A Study Report on Digital Economic Integration for MSMEs in Agro-processing and Tourism Sector in Cambodia

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Contents

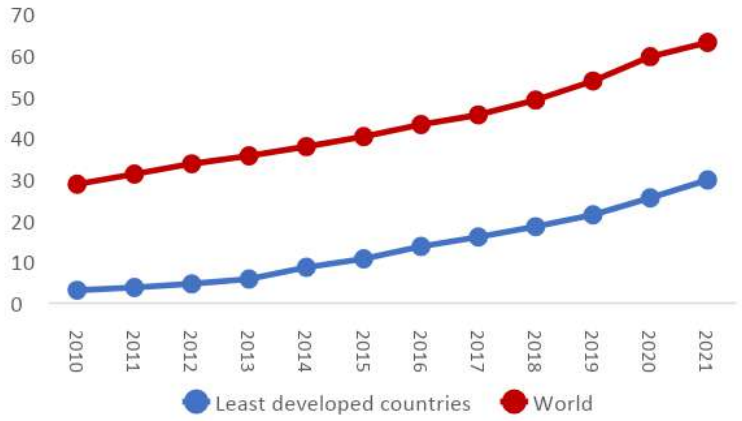
List of Abbreviations

ADB	:	Asian Development Bank
CDRI	:	Cambodia Development Resource Institute
CGCC	:	Credit Guarantee Corporate of Cambodia
DAI	:	Digital Adoption Index
EIF	:	Enhanced Integrated Framework
ERP	:	Enterprise Resource Planning
ESCAP	:	Economic and Social Commission for Asia and the Pacific
GDP	:	Gross Domestic Products
ICT	:	Information and Communication Technology
ITU	:	International Telecommunication Union
MoC	:	Ministry of Commerce
MSMEs	:	Micro, Small and Medium Sized Enterprises
OECD	:	Organization for Economic Cooperation and Development
PMS	:	Property Management System
POS	:	Point of Sale System
RGC	:	Royal Government of Cambodia
STEM	:	Science, Technology, Engineering and Mathematics
UN	:	United Nations

1. Introduction

In present days where digitalization is inevitable, it is essential that countries and firms adopt digital technology to survive. However, adoption varies across country, sector as well as firm size. Compared to the developed countries, emerging market economies perform poorly on indicators related to access and use of digital technology, because of barriers such as inadequate infrastructure, digital illiteracy, lack of financial inclusion and low use of digital payments by enterprises. Over the last decade, LDCs (least developed countries) have increased their Internet use from 3.1 to 29.8 individuals per 100 habitants using the Internet. Compared to the world, however, the average penetration rate of LDCs is still relatively low.

Figure 1. Internet penetration rate (%) in least developing countries and world between 2010 and 2021



Source: World Bank data, accessed 16 May 2023

On the business side, digital adoption is more common in larger corporations than in the micro, small and medium size enterprises (MSMEs). Evidence from OECD showed that both small and large firms have increasingly made computers and internet services available for their staff to perform their jobs; however, small firms do so less rapidly (OECD, 2021). Larger firms also adopt digital technology, especially a more sophisticated one, faster (World Bank, 2022). For instance, larger firms surpass their smaller counterparts in utilizing Enterprise Resource Planning (ERP) system, an integrated solution to manage all business activities including finance, human resources, procurement and inventory, logistics and manufacturing, supply chain and marketing (Ragowsky & Somers, 2002; Shehab et al., 2004). There are several benefits of digitalization. First it helps reduce the cost of operations and increase productivity of firms (Cagle et al., 2020; Oliveira et al., 2021). Digital technology reduces paperwork which saves both time and money spent on the materials and other associated costs. Technology such as automation, artificial intelligence as well as telecommunication and webinars help reduce barriers to communication, access to information, reduction in errors and speed (Aguirre & Rodriguez, 2017). Digital technologies increase firms' competitive advantage and accelerate their internationalization (Leão & da Silva, 2021; Lee & Falahat, 2019), which may imply the ability to move along the value chain. For manufacturing firms, besides saving cost, digitalization provides the firm with "production-related knowledge-intensive assignments" that leads to upgrading and product sophistication; plus, early digital adopters' products are 4-5 percent more sophisticated than the later ones (Banga, 2022; Szalavetz, 2019).

Internationalization can have many dimensions. Calabrese and Manello (2018) shared five dimensions of internationalization, namely exporting, outward foreign direct investment (OFDI), inward foreign direct investment (IFDI), networking and importing. Considering exporting, firms can catch up their share in international market or increase their foreign sales though using the internet to share information and facilitate transaction and involving in website for buying and selling and social media, as evidenced by (Cassetta et al., 2019; Eduardsen, 2018). Nonetheless, smaller firms may not be able to reap full benefits of digital technology due to the challenges they are facing. One challenge is that MSMEs are at the disadvantage of hiring skilled labour force and lack the budget to (Mohamed & Weber, 2020). Therefore, as they themselves as well have limited knowledge on digital technologies (Haji Salum & Abd Rozan, 2016), then they are less keen to commence adoption. MSMEs may not be aware of the availability and benefits of digital technology(Parra & Guerrero, 2020; Ritz et al., 2019). In addition, due it its small size, MSMEs lack necessary resources to utilize such technology either in production or service provision process. management, or marketing. Smaller firms are more cost-sensitive when making investment (Kilimis et al., 2019) as they lack financial capital capability, especially those with women owners (Ahmad & Arif, 2015; Beck & Demirguc-Kunt, 2006). Therefore, having sufficient physical infrastructure such as digital tools and devices like computers and smartphones, access to stable internet service and/or access to licensed computer software can be difficult for them.

The case might be true for MSMEs in Cambodia, where digital adoption has been increasing but at the early stage. Hence, this study report aims to investigate status of digital integration of MSMEs in Cambodia. Digital integration is understood as the digitally led engagement of MSMEs with other firms on local/global networks or consumers for economic growth.

The main goals of the study were twofold:

i. Understand the extent to which the current pathways for digital integration and the existing policy, and regulatory and governance frameworks can support the equitable development of MSMEs in Cambodia.

ii. Study the gendered impact of these developments with a specific focus on how women-led enterprises may be responding to the changing landscape, and the extent to which gender is mainstreamed in the policy discourse.

The study focuses on two sectors, namely agro-processing and tourism, which are the two-sectorstwo sectors gaining attention by the government, especially for post Covid-19 pandemic recovery, with potentials for growth in the future.

2. Digital Adoption in Cambodia: An overview

Digital adoption has taken place; however, it may be at a low level according to previous studies and reports. Using the data from World Bank Enterprise Survey 2016, SET (2020) found that just nearly a 25 percent of firms have a website; the percentage is even far lower for exporting and manufacturing firms, at 12 and 14 percent, respectively. Even though amongst foreign owned firms (with 10 percent of foreign share or more), which is believed to have higher level of digitalization, the rate is only at 22.6 percent. With the same dataset, Banga et al. (2020) disaggregated the data by service and manufacturing sector, they found that a larger percentage of firms in service sector have own website (27.5 percent).

In Cambodia, MSMEs have long been considered as the backbone of the economy since they account for more than 90 percent of total enterprises and 70 percent of total employment, leading to their contribution of 58 percent to the country's total GDP in 2018 (MISTI, 2018, cited in Thy, 2021).

MSMEs' digitalization has seen momentum in recent years, including the use of some digital tools such as computers, e-mail, and social media for marketing sales purposes, plus e-payment. Various digital market platforms were also established. To give example, in 2021 the Ministry of Commerce with the financial support from Enhanced Integrated Framework (EIF) successfully established an e-commerce platform called CambodiaTrade.com, which allows MSMEs to do trade and have access to a wider market. Besides CambodiaTrade.com, there are other privateprivately owned platforms such as Foodpanda, Grab, PassAapps, Tada, and BookMeBus that provide products ranging from foods, groceries and other goods delivery to transportation services domestically. E-payment has also taken off to assist small firms in particular, in faster and safe payment. Examples of digital payment platforms include ABA Pay, PiPay, Bakong/KHQR, ACLEDA ToanChet, and Wing Pay.

While the pandemic means small firms are more vulnerable than large firms, digitalization has helped MSMEs go through difficult times. According to a country report by DAI, some of surveyed MSMEs reported adoption of digitalization for their business during the Covid-19 pandemic, meanwhile others reported intention to adopt or expand the adoption of digitalization. Combining with another report by UN ESCAP (2020), it can be inferred that firms have used digital tools such as a mobile apps, spreadsheet and MS Word/Word Processing and accounting software, production software and inventory management, digital marketing via their own websites or Facebook, e-payment, and e-commerce. However, most used digital tools are Facebook and digital payment.

3. Digital Gender Divide

Digital gender divide" occurs when there is a gender gap in effective access and utilization of digital technologies within or between countries, regions, sectors and socio-economic groups; and the causes of digital gender divide include "access, affordability and education" (OECD, 2018; United Nations Division for the Advancement of Women, 2005). Digital gender divide can have a negative economic impact. Globally, men are 21 percent more likely to be online than women; and the figure rises to 52 percent in least developed countries; and it is estimated that governments could lose billions of dollars from this exclusion of women (Alliance for Affordable Internet, 2021). Alliance for Affordable Internet (2021) estimated that low and lower middle income countries have suffered a significant loss of 1 trillion USD in GDP due to the gender gap in internet use alone within the last ten years; 24.7 billion USD of which is estimated as a loss in tax revenue. Nonetheless, the digital gender gap is declining for the low- and middle-income countries. GSMA's the Mobile Gender Gap Report 2022 revealed that mobile ownership gap decreased from 9 to 7 percent between 2017 and 2021, while the gap in mobile internet usage reduced from 25 to 16 percent in the same period (GSMA, 2022). Both the AAI (2021) and GSMA (2022) recognized that despite the increase in women adoption of internet use, their catch-up rate remains slow.

A field survey amongst population aged 15–65 year by Galpaya (2018) provides information on digital gender divide in Cambodia. The survey revealed that women are 20 percent less likely to own a mobile phone, especially amongst those in the rural who have the lowest level of mobile phone ownership. In addition, women have lower access to the internet as there is a 12 percent and 34 percent gap between men and women's ownership of internet enabled phones and internet use, respectively. The main reason for not obtaining a smartphone amongst women is affordability, followed by not knowing how to use. In education, "tertiary enrollment in Science, Technology, Engineering and Mathematics (STEM) majors, including ICT, is relatively low in Cambodia"; meanwhile, the proportion of women enrolling in STEM is just around 30 percent and ICT is merely 15 percent (CDRI & CADT, 2021).

