Berglund, and P. Anderberg. 2022. "Technology Anxiety and Technology Enthusiasm versus Digital Ageism." *Gerontechnology* 21 (1): 1–8.
5. Braun, V., and V. Clarke. 2006. "Using Thematic Analysis in Psychology." *Qualitative Research in Psychology* 3 (2): 77–101.
6. Channuwong, S., Ruksat, S., & Srivinayaphon, P. (2022). The relationship between the four foundations of mindfulness and mental health development. *Kasetsart Journal of Social Sciences, 43*(1), 166-172. https://doi.org/10.34044/j.kjss.2022.43.1.23
7. Channuwong, S., Tongvijit, M., Bangbon, P., Siripap, P. (2025). The influence of cultural factors on organizational justice of public organizations in Bangkok. *Journal of Neonatal Surgery, 14*(3), 1-9.
8. Creaney, R., M. Currie, and L. Reid. 2023. "Digital Life as a Cabaret, Old Chum: A Dramaturgical Analysis of Older Digitalised Home Residents and Their Wider Caring Networks." *Journal of Aging Studies* 65: 101129.
9. Dutta, N., S. Kar, and S. Guha. 2023. "Informal Sector in India and Adoption of Digital Technologies." *Indian Growth and Development Review* 16 (3): 230–46.
10. Eekhout, T., J. Berrou, and F. Combarnous. 2023. "Entrepreneurs' Mobile Phone Appropriation and Technical Efficiency of Informal Firms in Dakar (Senegal)." *Journal of International Development* 35 (6): 1429–55.
11. Fayize, P. V. 2025. "The Impact of Social Media on Cognitive Function and Brain Health." *Acta Neurophysiologica* 6 (1): 1–8.
12. Frik, A., L. Nurgalieva, J. Bernd, J. Lee, F. Schaub, and S. Egelman. 2019. "Privacy and Security Threat Models and Mitigation Strategies of Older Adults." In *Fifteenth Symposium on Usable Privacy and Security (SOUPS 2019)*, 21–40.
13. Galletta, A., and W. E. Cross. 2013. "Mastering the Semi-Structured Interview and Beyond: From Research Design to Analysis and Publication." *Choice Reviews Online* 51 (05): 51–2430.
14. Gallistl, V., R. Rohner, L. Hengl, and F. Kolland. 2021. "Doing Digital Exclusion – Technology Practices of Older Internet Non-Users." *Journal of Aging Studies* 59: 100973.
15. Gietel-Basten, S. 2019. *A Life-Cycle Approach to Ageing in Thailand*. UNFPA. https://thailand.unfpa.org/sites/default/files/pub-pdf/framework_on_ageing.pdf.
16. Haigh, R. 1993. "The Ageing Process: A Challenge for Design." *Applied Ergonomics* 24 (1): 9–14.
17. Haq, M., and J. Davies. 2020. "'The Person with Maximum Knowledge Will Win the Race': Conceptualizing Knowledge in Microbusinesses." *Journal of Small Business Management* 61 (2): 295–321.
18. Harris, M. T., K. A. Blocker, and W. A. Rogers. 2022. "Older Adults and Smart Technology: Facilitators and Barriers to Use." *Frontiers in Computer Science* 4.
19. Hertzog, C., A. F. Kramer, R. S. Wilson, and U. Lindenberger. 2008. "Enrichment Effects on Adult Cognitive Development." *Psychological Science in the Public Interest* 9 (1): 1–65.
20. Introna, L. 2005. "Phenomenological Approaches to Ethics and Information Technology." In E. N. Zalta and U. Nodelman, eds., *The Stanford Encyclopedia of Philosophy* (Summer 2024 Edition). https://plato.stanford.edu/archives/sum2024/entries/ethics-it-phenomenology/.

21. International Labour Organization. 2015. "4.5 Informal Economy Workers." December 3. https://www.ilo.org/resource/45-informal-economy-workers.
22. Islam, A., F. Mazyed, and F. Aldaihani. 2021. "Justification for Adopting Qualitative Research Method, Research Approaches, Sampling Strategy, Sample Size, Interview Method, Saturation, and Data Analysis." *Journal of International Business and Management*.
23. Jiradilok, S. 2022. "Digital Future for SMEs." *Bangkok Post*, March 3. https://www.bangkokpost.com/business/2273179/digital-future-for-smes.
24. Kelikume, I. 2021. "Digital Financial Inclusion, Informal Economy and Poverty Reduction in Africa." *Journal of Enterprising Communities* 15 (4): 626–40.
25. Kelley, C. L., and N. Charness. 1995. "Issues in Training Older Adults to Use Computers." *Behaviour & Information Technology* 14 (2): 107–20.
26. Kimuli, S. N. L., K. Sendawula, and S. Nagujja. 2021. "Digital Technologies in Micro and Small Enterprise: Evidence from Uganda's Informal Sector during the COVID-19 Pandemic." *World Journal of Science, Technology and Sustainable Development* 18 (2): 93–108.
27. Kurek, S., and T. Rachwał. 2011. "Development of Entrepreneurship in Ageing Populations of the European Union." *Procedia: Social & Behavioral Sciences* 19: 397–405.
28. Lavanya, R., and S. Shrivastava. 2024. "Demographic Factors Influencing the Adoption of Digital Payment Methods: A Statistical Analysis of User Preference." September 13. https://mylib.in/index.php/JOM/article/view/JOM_11_03_001.
29. Lichy, J., J. D. Farquhar, and M. Kachour. 2020. "Entrepreneurship via Social Networks – 'Connected Woman' in Lebanon." *Qualitative Market Research* 24 (4): 426–48.
30. Lin, C. J., and S. Ho. 2020. "The Development of a Mobile User Interface Ability Evaluation System for the Elderly." *Applied Ergonomics* 89: 103215.
31. Lincoln, Y. S., E. G. Guba, and J. J. Pilotta. 1985. *Naturalistic Inquiry*. *International Journal of Intercultural Relations* 9 (4): 438–39.
32. Malmqvist, J., K. Hellberg, G. Möllås, R. Rose, and M. Shevlin. 2019. "Conducting the Pilot Study: A Neglected Part of the Research Process? Methodological Findings Supporting the Importance of Piloting in Qualitative Research Studies." *International Journal of Qualitative Methods* 18: 160940691987834.
33. MacCrory, F., M. Macharia, K. Ravindran, and J. Vithayathil. 2024. "Entrepreneurship in the Age of Social Media." *Entrepreneurship Research Journal*.
34. Miniesy, R., M. Shahin, and H. Fakhreldin. 2022. "The Determinants of Digital Entrepreneurship by Informal Micro and Small Enterprises (MSEs) in Egypt." *World Journal of Entrepreneurship, Management and Sustainable Development* 18 (4): 425–45.
35. Mkalama, B., G. Ciambotti, and B. Ndemo. 2022. "Digital Adoption in Micro and Small Enterprise Clusters: A Dependency Theory Study in Kenya." In *Edward Elgar Publishing eBooks*, 199–220.
36. Musa, C. I., and M. Hasan. 2018. "The Influence of Social, Economic, and Demographic Characteristics on Working Hours of Micro, Small, and Medium Enterprises (MSMEs) in Makassar City." *Journal of Physics: Conference Series* 1028: 012181.
37. NationThailand. 2024. "More Than 1/3rd of Thailand's 13.6 Million 60-Plus Population Still Working." April 20. *NationThailand*. https://www.nationthailand.com/thailand/policies/40037391.
38. Neves, B. B., and G. Mead. 2020. "Digital Technology and Older People: Towards a Sociological Approach to Technology Adoption in Later Life." *Sociology* 55 (5).
39. Neves, B. B., J. Waycott, and S. Malta. 2018. "Old and Afraid of New Communication Technologies? Reconceptualising and Contesting the 'Age-Based Digital Divide.'" *Journal of Sociology* 54 (2): 236–48.
40. Nurgalieva, L., J. J. J. Laconich, M. Baez, F. Casati, and M. Marchese. 2019. "A Systematic Literature Review of Research-Derived Touchscreen Design Guidelines for Older Adults." *IEEE Access* 7: 22035–58.
41. Nwaokolo, A. 2022. "How Information & Communication Technology is Influencing the Rise of Entrepreneurship in Nigeria." June 28. FATE Foundation. https://fatefoundation.org/how-information-communication-technology-is-influencing-the-rise-of-entrepreneurship-in-nigeria/.
42. OECD. 2024. *Financing SMEs and Entrepreneurs 2024: An OECD Scoreboard*. https://www.oecd-ilibrary.org/sites/fdacc78c-en/index.html?itemId=%2Fcontent%2Fcomponent%2Ffdacc78c-en#section-d1e938-f0572dbb2a.
43. Office of Small and Medium Enterprises Promotion (OSMEP). 2023. *SMEs*. https://en.sme.go.th/en/
44. Onyima, J. K., and N. C. Ojiagu. 2017. "Digital Technology and Formalization of Informal Businesses: A Case of African Traditional Spiritualists." *International Journal of Academic Research in Business & Social Sciences* 7 (11).
45. Pansuwong, W., S. Photchanachan, and P. Thechatakerng. 2022. "Social Innovation: Relationships with Social and Human Capitals, Entrepreneurial Competencies and Growth of Social Enterprises in a Developing Country Context." *Social Enterprise Journal* 19 (1): 51–79.