4. Sector Overview

4.1. Tourism sector

Tourism sector contributes significantly to the Cambodian economy. The sector directly employed 630,000 people of which 60 percent are female (ADB, 2021b). The sector contributed around 18% of to the country's GDP growth; the international tourism receipt was rising constantly from 166 million USD in 1998 to 4,919 million USD in 2019, accounting for 12 percent of its GDP (ADB, 2021b; Ministry of Tourism, 2022). However, due to the Covid-19 pandemic, the number of international tourists significantly declined by more than 80 percent, leading to international tourism receipt of just 1,023 million USD in 2020. As a hard-hit industry by the pandemic, business in the sector faced reduction in revenue and income, business closures, laying off workers and increasing loan burdens. According to the Ministry of Tourism, 1,200 establishments in the tourism industry were closed and almost 22,000 direct jobs have been lost as of May 2022 (Khmer Times, 2022). To ease the burden of enterprises under tourism sector, the Royal Government of Cambodia (RGC) released assistance by providing a 40USD wage subsidy for suspended workers and skill training to those who lost their jobs. However, informal businesses and workers were not eligible for the scheme.

As the situation eased and to help tourism business recover, the government, via state-owned Credit Guarantee Corporation of Cambodia (CGCC), launched a scheme to provide loans to tourism establishments without collateral. Owners of tourism establishments applying for the loan need to fulfil three main requirements: (1) the business has to be owned by a Cambodian national who holds at least more than 50 percent of shares, (2) the business has to be legally registered and (3) the business has the ability to make repayment. Besides financing scheme, digital transformation is also seen as one of the drivers for tourism sector recovery as it will help tourism establishments provide better quality services.

Other efforts were made to increase the uptake of digitalization in the tourism sector. One example is the ministry's success in cooperation with partners to provide MSMEs with digital-related training. With support from the ILO under a project that aims to build resilience and digital capacity after the Covid-19 pandemic, some MSMEs managers were trained about digital marketing and e-commerce; the course covers digital-related basic knowledge such as how to use social media, how to do business online, building brand and reaching out to more customers etc. Besides, there is a launch of online tourism vocational schools in 2021; and now the ministry is partnering with Wonderpass Technology to promote tourists' experience through digital technology such as cashless payment and e-ticketing.

4.2. Agro-processing Sector

Although agro-processing accounts for just around 2 percent of Cambodia's GDP, it is an important sector in Cambodia because it adds value to Cambodia's agricultural products and contributes to industrial development. The promotion of the sector has been mentioned in the RGC's Rectangular Strategy Phase IV as well as Industrial Development Policy 2017-2025. Nonetheless, the sector has not been able to reach its potential due to challenges such as the low level of private and large-scale investment in the sector.

Since 1998 the sector's capacity to process has been limited, just 10 percent of Cambodia's agricultural materials are processed domestically. From the available data, there were 31,400 SMEs processing food and beverages in 2010, a majority of which are formally registered. These SMEs mainly supply local markets, while medium and large agro-processing enterprises comprise of rice millers and exporters, beer manufacturers, tobacco manufacturers, boutique breweries, and specialty food exporters (BDLink (Cambodia), 2014).

To support the sector, the government stated clearly in the Cambodia's Industrial Development Policy 2017-2025 that the sector needs to be diversified and further investment is needed, both domestic investment and Foreign Direct Investment (FDI). The policy also emphasizes the establishment of Agro-processing Special Economic Zone (SEZ), that can enhance production connectivity, technology and export market. According to the policy, the government aims to increase the export of agro-processing products to 12 percent by 2025.

There were a number of challenges faced by businesses in agro-processing sector. According to the World Bank, transportation cost for Cambodia remains high despite a decrease from 15USD per 100kg/ton in 2009 to 10USD per 100kg/ton in 2013. Yet, it is higher, comparing to 7USD in Vietnam and 5USD in Thailand. From the Cambodian Enterprise Survey 2016 by the World Bank, enterprises raised that they had to pay informal fee to get, for instance, export license and/or other procedural requirements. Informal exports of agricultural products such as rice paddy, cashew nuts, and peppers is also a burdensome (Oum et al., 2018).

5. Digitalization Development and Supporting Polices for MSMEs

5.1. Digitalization Development

ICT system in Cambodia has grown in recent years. According to the latest data from Telecommunication Regulator of Cambodia, in 2022 there are 19.5 million mobile connections and 18 million internet users. In 2020, around 80% of the population is covered by 3G and 4G mobile service as of July 2020 (RGC, 2021a) . According to the ITU data, there is a quick jump in proportion of internet users to the total population from 2015 to 2016, from 16.7 to 85.7 percent respectively for the 15-24 age group and from 10.1 to 39.8 percent respectively for the 25-74 age group. However, there are some challenges that the country must address, including development of both hard and soft infrastructure, human capital and legal framework. According to CISCO's Digital Readiness Index 2019, Cambodia is still ranked low, 102nd out of 141 countries with the score of 9.27 out of 25, placing the country at Accelerate Low, which indicates that the country has taken some steps towards digitalization but there remain opportunities to accelerate or improve their digitalization readiness. Two out of seven components used to calculate the index, namely technology adoption and technology infrastructure, scored 0.77 (out of 3) and 0.47 (out of 4) respectively.

Table 1. CISCO's Digital Readiness Index 2019; Cambodia and Selected Countries

Country	Score	Stage	Basic Needs	Business and Gov't Investment	East of Doing Business	Human Capital	Start-up Environment	Tech Adoption	Tech Infrastructure
Cambodia	9.27	Accelerate Low	2.45	1.17	1.59	2.54	0.27	0.77	0.47
Vietnam	12.06	Accelerate High	3.5	0.86	2.64	3.06	0.4	0.98	0.62
Thailand	13.21	Accelerate High	3.65	1.18	2.87	2.6	0.42	1.24	1.25
Lao PDR	8.58	Accelerate Low	2.58	0.9	1.75	2.22	0.3	0.43	0.4

Source: CISCO Whitepaper

Digital literacy rate in Cambodia is concentrated at basic level and a low rate; only less than 30 percent of the population have basic digital skills according to the International Telecommunication Union (ITU) statistics in 2018. As defined by the ITU here, basic digital skills comprise of copying or moving a file or folder, using copy and paste tools to duplicate or move information within a document, and using basic arithmetic formula in a spreadsheet (Banga & Velde, 2020).

On the financial aspect, financial technology has developed markedly. From the National Bank of Cambodia report, in 2021 there were 698.8 million financial transactions amounting to 199.76 billion USD in volume. With the introduction of a blockchain technology—the KHQR—that allows transaction without fees between banks, this sector is expected to increase even more rapidly in the following years.

5.2. MSMEs Supporting Policies

By recognizing the potential benefits of digitalization to social and economic development as well as the constraints, the RGC has set several polices as follows, that directly and indirectly benefits business, including MSMEs.

Digital Economy and Society Policy Framework 2021-2035, which was officially launched in June of 2021, is an overarching policy document that covers overall goal and strategies for digital development of the country. This policy framework aims at building "a digital economy to become both a new growth driver, as well as an ecosystem to contribute to increasing economic productivity and efficiency and improve the welfare of the people of Cambodia's digital society." (RGC, 2021a). The framework is divided into three phases. In the first phase—building foundation and digital adoption (2021-2025), both hard and soft infrastructure such as connectivity and institutional and legal framework will be developed to create an ecosystem as a solid foundation to digital adoption and transformation. The second phase—digital adoption and digital transformation (2026-2030), key players in the digital economy and society will be further strengthened regarding their capacity and readiness for digital transformation in all aspects of the economy and society. The last phase—digital transformation (2031-2035), it is an acceleration stage where digital technology becomes a norm in the new social and economic growth model. Three main pillars are defined to achieve a vibrant digital economy and society, namely digital citizen, digital government and digital business, once the digital foundation and reliability and confidence are established. Digital citizen is ensuring digital skills and knowledge amongst public and private sector and at all levels through capacity development on digital leadership in both public and private sector, mobilising and building a digital talent pool, and ensuring that people have adequate practical knowledge and skills to use digital technology in their every life in an effective and responsible manner. Digital government, on the other hand, is modernising core government functions and public services provision to become digitalised, building digital platforms as enablers and building a data-driven governance. Meanwhile, digital business refers to promoting digital adoption of enterprises, especially small and medium size enterprises (SMEs), promoting entrepreneurship and startups ecosystems and promoting digital value chain.

Through the guidance of the Digital Economy and Society Policy Framework 2021-2035, National Digital Economy and Society Council was established and chaired by the Cambodian Prime Minister. The council comprises of three committees, under which there are three committees, namely Digital Economy and Business Committee, Digital Government Committee and Digital Security Committee. The first committee "is responsible for leading, preparing, coordinating, monitoring, and evaluating the implementation of policies, strategies, measures and action plans, and investment in the development of the digital economy, business and society. In addition, this Committee is responsible for leading, organizing and coordinating public investment related to the development of the digital sector, as well as responsible for supporting the council on monitoring and evaluating the implementation of this policy framework" (RGC, 2021a) , the later acts as an

"etat major" to the council in coordinating, leading, preparing, implementing, monitoring, and evaluating the implementation of policies, strategies, measures, technical standards, and action plans related to building the digital government. This committee successfully form the Digital Government Policy (2022-2035) which was released in 2022. With the effort of the RGC in promoting e-government since 2008 and many projects being developed, the newly established policy document aims to build a smart government that operates in a credible and transparent manner using digital infrastructure and technology to provide public services for inclusive economy and society. One of the three principle of this policy is to provide services to business, which means this policy straightforwardly supports MSMEs as, for instance, improved business online registration platform, tax system and postal service and infrastructure. The last committee under the council is Digital Security Committee. This committee, according to its name, is responsible for "coordinating, directing, preparing, implementing, monitoring and evaluating the implementation of policies, strategies, measures, technical standards and action plans related to security in the digital space, including cybersecurity, cybercrime and national security" (RGC, 2021).

Another regulatory document directly support digitalization amongst MSMEs is the E-Commerce Law enacted in 2019. The law (RGC, 2019b) intends to govern electronic commerce in the Kingdom of Cambodia and with the international countries, create legal certainty in the civil and commercial transactions by electronic commerce and give confidence to the public in the usage of electric commerce. Therefore, via this law, MSMEs as well as buyers can build more confidence in participating in the e-commerce practice because the law helps eliminate barriers to e-commerce, such as uncertainty of requirements of written documents and signature and security concern, as the law clearly states the responsibility of the consumers, payment service providers as well as intermediaries and e-commerce service providers as well as standard for authenticity and perfection of electronic records that contribute to consumer and data protection on e-commerce. Along with this law, two Prakas[1] were issued on granting permit license to intermediary, e-commerce provider and exemption in 2020 to ensure a smooth application for permit license and ensure governance of all transactions by e-commerce in the kingdom and with foreign countries. The permit license is given to any natural and legal person, sole proprietorship or branch of foreign company whose have electronic commerce transactions or activities such as providers of electronic commerce website service, electronic commerce platform service, online marketing service, online bidding service, and other similar services provided computer system or other smart devices that promote electronic commerce. The exemption includes those who are in the following activities,

- conducting commercial advertisement which is not for a purpose of forming a contract,
- Reserving/booking services not requiring a deposit or payment from customers,
- Selling goods or services with an annual turnover that is less than that required for a business to be considered a small taxpayer,
- Selling goods or services through a family business or on a seasonal basis,
- Selling goods or services that are or relate to personal artwork,
- Personal training, and
- Services relating to the State's religion training and education.

For a successful e-commerce in Cambodia, E-Commerce Strategy was also launched in 2020 and SME regulation is one of the many areas that are covered by Chapter 3 of this strategy document (MoC, 2020). The chapter proposes that regulatory framework and the one specific for e-commerce firms need to be strengthened, including tax issues, administrative formalities, and cost, as well as registration.

[1] It is an official proclamation, which is a ministerial or inter-ministerial decision signed by the relevant minister(s).

The second emphasis is on strengthening of private sector involvement and capacity in e-commerce via collaborative and regular discussion between policy makers and private sector associations and chamber of commerce on e-commerce development, creating a one-stop website that provides SMEs with comprehensive and up-to-date information on SME-related topics, and establishing e-commerce association of Cambodia represents the interests and drives e-commerce development in the sector. The third emphasis is on improving enterprise-level capacity to keep ahead of policy and regulation changes by conducting workshop to identify the gaps and capacity building. The last emphasis is developing focused and specialized SME support tools, for example, an end-to-end information guide for e-commerce SME related to policies and regulations, creation of business environment that enable them to innovate and diversify their service offerings, and regular mode of engagement between relevant ministries and e-commerce SME.

For tourism sector revival, a policy document—Roadmap for Recovery of Cambodian Tourism During and Post Covid-19—was launched in 2021 (RGC, 2021b). The roadmap focuses on transforming the threat from the COVID-19 crisis into an opportunity to reform Cambodia's tourism sector into a quality, safe and sustainable tourist destination, bringing back 7 million international tourists by 2025 and 11 million domestic tourists by 2023. Amongst all the many goals to achieve the above vision are promoting tourism through digitalization in the context of the Fourth Industrial Revolution (IR 4.0)—the use of digital advertising through social media such as Facebook page and digital media such as Website and Apps—and promoting technology adoption in the tourism sector. Digitalization goals, amongst others, include (1). digital marketing campaign, (2). strengthen training on digital literacy and digital skills in the tourism industry, (3). organize digital administration (by government) and (4). Promote digitalization for tourism enterprises. To achieve digital-related goals in the roadmap, the Ministry of Tourism with support from partner organizationorganizations is actively providing digital literacy training courses to MSMEs. One example is the ministry's partnership with Union of Youth Federation of Cambodia and Cambodia 4.0 Center to provide digital literacy training course to MSMEs affected by the Covid-19. The training courses, as of October 2022, cover various digital marketing tools such as Google Business, OTA platforms (Booking.com, Agoda, TripAdvisor, AirBnB), and E-Mail in Phase 1; E-Menu, Instagram and Facebook, Chat Apps, Google Maps and Google Translate in Phase 2; Cloud and Cloud Management, Privacy Protection (e.g., on Telegram and Facebook) and risk in Phase 3; and Instagram and Facebook Marketing, E-mail marketing and Market Research in Phase 4.

To support SMEs with upskilling and match the demand and supply of labour force, Skill Development Fund (SDF) was established in 2018 with six priority sectors including construction, manufacturing, ICT, electronics, tourism, and other skills. This Skill Development Program can be considered contributing to some extent to digital capacity of SMEs as two out of its four schemes are designed for SMEs who apply for financing, (1) SME employees—providing financing for upskilling and pre-employment training for the current employees and unemployed person who will be recruited, and (2) SME owner/management team—providing financing for upskilling of SME owner and managers. By November 2022, 6,950 employees and owners/managers, 42 percent of them are female, have been and are being trained, of which 191 in construction, 949 in electricity and electronics, 637 in ICT, 2,719 in tourism and other 2142 in other skills.

As the outputs and outcomes of the above-mentioned policies and regulations, programs, government portals and e-commerce platforms have been developed to assist MSMEs and the business sector. To illustrate, CambodiaTrade—an e-commerce marketplace was launched in 2021 under the Go4eCAM Project. The platform is operated by Ministry of Commerce and its objective is to help SMEs in Cambodia realize the benefits of e-commerce and sell their products to potential clients in the country as well as abroad. According to a report by Ministry of Commerce in a workshop on Cambodia's Digital Economy and Business Web Portals on October 29th, 2020, 141 SMEs registered with the platform, that employ more than 4,500 employees, 58 percent of them are female. In addition, 50 percent of these registered SMEs are in the provinces and women-led,

respectively. Currently, to mobilize SMEs into the CambodiaTrade platform, selling on the platform is currently free of charge, plus SMEs can also receive more support such as on formalization if needed, basic equipment provision for digitalization to SMEs in the province, training courses on digital marketing and export procedure, for instance, and assistance for product image/MV or description.

In addition, to promote digital literacy amongst Cambodian citizen, an information and web portal—Go Digital Cambodia—was developed. This portal provides all digital-related information including events, programs, learning and news section and links to various programs that were launched to assist Cambodians in embracing and adopting digital technology. This is also considered an essential source for MSMEs to begin with and/or learn more about digital technology. A Facebook Page for this portal is also set up so that everyone could receive information or knowledge on digital technology frequently such as terminology, cybersecurity, to name a few.

Several digital government services for business have been successfully developed. To give example, online business registration service where 19,072 businesses registered in this digital platform as of 2nd November 2022. Another example is e-Tax Service that includes e-payment, e-registration, e-data, e-uploader, e-VAT and e-filling. Bakong/KHQR, using a blockchain technology, has facilitated payment and it has been popular amongst Cambodian youth. This technology is not only safe, but it also reduces cost for financial transactions across banks.

On the tax and custom aspect, there are tax incentive scheme, custom duty exemption and tax incentive on voluntary registration. In the tax incentive scheme, SMEs are exempted from income tax for three to five years and additional incentives for deductible expenditures for six priority sectors including (1) agricultural or agro-industrial products, (2) food manufacturing and processing, (3) manufacturing of local consumable goods, waste recycling and production of goods for the tourism sector, (4) manufacturing of finished products, spare parts or assembling parts to supply other manufactures, (5) research and development associated with IT or the supply of IT-based services and (6) enterprises located in SME cluster zone and enterprise developing cluster zone. Whereas custom duty exemption aims at promoting job creation and SMEs' competitiveness. SMEs may obtain custom duty exemption on imports of production equipment (PE), construction equipment (CE) and raw materials/other production inputs (PI) if their business falls into one of the following categories. (1) Producers and suppliers of clean water, (2) Export-oriented enterprise and (3) Supporting industry for export-oriented enterprise. SMEs who voluntarily register for tax will receive a two-year exemption from tax on profit, commencing from the year in which the enterprise first generate revenue for those who have not earned revenue.

Other policies that contribute to MSME development include Industrial Development Policy 2017-2025, National Employment Policy (2015-2025), National Technical Vocational Education and Training 2017-2025 (RGC, 2017) and Cambodia Trade integration Strategy 2019-2023 (RGC, 2019a). These polices support MSMEs in a sense that they promote production and competitiveness of enterprises in general and SMEs, promote human capital development and labour market and promote the role of SMEs in the global value chain.

6. Methodology and Data

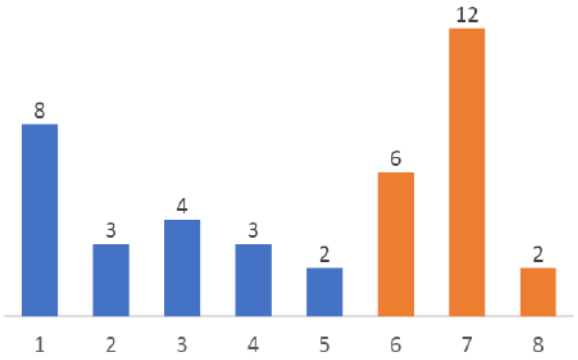
This study relies on qualitative research methodology to understand the experience of digital integration amongst MSMEs in the target sectors, their benefits from digital technology and challenges to adoption. 40 MSMEs, 20 in each sector, were selected using a quota sampling (only on sub-sector and women-led) and snowball sampling method. This means they are drawn from various lists and source such as Establishment Survey 2019, CambodiaTrade.com vendor list, Facebook, and digital platform (Online Travel Agency) search to ensure the desired number of the

sample can be achieved. Snowballing happens when interviewed MSMEs are asked to identify a potential respondent for the following interview.

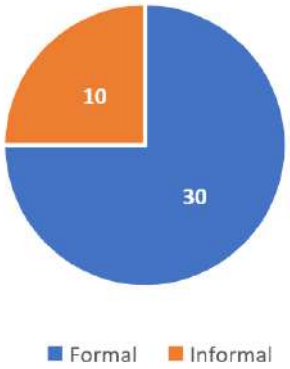
Finally, the following MSMEs were interviewed as shown in Figure 2. As per data analysing, the Nvivo 12.0 was used for defining attributes such as enterprise type (women-led, formality, sector, and size), location, and respondent's characteristics such as gender and age, and coding. Coding is done using pre-defined themes such as digital adoption level (connectivity infrastructure and tools, platforms, and frontier technology), motivating factors, support, benefits/impact pathways of digital technology for MSMEs, challenges, and gendered issues. Some sub-themes are also pre-determined, for instance, time and cost saving and competition pressure under the "motivating factors" theme; some are new emerging ones such as "increase business visibility" and "language barriers" under the "benefits/impact pathways" and "challenges" respectively.