46. Parry, D. A., and D. B. L. Roux. 2021. "'Cognitive Control in Media Multitaskers' Ten Years On: A Meta-Analysis." *Cyberpsychology: Journal of Psychosocial Research on Cyberspace* 15 (2).
47. Pena, B. B., R. E. Clarke, L. E. Holmquist, and J. Vines. 2021. "Circumspect Users: Older Adults as Critical Adopters and Resistors of Technology." In *CHI '21: Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*, Vols. 84, 1–14.
48. Rassool, M. R., and D. R. Dissanayake. 2019. "Digital Transformation for Small & Medium Enterprises (SMEs): With

Special Focus on Sri Lankan Context as an Emerging Economy." *International Journal of Business and Management Review* 7 (4): 59–76.
49. Rattananda, N., Kenikasahmanworakhun, P., Channuwong, S., Sawangwong, B., Islam,
50. M.M., & Han, W. (2025). Leadership of administrators, organizational structure and
51. organizational culture influencing good governance implementation of Thai Higher
52. Education Institutions. *Vascular and Endovascular Review*, *8*(6s), 71-78.
53. Rochmawati, E., F. Kamilah, and A. C. Iskandar. 2022. "Acceptance of E-Health Technology among Older People: A Qualitative Study." *Nursing and Health Sciences* 24 (2): 437–46.
54. Ruiu, G., and M. Breschi. 2019. "The Effect of Aging on the Innovative Behavior of Entrepreneurs." *Journal of the Knowledge Economy* 10 (4): 1784–1807.
55. Schirmer, W., N. Geerts, A. Vercruyssen, and I. Glorieux. 2022. "Digital Skills Training for Older People: The Importance of the 'Lifeworld.'" *Archives of Gerontology and Geriatrics* 101: 104695.
56. Sebastian, I. M., J. W. Ross, C. Beath, M. Mocker, K. G. Moloney, and N. O. Fonstad. 2020. "How Big Old Companies Navigate Digital Transformation." In *Routledge eBooks*, 133–50.
57. Shinozaki, S. 2022. "Informal Micro, Small, and Medium-Sized Enterprises and Digitalization: Evidence from Surveys in Indonesia." *Social Science Research Network*.
58. Sutthadaanantaphokin, K., Channuwong, S., & Moolngearn, P. (2025). *Transformational leadership influencing mission implementation of Thai universities in Bangkok*. *Sciences of Conservation and Archaeology*, 37(3), 58-67. https://doi.org/10.48141/sci-arch-37.3.25.7
59. Swaminathan, M. (1991). *Understanding the 'informal sector': A survey* (WIDER Working Paper No. 95). Centre for International Studies, Massachusetts Institute of Technology.
60. Terry, G., N. Hayfield, V. Clarke, and V. Braun. 2017. "Thematic Analysis." In C. Willig and W. S. Rogers, eds., *The SAGE Handbook of Qualitative Research in Psychology*, 2nd ed., 17–37.
61. Ugargol, A. P., and L. Parvathy. 2023. "Precarity of Informal Work, Absence of Social Security, and Ageism: The Persistence of Social Inequalities and Challenges for Older Adults' Labor Force Participation in India." In *Handbook of Aging, Health and Public Policy: Perspectives from Asia*, 1–29. Singapore: Springer Nature Singapore.
62. Vrontis, D., R. Chaudhuri, and S. Chatterjee. 2022. "Adoption of Digital Technologies by SMEs for Sustainability and Value Creation: Moderating Role of Entrepreneurial Orientation." *Sustainability* 14 (13): 7949.
63. Walsh, K., T. Scharf, and N. Keating. 2016. "Social Exclusion of Older Persons: A Scoping Review and Conceptual Framework." *European Journal of Ageing* 14 (1): 81–98.
64. Wang, K. H., G. Chen, and H. Chen. 2018. "Understanding Technology Adoption Behavior by Older Adults." *Social Behavior and Personality: An International Journal* 46 (5): 801–814.
65. Wherton, J., P. Sugarhood, R. Procter, and T. Greenhalgh. 2018. "Designing Technologies for Social Connection with Older People." In *Berghahn Books*, 107–24.
66. Yeung, W. J., S. Desai, and G. W. Jones. 2018. "Families in Southeast and South Asia." *Annual Review of Sociology* 44 (1): 469–95.
67. Zafri, K. Z., B. Sigdel, and P. Bhandari. 2023. "Crisis Management during the COVID-19 Pandemic: Street Food Vendors' Perspectives from Bangkok." *Journal of Contingencies and Crisis Management* 31 (4): 877–89.
68. Zafri, K. Z., T. Lertatthakornkit, S. Photchanachan, T. Zhu, and W. Wider. 2024. "Weathering the Inflationary Storm 2021–2022: Crisis Management Modalities for the Informal Microenterprise Sector." *International Journal of Economics and Financial Issues* 14 (5): 47–61.