Figure 2. Summary of MSMEs characteristics

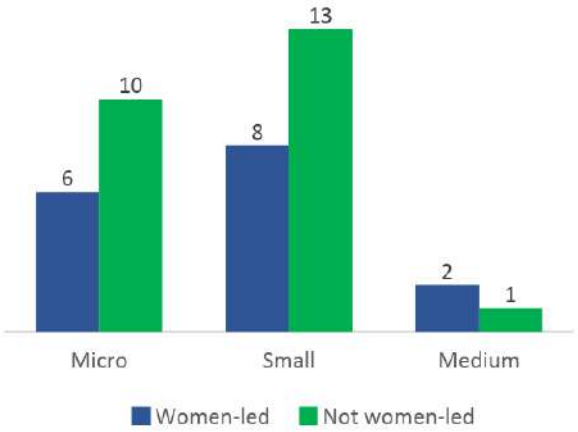
By sub-sector



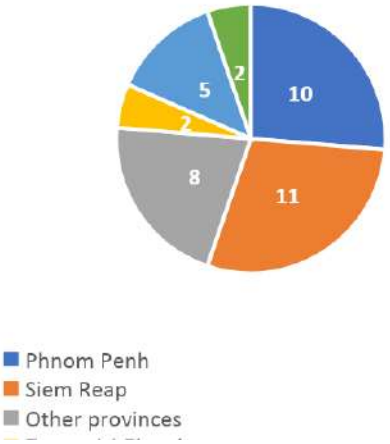
By formality



By women-led and size

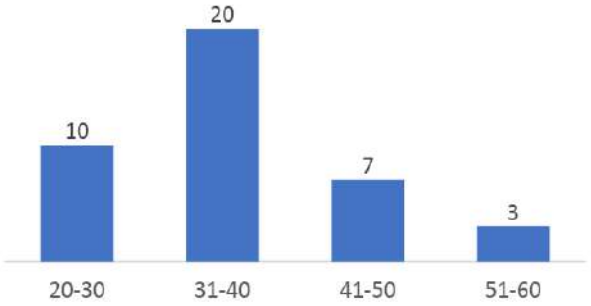


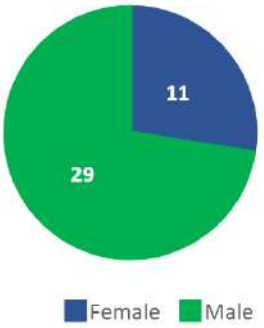
By location



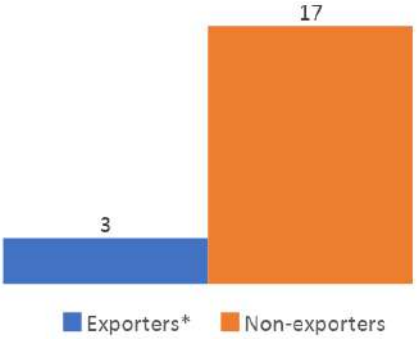
By respondent's age

By sex of respondent





By exporting status



(*) all exporters are under food processing sub-sector

Source: Author's compilation from the semi-structured interview

7. Findings

7.1. Agro-processing Sector

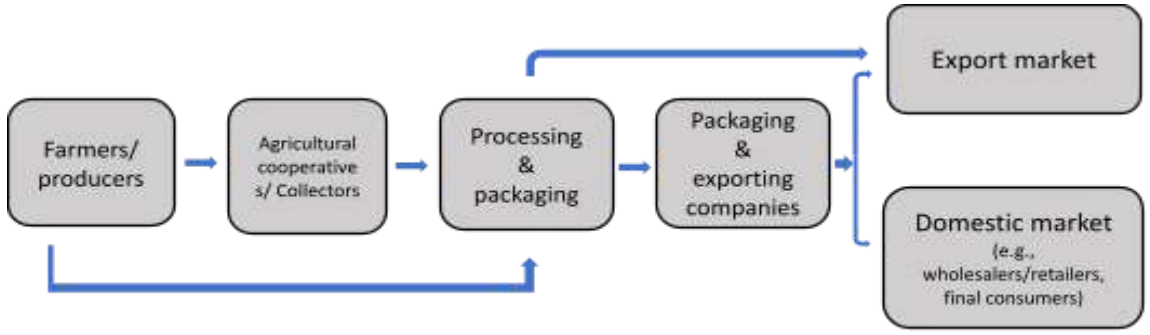
7.1.1. Level of Digital Integration

A typical agricultural value chain normally starts from farmers/producers to final consumers, where processors can come somewhere in the middle. From the semi-structure interview, a specific value chain can be drawn as in Figure 3. Where processors are the centre of our study, Figure 3 provides that processors purchase their raw materials from their suppliers who are farmers, agricultural cooperatives and/or collectors. Interviewed MSMEs in this sector do the processing and packaging; then they sell their finished products to exporters and/or export by themselves. According to the interview with twenty processing MSMEs, it appears that digital adoption is more concentrated amongst processors and exporting MSMEs as they reported having access to digital infrastructure such as internet service, computers as well as smartphones and utilizing digital marketing and sales platforms.

Amongst all the processors, digital technology is hardly found in production process for all sub-sectors. However, adoption of some other technologies varies between sub-sectors. Rubber processors adopted the least digital technology, i.e., digital technology is integrated minorly or not at all in accounting and administration as well as marketing and sales process.

Meanwhile processors in other two sub-sectors adopt accounting/management software, utilize mobile communication applications and digital marketing platforms such as social media (e.g., Facebook, Instagram and Tik Tok) as well as own or third-party e-commerce platforms.

Figure 3. Agricultural value chain



Source: author's inference from the semi-structured interview

7.1.1.1. Connectivity Infrastructure and Tools

Overall, most of interviewed MSMEs in agro-processing sector have access to digital connectivity infrastructure and tools such as mobile phones, internet, email and messaging services. With the current information and communication technology development, Internet service is commonly accessible by MSMEs either as they can either subscribe broadband internet service or use mobile internet. MSMEs mostly reported acceptable quality of the internet; however, it depends on their subscription package. Despite this fact, half of the interviewed MSMEs reported unstable internet quality, especially when there is rain or storm. In addition, a small proportion of those using mobile internet reported some poor internet service which apparently forced them to utilize mobile as well as mobile internet service from two or more companies.

A large majority of interviewed MSMEs in this sector also reported having smartphones, which can be of individuals or the enterprises and enable them to use mobile communication application as well as other applications. They also have computers which they can install and use some management software for accounting as well as other administrative work. When it comes to communication, not all mobile applications, such as Telegram and Facebook Messenger, are popular and user-friendly. All interviewed MSMEs have at least one communication application, either Telegram account or email to communicate with colleagues/employees or customers, while a few of them have other mobile applications such as WhatsApp, WeChat or Line, depending on the requirement by customers in different countries. E-mail is less frequently used than other communication tools like Telegram, but in formal communication with business partners and customers.

Table 2. Level of digital integration by interviewed MSMEs in the agro-processing sector

Level of digital integration	**Description**	**% of agro-processing MSMEs**
Connectivity infrastructure and tools	- Access to internet connectivity - Electricity	100%
	- Computers and smartphones	Computers (95%) Smartphones (all)
	- Mobile communication apps (Telegram, WhatsApp, Line, e-mail, Facebook messenger, etc.)	100%
	- Online meeting applications	40%
	- Cloud computing/storage	35%
	- Accounting system/software, channel manager, POS system	30%
	- E-payment (e.g., KHQR)	100%
Platforms	- Social media (Facebook, Instagram, Tik Tok, YouTube etc.)	100%
	- E-commerce platforms (CambodiaTrade, Foodpanda, Nham24, Kokopon, Grocerdel, Lazada, Alibaba etc.)	85%
	- Own informational website/e-commerce website	50%

Source: author's calculation from semi-structured interview

A rubber processor also mentions that "I rarely use e-mail even though I have one address; I think communication is slower if comparing to Telegram or Facebook Messenger. E-mail is not that slow, but it is also a matter of its popularity." A fruit processor also adds that, "... we have company and personal e-mail address; nonetheless, communication often takes place via Facebook messenger or Telegram since we have a Telegram group with our distributors."

E-payment is another digital technology available for business; and all interviewed MSMEs have experienced the use of digital payment either via simple transfer via bank application or QR/KHQR. The use of online meeting platforms such as Zoom, Microsoft Team or Google Meet, are not frequently mentioned by interviewed MSMEs in this sector, only 40 percent of interviewed MSMEs in agro-processing sector reported having used online meeting platforms as they had to communicate with customers or business partner abroad. Some 30 percent of MSMEs in agro-processing sector also report storing some documents on cloud. Nonetheless, they do not store important or confidential documents in it. One health product processor said he would keep the softcopy of legal documents offline in this computer.

The use of Enterprise Resource Planning (ERP) system is limited in agro processing sector. Less than forty percent of interviewed MSMEs in agro-processing sector have a specific system software integrated with those devices, which is either for accounting process, inventory or booking management only. This means more than half remain simply using Microsoft Word and Excel for administrative and accounting work. One agro-processing enterprise reported that,

"We adopted the POS system; however, it can only record the purchase and sales only, that makes it difficult for a manufacturer like us. While an ERP has more functions than this, we must wait until next year when we can afford a programmer to add more codes to the system as we do not have the knowledge and skills in doing so... For accounting, we use Microsoft Excel to track expense and income..."

7.1.1.2. Platforms

The second mode of digital integration was via platforms – either social media or e-commerce platforms or own business websites. I sSocial media in particular, was found to be a key way of connecting - common social media platforms used by MSMEs include Facebook, Instagram, LinkedIn, Tik Tok and YouTube. However, one platform can be more dominant than another. For instance, Facebook is the most cited social media platform by MSMEs. From our semi-structured interview, all MSMEs in the two sector alike have a Facebook account, most of them are business ones while a few have a personal account just to communicate with colleagues or share information about their business occasionally. However, a small proportion of them raised that they only post or promote their business on Facebook sometimes, as a food processor said, "...once in a while, we post on social media."

Besides social media platforms, MSMEs also develop their own websites to provide detailed information of their business and/or as an e-commerce website. Considering by sector, only half of agro-processing MSMEs revealed that they have their own website; two of them are in development process, however. Three out of ten interviewed MSMEs in this sector also added that their website is informational while one is fully functioning as an e-commerce one. When looking at sub-sector, two out of the three sub-sectors under agro processing, namely health and beauty products and food products, have their own website. The rubber processors do not develop their own website, reporting that their buyers are local merchants and/or exporting companies who come and buy at their establishment.

In additional to social media platforms and websites, many of interviewed MSMEs in in this sector sell their products on e-commerce platforms. From Table 2, 85 percent of agro-processing MSMEs sell their products on e-commerce platforms such as CambodiaTrade, Khmum, Foodpanda, Grocerdel, Lasada and Kokopon, with many of them having contractshaving contracts with more than one platform.

7.1.2. Motivating Factors

7.1.2.1. Business Visibility

There are a number of drivers for digital adoption. Digital marketing, especially social media platforms, are widely used by interviewed MSMSEs and the driver is mainly to increase visibility of their business to potential customers. Inarguably, social media platforms such as Facebook, Instagram and Tik Tok has millions of users, and they are popular amongst Cambodian youth. Therefore, it is recognized by approximately 80 percent of interviewed MSMEs in each sector (Table 3) as a means to promote their business. One fruit processor emphasized the significance of social media as follow,

"I saw that Facebook is popular; everyone has an account, so our promotion campaigns can reach many people. Facebook is our first choice, followed by Tik Tok, which we film short videos of our products and activities. We do not pay for boosting service, but we can gain many followers, who can be our friends and customers."

One health/beauty producer who does not have a physical store and sell her products on digital platforms adds that,

"Creating a Facebook page is our strategy to let others know about us—who we are, what we do and whom we work with, for instance. We do not have a physical shop and with no better mean to let people know about us due to budget constraint, Facebook is the only method that makes our business move forward."

Table 3. Main motivating factors of digital technology adoption in agro-processing sector

Motivating factors	**% of agro-processing MSMEs**
Business visibility	80%
Competition pressure	45%
Time and cost saving	25%

Source: author's compilation from the semi-structured interview

Besides social media platform, MSMEs in agro-processing did not express a clear potential of e-commerce platforms in reaching out to customers since they experienced none or just a few orders from e-commerce platforms since they first participated, recognizing some of them are only popular for food delivery. A few MSMEs, however, raised that participating in such e-commerce platform from now, even though it does not provide them an immediate benefit, can help them stay up to date with such technology and be ready once it become dominant in the future, as said by one health/beauty products producer mentioned,

"... even if we want it or not, our country will shift to e-commerce adoption. As the owner of a business, I should enhance my knowledge in this area, although I have not sold on those platforms yet. We need to keep ahead of our customers regarding e-commerce, so when it became popular amongst customers, we are ready to go."

7.1.2.2. Competition Pressure

Competition pressure is also a driver of adopting digital marketing and sales platforms. Those who mentioned it expressed that because everyone goes online, it is perceived by the interviewed MSMEs that they must participate in those platforms, or they lose the opportunity to reach out to potential customers. Moreover, participating in those platforms help maintain their competitiveness. These MSMEs perceived that they could not continue practicing conventional marketing strategies such as printing brochures and/or promotepromoting their business on radio/television only or wait for customers to contact them. Therefore, using digital technology was seen as the key to business promotion. A fruit processor who does not sell their products on any e-commerce platforms yet stated that, "...without Facebook, we would not be able to promote ourselves or sell our products to customer." Another agro-processing MSME owner emphasized the consequence of not using digital technology as,

".... First, the number of our customers would drop due to information ofabout our business such as location or products cannot be widely spread. As a consequence, this leads to a revenue decline, which then affects our productivity. ...It is what I personally experienced; and that is the reason why I seek out those platforms to promote our brand so that sales can be increased; the same goes to productivity and income. Thus, the effective way is to digitalize marketing and makingmake information accessible by customers. "

7.1.2.3. Time and Cost Saving

While this was not a predominant reason, for about 30% of the MSMEs, time and cost savings were a key consideration. For example, some interviewed MSMEs in this sector participated in some e-commerce platforms because they are free of charge. Since its launch in 2021, CambodiaTrade has not charged commission fee from registered MSMEs. One fruit processor mentioned that some e-commerce apps even promote their business for free for three days to a week when they first registered. Similarly, these MSMEs also perceived that they can reach many more customers using social media such as Facebook, Instagram and Tik Tok even without paying for the business promotion service.

7.1.3. Benefits/Impact Pathways

7.1.3.1. Contribution to Sales/Revenue

More than 80 percent of interviewed MSMEs in agro-processing sector acknowledged that the adopted digital Technology's contribution to their total sales/revenue is significant, especially social media such as Facebook. One fruit processor stated that he was contacted by a new customer in Phnom Penh because of Facebook, while another meat processor said,

"Not many people know about our brand, but since we have our Facebook page, customers can learn about our product details such as price and location; they made an order with us; we delivered, and they paid accordingly through bank transfer."

When asked about the proportion of sales from such social media platforms to total sales, agro-processing MSMEs revealed that sales from Facebook account for 20-40% of total sales, as they also rely on direct or store sales, except one agro-processing enterprise who do not have a physical store. Nonetheless, this is a much higher percentage when compared to the performance of e-commerce in this sector. Sales from e-commerce account for just around 2-5 percent of total sales.

Table 4. Benefits of using DTs (agro-processing MSMEs)

Benefits of DTs	% of agro-processing MSMEs
Increase in sales/revenue	85%
Customer interactions	55%
Cost and time saving	45%
Upgrading and innovation	40%
Source: author's compilation from the semi-structure interview	

7.1.3.2. Customer Interactions

Besides the ability to widely spread information of business to perspective customers, digital technology is an essential mean for business to receive feedback, which therefore helps them make changes and/or enhance their product/service quality. For example, in the aspect of product development, MSMEs depend on feedbacks, for instance, on taste and packaging, from customers via social media (e.g., comments on posts or messenger chat) and/or face-to-face. One fruit processor shared that, "Customers feedback on packaging as well as quality of the products." Half of interviewed MSMEs in agro processing said that they received feedback from customers on their products, via Facebook, Instagram, YouTube, Telegram and WhatsApp, noting that these are more convenient than other modes of feedback.

7.1.3.3. Time and Cost Saving Benefits

Interviewed MSMEs reported gaining more customers from social media platforms such as Facebook, which then translated into a direct save in business advertising and promotion costs. On the one hand, the ability to reach a larger number of people than they could using conventional marketing channels such as printing brochures or spending on a sales force, also translated into an indirect save. Features such as "likes" and "shares" offered by platforms such as Facebook were perceived as free of charge services that MSMEs could use to reach a larger audience. Plus, the ability to set the target audience was found to be useful and efficient for thosefor those who were proficient with using the feature.

A fruit processor compared the effectiveness of social media to his conventional marketing strategy as,

"Previously, I was not aware of digital marketing, so I spent a lot on deploying sales staff to go door-to-door and provided free testing of our products. However, the effectiveness is little. Some did not dare try our products back then. After we promote ourselves on Facebook, people recognized, became more interested and felt more confident on our products. … as a new enterprise like mine, we need to search for any methods that cost us less with higher effectiveness."

For some others, online payments were seen as a key advantage in digital integration, resulting in time saves from not having to travel to a bank.

7.1.3.4. Upgrading and Innovation

Upgrading and innovation as a result of digital technology is minor. However, adopting some digital technology either in management, marketing and production is already a form of innovation for interviewed MSMEs, specifically those who previously had conventional ways of running a business. Nonetheless, one revealing innovative but indirect effect of digital technology for interviewed MSMEs is that it enables new ideas on product/service provision via customers' reviews and feedback, learning from competitors as they also go online, as well as searching for knowledge from search engines, websites, as well as social media platforms like Facebook and YouTube. One owner of health/beauty product business shared that she researched for information and took courses online to improve the packaging of her products. The owner of a banana processing business claimed that she improved the packaging of her products according to customers' comments on social media.

7.1.4. Challenges

7.1.4.1. Digital Skill Shortages

Despite all the benefits brought about by digital technology, there are some challenges that prevent interviewed MSMEs from adopting and/or utilizing digital technology efficiently. First and foremost, the knowledge and skills of either the owners/mangers or employees. Many interviewed MSMEs revealed that, despite being aware of social media and platforms, they are unable to manage them effectively due to a lack of understanding of the technology, a lack of time to learn about it, and the difficulty of hiring someone to do the job. According to the semi-structured interview, digital market platforms are managed by owners/managers or, at the most, family members such as children. One reason is that the majority of employees in this sector are low-skilled workers who can only use basic functions of social media. As a result, unless they have a clear plan and the resources to do so, owners/managers cannot rely on internal promotion. One owner of a cashew nut processing business raised that he and his daughter who is studying at university are the one who manage the social media and e-commerce platforms where they sell their products. He continued that, "...workers here are able to use just 'like' and 'share' function of Facebook; ...they do not even know how to use Telegram properly."

A few MSMEs delegated digital platform-related tasks to specific individuals. However, there are some challenges. On the one hand, the staff has limited knowledge in managing the platform at a high level, despite the fact that it is satisfactory for them. They, on the other hand, are mostly multi-taskers, which means they do not just manage the company's Facebook page or e-commerce platforms, but also some accounting and/or administrative work. Recruiting staff to handle digital-related work is somehow challenging for some MSMEs, who are mostly a small family business and is located in the countryside. One fruit processor owner in Banteay Meanchey shared that recruiting a skilful personal to manage their social media page and/or e-commerce platform has been a challenge for him, he said,

"It is very difficult; first, it is about the salary. Second, they are less keen to work in a new enterprise like us. Thirdly, we require a high skilled person while most of them have only an average knowledge on the task. Also, it is also another burden that we must train them."

Outsourcing may be one solution to the shortage of skilled workers for digital-related jobs. However, this also had limited effectiveness. Two MSMEs in the agro-processing sector shared a similar experience, stating that they hired someone to manage their Facebook page, however this did not translate into anyinto any meaningful outcome for the business, adding that whether they manage the page on their own or hire someone to manage it, the result is the same.

7.1.4.2. Language Barriers

Language can be a barrier to using some digital technologies as 65 percent of MSMEs in agro-processing and tourism sector raised that English language is a challenge for them and their employees as well, therefore understanding the digital platforms can be limited for them. Even with the help of Google Translate, it can still be hard due to technical terms.

7.1.4.3. Difficulties in navigating platform policies

Many MSMEs found it difficult to navigate through the policies of digital platforms which disadvantaged their businesses, particularly in comparison to larger firms which employ a more tech-savvy workforce. For example, their limited understanding of platform terms and conditions meant that they would have inadvertently violated the platform policies, resulting inresulting in their account being fully or partially blocked from some platform services . A fruit processor shared that he promoted his post on Facebook using a copyrighted song; the business' Facebook account was blocked from boosting service since then. Another fruit processor experienced technical errors on some e-commerce platforms stating that, "For some apps, I could not find my products on them, except when I log in to my own account. I was curious whether other customers could neither see my products." However, he added, "... It can be either the technical gaps in the e-commerce apps or the fault of our employees during uploading." Whereas one rubber processor who tried registering on an international platform could not finish his registration, he said, "The registration was not successful; I did not know where it wrong. ... Currently, I am still looking for solution to it."

7.1.4.4. Inability to use platform data analytics

Another usefulness of digital technology is data analytics, where business can utilize historical data to forecast, predict and draw meaningful results from it, for instance, to improve decision on marketing strategy. MSMEs acknowledged that the use of such digital platforms allows to know about their customers, age group, locations as well as interests. While digital technology and platforms can provide business with necessary data that helps business assess their performance, not many of interviewed MSMEs are aware of or have used the data generated from digital platforms they are using. One fruit processor in Banteay Meanchey stated that, "I heard about that feature of Facebook; however, we lack the knowledge on it. We only know that if we want to gain more customers, we should use boosting service." A few others reported having focused on only the number of comments, likes and share to assess their performance without using formula or sophisticated method to forecast and make decisions.

7.1.4.5. Limited value proposition

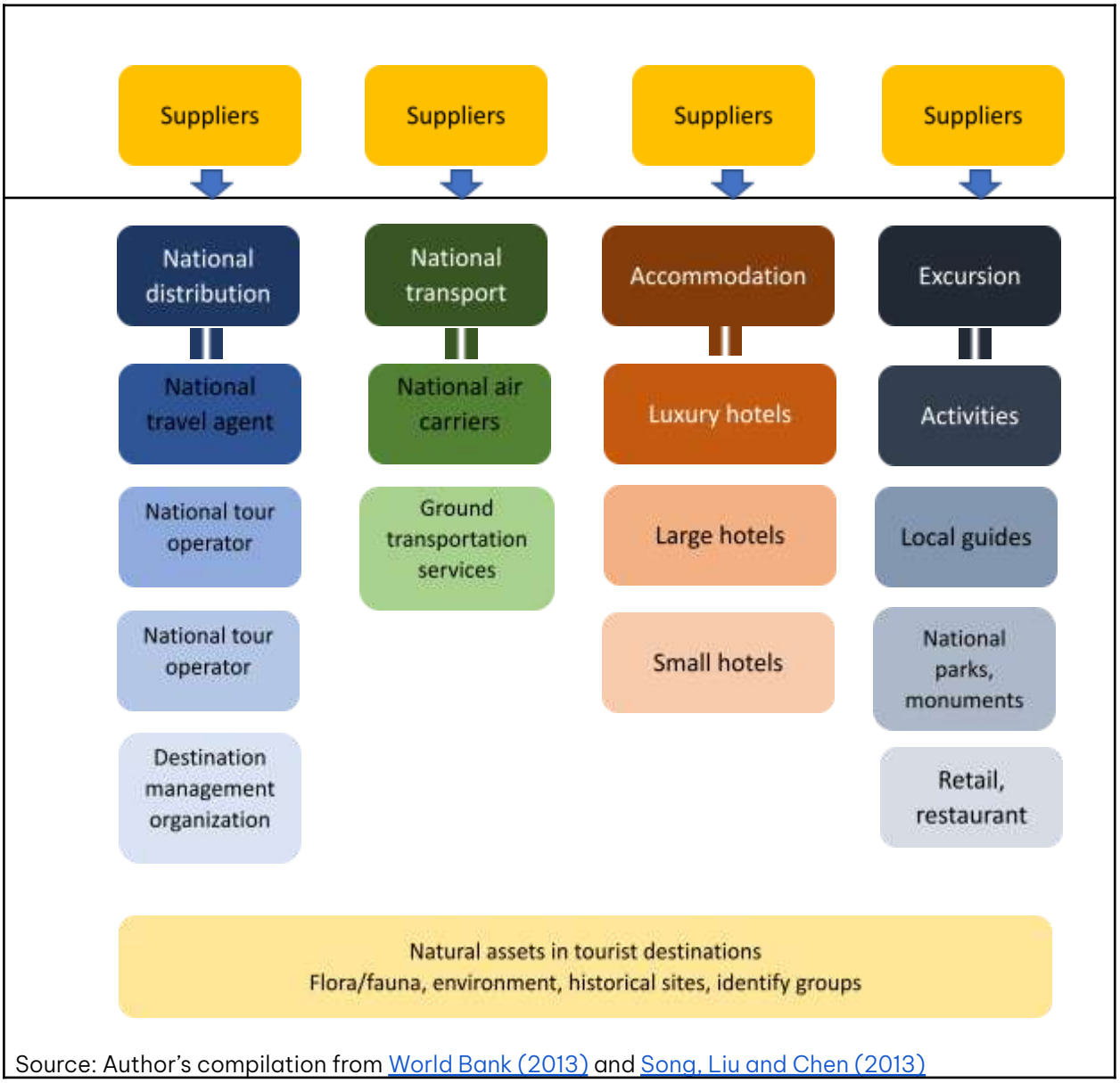
A few businesses who do not have own business e-commerce website and/or Facebook account or have not been active on them said that these platforms are not a priority yet as one exporter as well as a fruit processor said, "E-commerce may be beneficial for our business, but it is not our priority. Our priority is to have stable partners and suppliers and to ensure that our products can meet the customers' demand." An owner of a sauce processing enterprise who only sell their products to wholesalers and retailers acknowledge the importance of Facebook; however, her business relies more on sales team as they perform the job of sales and marketing as well as delivery team at the same time.

7.2. Tourism Sector

7.2.1. Level of digital integration

Figure 4 illustrates a typical inbound tourism value chain that includes micro, small, medium, and large actors. This value chain comprises of small hotels, ground transportation services, tour operators and restaurants. While most of the MSMEs in the value chain were "users" of digital platforms, there were two local tourism marketing platforms that could be categorised as "suppliers" as they supply related products or services to tourism products and service providers such as tour operators, hotels, and restaurants. First, they promote tourism destinations in Cambodia. Second, they offer accommodation, transportation, tour operators as well as restaurants with marketing services.

Figure 4. (inbound) tourism value chain



Source: Author's compilation from World Bank (2013) and Song, Liu and Chen (2013)

7.2.1.1. Connectivity Infrastructure and Tools

Similar to MSMEs in the agro-processing sector, interviewed MSMEs in tourism sector also have equal access to internet and electricity, with a small proportion of them reportingthem reporting poor quality internet service occasionally. For example, an owner of a camping resort shared that she only uses mobile internet, and it works only for a few specific mobile service providers. Therefore, customers must utilize their own mobile internet accordingly. One accommodation manager in Kampong Speu claimed that when there is heavy rain, the internet is usually cut. Although it has not been many MSMEs reported work disruption due to internet connection issue, those in tourism sector would be the most vulnerable as their hotel management system is link to the Online Travel Agency (OTA) platforms and Wi-Fi service become common and essential for customers.

Mobile communication apps such as Telegram, WhatsApp and e-mail, are also adopted by MSMEs in tourism sector. Two small tour operators claimed that mobile applications were used more frequently than emails and that a Telegram Chatbot or Group was useful for informing prospective consumers who were interested in their services, saying that, "We have an e-mail address; however, most of the customers contacted us via Telegram or WhatsApp instead," and "We created a {Telegram} group and those who are members can make inquiry while we can also share our package here in addition to Facebook page." Digital payments are widely adopted by MSMEs in tourism sector as well.

Table 5. Digital technologies adopted by interviewed MSMEs in tourism sector

Digital Technologies adopted by MSMEs	**Description**	**% of agro-processing MSMEs**
Connectivity infrastructure and tools	- Access to internet connectivity - Electricity	100%
	- Computers and smartphones	Computers (95%) Smartphones (all)
	- Mobile communication apps (Telegram, WhatsApp, Line, e-mail, Facebook messenger, etc.)	100%
	- Online meeting applications	40%
	- Cloud computing/storage	35%
	- Accounting system/software, channel manager, POS system	30%
	- E-payment (e.g., KHQR)	100%
Platforms	- Social media (Facebook, Instagram, Tik Tok, YouTube etc.)	100%
	- E-commerce platforms (CambodiaTrade, Foodpanda, Nham24, Kokopon, Grocerdel, Lazada, Alibaba etc.) - Online Travel Agency (Booking.com, TripAdvisor, Agoda, Viator, GetYourGuide, Expedia etc.)	85%
	- Own informational website/e-commerce website	50%

Source: author's compilation from semi-structured interview

Only 10 percent of those in tourism sector reported using online meeting tools. Nonetheless, they had claimed that they started using it during the Covid-19 outbreak but quit after the situation recovered. A tour operator revealed that, "Frankly speaking, I do not Zoom nowadays; even with Western customers/partners, we only called on WhatsApp."

Fifty five percent of interviewed MSMEs in tourism sector utilized a system software integrated in their computers or mobile devices. The incidence is highest for those in accommodation sub-sector and restaurants as a majority of MSMEs in accommodation have a channel manager, which is necessary to connect to the OTA platforms and help them control the bookings and generate related reports effectively. As per restaurants, the POS system is used to control order and print receipts faster. As per the use of cloud storage, around half of the interviewed MSMEs in tourism sector store their documents in cloud such as Google Drive and Dropbox. Same as those in agro-processing sector, they only store some documents and image files. One tour operator shared that he only keeps his booking documents and some images in the cloud.

7.2.1.2. Platforms

Social media platform, particularly Facebook, are widely adopted by MSMEs in tourism sector. Most MSMEs reported having a presence on Facebook, even if they only posted occasionally on it. Explaining this, a hotel manager said, "...we rarely post on Facebook; it depends on the occasion. For instance, we only promote our Facebook for a few days during the Khmer New Year..." It is similar to a quote from a food processor, "...once in a while, we post on social media."

Approximately 70 percent of MSMEs in tourism sector reported that they have their own website. Similar to those in agro processing, some of their websites are informational while the other allow customers to book their services but there is not a payment gateway integrated.

75 percent of MSMEs in tourism sector are using OTA platforms such as Booking.com, Agoda, TripAdvisor, AirBnB, Klook, to name a few, for tourism MSMEs. It appears that various digital platforms are popular amongst different sub-sectors such as tour agency, hotels and accommodation, transportation and/or restaurants. To give example, Booking.com and Agoda are the two most cited platforms amongst interviewed MSMEs in accommodation sub-sector, while GetYourGide, Expedia and Klook are often reported by tour operators interviewed. This, however, does not imply that accommodation businesses do not sell their rooms on OTA platforms such as Expedia; it is likely that platforms are reported by respondent due to their familiarity with the platforms being used and/or reported platforms being the ones that bring the most customers for them. According to one hotel owner, Booking.com and Agoda are the two most popular platforms amongst customers while they receive few bookings from other reported platforms. Although Booking.com was reported by MSMEs in accommodation but not tour service provider sub-sector, it was also cited by those in transportation sector. Meanwhile, two out of three interviewed restaurants, due to its business nature, participated in e-commerce platforms such as FoodPanda and Nham24, which were commonly cited by those in agro-processing sector. One platform that fits all sub-sector under tourism is TripAdvsor as many of interviewed MSMEs in each sub-sector have their businesses listed in TripAdvisor so that customers can search and provide reviews.

7.2.2. Motivating Factors

7.2.2.1. Business Visibility

Using digital technology, especially social media, is well-known for promoting one's business visibility in a way each platforms has a large number of users. For MSMEs in tourismthe tourism sector, the use of Facebook is more to attract Khmer nationals since they perceived that most of them can be reached faster and more effectively via this platform. Online Travel Agency (OTA) platforms for this sector, such as Booking.com, Agoda, TripAdvisor and Viator, are believed by MSMEs that they can reach potential customers who are foreign due to its popularity amongst

them, unlike Facebook. One accommodation business owner described her use of social media and OTA platforms,

“We use Facebook and Instagram as they can reach Khmer nationals quickly and widely. Through these platforms, people can easily share and mention our place to their friends. For Booking.com and TripAdvisor, since we do not only focus on locals, but we also still expect some foreigners even during the Covid-19 pandemic.”

Table 6. Main motivating factors of digital technology adoption in tourism sector

Motivating factors	**% of tourism MSMEs**
Business visibility	85%
Competition pressure	45%
Time and cost saving	55%
Upgrading and innovation	40%

Source: author’s compilation from semi-structured interview

7.2.2.2. Competition Pressure

Nearly half of interviewed MSMEs express the obligation to adopt digital technologies. These MSMEs claimed that it is not a smart option to wait for walk-in customers, especially after the CoVID-19 where they perceived the competition is getting higher. They also claimed that because everyone is informed via social media and OTA platforms, there would be a consequence if they do not change their strategy. One transportation business owner shared that,

“Our business is in high competition, so using these platforms can help us more visible comparing to our competitors. For example, our competitors may use only TripAdvisor as they perceived that having people giving comments on this platform is adequate. However, in my opinion, I must participate in other platforms to reach more customers. Without these platforms, there would be very few bookings per year.”

One tour operator, on the other hand, raised that because the competitors who are local and international companies participate in those platforms, so he must do the same.

7.2.2.3. Time and Cost Saving

Comparing to agro-processing sector, a larger proportion of interviewed MSMEs in tourism sector—around half of them—expressed that those technologies such as Telegram apps, social media like Facebook or Tik Tok, system software such as channel manager and POS system for restaurants, as well as delivery apps, are cost and time effective. One restaurant manager revealed that because handwriting the receipt takes long and maybe inaccurate, so he decided to use the POS system where all orders are input and printed out in a short time for customers. One tour operator shared that he booked a room for his customer using an OTA platform because he did not want to want to spend time negotiating the terms with the hotel nor call the hotel directly.

7.2.2.4. Upgrading and Innovation

Same as MSMEs in agro-processing, less than fifty percent of MSMEs reported on upgrading and innovation impact from digital technology. However, for MSMEs in tourism who have introduced service innovation, they mentioned that it relies on customers' reviews and feedbacksfeedback. Others reported innovative ideas in post design, for example, from Canva software or utilization of modern smartphone for taking pictures for business promotion.

7.2.3. Benefits/Impact Pathways

7.2.3.1. Contribution to Sales/Revenue

A majority of interviewed MSMEs in tourism sector (85 percent) also claimed that digital technology accounts for a significant share of their total sales/revenue, same as in agro-processing sector. One transportation service provider claimed that he had more customers than when he did not use digital platforms such as Booking.com, TripAdvisor, Viator, and social media platforms such as Facebook and Instagram. In contrast to agro-processing, the role of OTA and social media for MSMEs in tourism sector fluctuates depending on the target customers. For example, if the business is based on foreign nationals, who are more likely to use the platforms for their travel, OTA is more effective, representing more than half of total revenue. Whereas those targeting Cambodian nationals found that Facebook is more effective as it is more convenience for them to learn about the business and process the booking. One bungalow in Kampot Province addressed that, "...Most of Cambodian customers make bookings via Facebook or phone calls; a very few of them do it via Booking.com." While a few others rely neither on OTA nor social media but networking, direct bookings and/or walk-ins.

7.2.3.2. Ability to provide information and interact with customers

The use of OTA platforms allows MSMEs to provide detailed information such as on room conditions and pricing to customers so that they can make decision. Along with a channel manager software that supports OTA platforms, the booking process also becomes more convenient and efficient. MSMEs in the tourism sector (approxapprox. 50%)%) also recognized the importance of customer reviews and feedback because customers base their decisions on others' experience on the service they intend to use. Consequently, they are cautious about their service quality since the beginning. Otherwise, they received bad reviews, leading to low rating and ranking in the platforms. One transportation service provider shared that positive customer feedback is beneficial for his business as it increases the customers' confidence. A bungalow owner shared her experience with bad reviews as,

"There was a time when we are given bad reviews. Since it cannot be deleted, we experienced a decline in number of customers The bad review happened because the bungalow only cost 7-10USD; therefore, the quality was not as good as now that it is 40USD. However, they reviewed that we had a friendly service."

7.2.3.3. Time and Cost Saving Benefits

Sixty percent of interviewed MSMEs in tourism sector shared how digital technology impact on their time and expense. First, they do not need to spend much on networking as previously. Two tour operators shared similar experience on cost of networking. They claimed that they had to travel abroad to participate in various events for networking, e.g., to participate a tourism fair, plus spending on gifts and a small drink.

Own business website is also perceived a good investment by some MSMEs as it allowsit allows customers to gain more details of the products/service and place orders/bookings. One tour operator stated that, "Building our website means that we do not need to pay high commission to digital platforms, so we can get the whole income from the bookings."

In addition, the use of telecommunication apps, such as Telegram, WhatsApp and/or online video conferencing products such as Zoom and Google Meet, could offer a new experience in communicating for both MSMEs and their customers. Often cited, Telegram is effective due to its ability to send files and pictures. Meeting with customers or business partner via WhatsApp, Zoom or Google Meet is just as effective as meeting face-to-face, and even more cost effective in some circumstances.

The use of computer system software such as channel manager could reduce cost for MSMEs in tourism sector. First, it requires fewer people to handle it; second, it saves time managing it and minimize the errors. A restaurant manager shared that they currently hire fewer staff and that they can record the order and print the bills with just a few click. A few MSMEs who reported using government digital platform for tax payment also acknowledged that this technology is convenient and reduces their expense on traveling and unofficial cost; and thus, improves transparency.

7.2.3.4. Upgrading and Innovation

Same as in agro-processing sector, innovation does only occur due to indirect effect digital technology as they observe through competitors or other non-competing businesses and/or learn from customer feedback. One tour operator also shared that he had one unsuccessful tour package, which was not receiving many reviews on platforms, so he decided to improve the package to gain more reviews. In addition, by observing his competitor's tour package, he was able to initiate an equally or more attractive tour destination for the customers.

Some MSMEs (45 percent) also reported checking for business performance metrics that can be generated from digital platforms they participated. From this metrics, they are able to better set their target audience for the next promotion on OTA platforms as well as social media. One tour operator raised that,

"The data provided to us {by those platforms} help us in doing business. It tells us where our customers are from and assist us in making a marketing decision, for example, who are the target customers for specific months or whether to offer a discount."

One bungalow owner shared that due to statistics from OTA platforms, she was able to decide whether to offer a promotion to attract more customers, for instance, the "last minute" discount.

7.2.4. Challenges

7.2.4.1. Digital Skill Shortages

Fewer interviewed MSMEs in tourism sector showed concerns over the digital skill shortage, as compared to those in agro-processing sector. A few MSMEs in this sector reported the lack of skills in using social media, while a few others reported the lack of skills for developing and maintaining their own business platform. One bungalow owner and manager said that,

"...I do not know how to choose the target groups on Facebook; all I know is to post, share and tag people. ...The staff do not have much knowledge on that as well; however, it is not their fault since they are not required to do that job. On the other hand, I can have my younger sister to handle it for me."

Two tour operators who attempted to develop their own business website stated that the developers did not understand the tourism sector and were unable to communicate effectively with them, resulting in a waste of time and money.

The skills shortage was also experienced by the two tourism service suppliers. While one owner reported that he has some level of digital-related knowledge, he sought assistance from a friend who has expertise in creating the website and the web-app for him. In addition, because he offers work opportunity to high school and/or undergraduate students and lacking the ability to recruit highly skilled employees due to financial constraint, the platform currently offers services such as information sharing and business advertisement but does not allow any bookings like Booking.com or Agoda. Another platform which has similar functions but allows users to create their own account so that they can share their travel experience and invite people to travel with them, also shared that retaining digital talents is a challenge for them, claiming that "...we are a small start-up, therefore, we experience disadvantage competing with large bank businesses for digital talents. .... some could work with us for a few months...."

7.2.4.2. Language Barriers

Less than fifty percent of interviewed MSMEs in tourism sector posted that language is challenge. This is probably most often, owners/managers as well as employees work with foreigners, especially before the Covid-19 pandemic where foreign visitor inflow was higher; in addition, business in this sector is more likely to recruit those with already some level of English language.

While one tour platform operator claimed that English is not a challenge for him, another raised that English can be difficult, nonetheless with some level of his language ability, he is still able to grasp the meaning of any video instructing on digital technology.

Comparing to others, language is the main barrier for one transportation business owner. As a consequence, he had not participated in any platforms to promote or sell his service. Even with his personal Facebook account, he only posts occasionally.

7.2.4.3. Technical and Platform Policy Challenges

Technical challenges experienced by some MSMEs in this sector include, platforms being tricky with rate setting and system errors and updates that MSMEs need some time to adjust. Some of those in accommodation sub-sector claimed that OTA platforms have been offering discount without prior notice to them resulting in negative profit for their business sometimes. In addition, contacting to these platforms about these issues can be difficult for them as they experience no response from the agency. One hotel owner said that once the system at his hotel is updated, it may take 4 to 5 days or a week, depending on their versions, to learn about it.

7.2.4.4 Limited value proposition

For some businesses, digital technologies did not offer a strong value proposition, particularly if they were small and catering to a more local audience. For example, a bungalow owner in Kampot talked about not using a computer and a channel manager to handle the booking as follows,

"Because we do not find the need to have such program/technology and our staff may not have the capacity to use it, so we do not use it yet. In addition, writing down in a book is still more useful for us..."

Another tour operator mentioned that locals,locals rarely use such OTA platforms; therefore, participating in these platforms would mean adding more expense, with limited returns, particularly since his customer base was largely local. Whereas one restaurant owner who cares more on quality and does not sell his dishes on any digital platforms addressed that selling on those platforms means that foods are packaged and delivered which it takes some time to reach the customers; and this spoiled the quality of the food.

7.3. Source of Knowledge on Digital Technology

Being aware of available digital technology is a critical stage for MSMEs; otherwise, they cannot decide which technology to use and how to use it most effectively. According to the semi-structured interview, the most reported information source on digital technology amongst interviewed MSMSs is self-learning and friends and business partners. Some MSMEs in the two sectors revealed they were approached by platforms such as CambodiaTrade, Khmum, Booking.com, TripAdvisor and GetYourGuide so that their business can be listed in them. Most of the platforms even provide training on how to work on their platforms such as uploading images, adjusting product content, processing order, stock management as well as offering promotion. Some also received knowledge on platforms and digital marketing from organizations such as UNDP, UNIDO, GIZ etc. as well as business associations. Those MSMEs also reported that they were either recommended to use Facebook, channel manager and to create their business website by friends or requested additional details from their friends once they learned about it.

Nonetheless, MSMEs do not rely solely on other persons or institutions to gain knowledge on digital technology. Most people are familiar with mobile applications like Telegram and WhatsApp and social media platforms like Facebook and Tik Tok, except how to best utilize it. Some of the interviewed MSMEs did further research on each digital technology they encountered via search engine like Google, social media platforms such as Facebook and/or YouTube. However, these MSMEs have experienced these digital technologies prior to the current business or position. For instance, two of the agro-processing owners graduated in engineering and information technology (IT) field, so they have somsesome prior knowledge of them, whereas the others have used them in their previous jobs or have made purchases on e-commerce platforms. A cashew nut processor who worked in tourism sector prior to the Covid-19 pandemic said, "... I worked in tourism sector before, so I have knowledge on digital marketing and such. Therefore, when I started by own business, I considered digital marketing so that my business can grow." A hotel manager also revealed that, "Because I worked for a tour agency prior to working at the hotel, I knew that these are the largest platforms for hotel business."

Noticeably, only a few of interviewed MSMEs said they learned about digital technology from government sources. One tour operator in Siem Reap who participated in events organized by the ministry and followed the ministry's Facebook page could gain basic information on digital technology that can be utilized in their business. Meanwhile, a few MSMEs in agro-processing received information on CambodiaTrade from the Ministry of Commerce as they contacted and trained them about the platform.

7.4. Support

Considering support, there is a distinct level of support received by interviewed MSMEs. From the semi-structured interview, 85 percent of those in agro-processing received supports—financial support, in-kind, training and other supports, while 50 percent of MSMEs in tourism sector claimed that they received training and other support, including tax exemption. Non-governmental body who had been mentioned by interviewed MSMEs in comprises of UNIDO, UNDP, USAID, GIZ, CAVAC, Impact Hub, SHE Investment and some business associations. Whereas, governmental body consists of Ministry of Industry, Science, Technology, and Innovation (MISTI), Ministry of Commerce (MoC), Ministry of Tourism (MoT), and Khmer Enterprise. However, the supports from ministries

usually happen with the collaboration from earlier mentioned non-governmental institutions. As an example, UNDP's partnership with Ministry of Commerce and Enhanced Integrated Framework (EIF) to support e-commerce ecosystem in Cambodia by providing training workshops to enhance e-commerce knowledge so that they can either participating in existing e-commerce platforms or create one for themselves.

Table 7 provides detailed proportion of interviewed MSMEs by types of support. It appears from the table that training is the most received form of support in both sectors, probably due to its fundamental role for capacity building for business and cost-effective practice. While some MSMEs in agro-processing sector received in-kind and financial support, none in tourism sector reported having received support of these kinds. 20 percent and 60 percent of interviewed MSMEs in agro-processing sector received in-kind and financial support, respectively. In-kind support includes desktop computers and machinery provision. Financial support can be in a form of full grant or subsidy for agro-processing MSMEs to purchase machinery, such as metal detector or pasteurized machine, improve their products through research and development, as well as to develop own e-commerce website. Less than 30 percent of MSMEs in agro processing reported receiving opportunity to do networking as well as participating in events or exhibitions, while less than 20% of those in tourism reported so. During Covid-19, 15 percent of MSMEs in tourism sector reported having received tax exemption which is a government assistance for business affected by the crisis. Other who did not receive this support are those ineligible due to their location[2], informality as well as the business being completely closed during the pandemic.

Table 7. Share of MSMEs by types of reported support

Types of support	**Agro-processing**	**Tourism**
In-kind support	20%	0%
Financial support	60%	0%
Training support	80%	25%
Networking/ Information sharing session/exhibitions/events etc.	25%	15%
Tax exemption (during Covid-19)	0%	15%

Source: Author's compilation from the semi-structured interview

Table 8. Summary of supports received by interviewed MSMEs

Government (MISTI/MoC/MEF/KE…)	**DPs/NGOs** **Business associations**
• Funding (KE, during COVID-19) • In-kind (a computer set from MoC) • Training on 5s (MISTI), digital marketing and copyrights and related laws (MoC) and digital related training (MoT)	• Funding/grants or subsidy for purchasing of metal detector, pasteurized machine etc. (USAID and UNIDO) • Networking (GIZ, business associations) • Training on business plan and proposal writing, processing, business and financial management, digital marketing (GIZ, USAID, UNDP)

Source: Author's compilation from the semi-structured interview

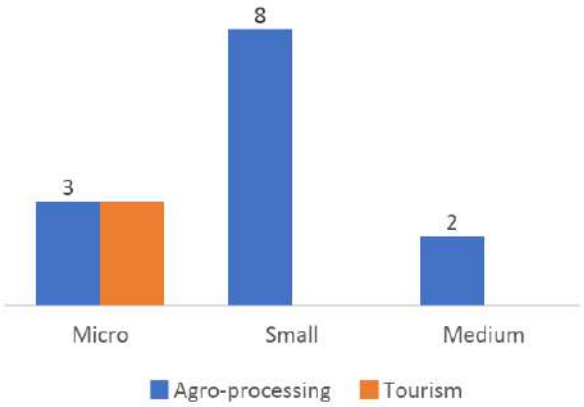
[2] Tax exemption is eligible for hotels/guesthouses and tour operators/agencies in Phnom Penh, Siem Reap and Sihanouk Ville.

7.5. Deep Dive – Women Led MSMEs

7.5.1. Digital Adoption

In this study, there are more of women-led MSMEs concentrating in agro-processing sector, while there are only three in the tourism sector (Figure 5).

Figure 5. Women-led MSMEs by size and sector



Source: Author's compilation from the semi-structured interview

Our study revealed that both male and female led enterprises have equal access to digital tools and technologies. However, as shown in Table 9, there are some gender-based differences in digital integration. For example, there was a higher proportion of women led firms on e-commerce / OTA platforms as compared to male led firms, and a smaller proportion of women led MSMEs adopt cloud computing / have their own business website. It appears from the interview that, women are fast in adopting digital marketing, especially the less complicated and free-to-use tools and technologies.

While both women-and men-led MSMEs face skill shortage challenges, women owners/managers appear to have lower capability in digital technology and they are more likely to hire someone to do the digital-related tasks, especially if it involves more complications such as designing a poster or videos and boosting on social media or posting their products on e-commerce websites. Meanwhile, men owners/managers are more likely to handle the digital-related task themselves, in compliment to hiring the experts. Moreover, there are fewer incidents of women owners/managers reported having acquiring knowledge on digital technology and are looking to apply more of them in their businesses, if compared to their male counterparts. From the semi-structured interview, men owners/managers are more likely to conduct self-learning experience and receive digital knowledge from their surroundings, including friends, business partners as well as the government sources, where they tend to follow social media pages of some government bodies such as Ministry of Commerce.

7.5.2. Social Norms

Significant gender differences were observed in the split of household responsibilities – with family / domestic / care work burdens being reported more frequently amongst female business owner/managers as compared to male business owners. As a wife, a mother and a businesswoman, an owner of a sauce processing enterprise revealed that even though her husband shared childcare burden with her, she is still the main responsible person and that she feels it herself that she cannot depend on her husband entirely. She emphasized that, "My husband also takes care of the children, but as a mother, I cannot depend on him a hundred percent." She added, "My children are still young, if they get sick, I cannot concentrate on my work, and I must stay home. And that would disrupt some workflows." Moreover, starting a business may be challenging for entrepreneurs; however, some woman business owners reported that they lacked support from their family members or spouse at the beginning. Those woman owners revealed that their family members were initially worried that their business would not be successful. However, as they became successful, they started to support them. Despite all the doubts from their surroundings, these women business owners have shown a strong will and independence in bringing their business forward.

Though female owners/managers did not report experiencing any form of discrimination on social media or other digital platforms, two of them revealed some difficulties in doing business. One food processing shared, "Because it is a small woman-led business processing bananas, seeking cooperation can be difficult; we got rejected when making requests or after negotiations." Another woman business owner explained about difficulties in some business negotiations, "Unlike men, it is not proper if we [women] have some drinks during business negotiations or other occasions; I am not good at drinking [alcohol] and I do not see the point of doing so. However, to reach a discussion and solution, there is always drinking involved."

7.5.3. Decision Making

In terms of decision making with respect to the business, some married women business owners claimed that they sought consultation from their spouse; nonetheless, they perceived that it is out of respect as they would reject their spouse's advice if deemed not practical for them. A health and personal care products business owner mentioned that "My spouse does not really support my work, but I still consult with him. Even if he disagreed, I would still do it anyway." A bungalow owner also expressed that "It is not required that we must have his consultation, but since he is more knowledgeable, we should seek his consultation sometimes."

Meanwhile, some male business owners also consult with their spouse before making important decisions. Those female and male business owners who reported seeking their spouse's advice had one thing in common: if it is a minor issue, they can make their own decision; however, if it is a major issue, such as financing, they may consult with one another, as one male hotel business owner claimed,

"Generally, my wife and I, both make decisions. However, I am normally the one who first made it. But if it is about an investment that requires a big sum of money, then we discuss with each other. If it is just about food menus in our restaurant, I am the one responsible."

Table 9. Digital Adoption in women-led vs. men-led MSMEs

Digital Technologies adopted by MSMEs	Description	% of Women-led MSMEs	% of Men-led MSMEs
Connectivity infrastructure and tools	- Access to internet connectivity - Electricity	100%	100%
	- Computers and smartphones	Computers (95%) Smartphones (all)	Computers (95%) Smartphones (all)
	- Mobile communication apps (Telegram, WhatsApp, Line, e-mail, Facebook messenger, etc.)	100%	100%
	- Online meeting applications	25%	29%
	- Cloud computing/storage	25%	58%
	- Accounting system/software, channel manager, POS system	63%	58%
	- E-payment	94%	92%
Platforms	- Social media (Facebook, Instagram, Tik Tok, YouTube etc.)	100%	100%
	- E-commerce platforms (CambodiaTrade, Foodpanda, Nham24, Kokopon, Grocerdel, Lazada, Alibaba etc.) - Online Travel Agency (Booking.com, TripAdvisor, Agoda, Viator, GetYourGuide, Expedia etc.)	88%	75%
	- Own informational website/e-commerce website	50%	67%

Source: Author's compilation from the semi-structured interview

Case Study 1
Agri House: Integrating Digital Technology for Cricket Raising in Cambodia

Crickets have long been a popular snack among Cambodians, known for its protein content. However, traditional methods of cricket farming in the country involve using lamps to attract crickets into plastic tents built in rice fields or constructing large concrete pens without proper temperature, humidity, or pest control. This approach faces several challenges, including vulnerability to climate change, low and inconsistent productivity, and limited control over the farming environment.

Agri House, a registered women-led business founded in 2019, aims to promote the cricket farming industry by encouraging farmers, particularly those in marginalized communities, to adopt cricket farming. Agri House provides them with a climate-resilient solution, helping them earn passive income.

Recognizing the potential of integrating smart technology into cricket farming, Agri House embarked on a journey to enhance productivity and climate resilience. The business has an in-house engineer who designed a program utilizing smart technology, making it the first of its kind in Cambodia. Initially, Agri House introduced a six-pen kit, but considering the high investment required for farmers, they later introduced a more affordable two-pen kit. As farmers become more familiar with the smart cricket raising pens, Agri House plans to reintroduce the initial idea of the six-pen kits.

The smart technology includes a solar-powered semi-automatic cricket raising system equipped with an Arduino chip. The program encoded in the chip regulates humidity, temperature, airflow, and water through sensors installed in the kits. The cricket pens maintain a temperature between 28 and 30 degrees Celsius. If the temperature exceeds the desired level, the system automatically sprays water mist and activates a solar-powered fan to lower the temperature and maintain the required humidity. Additionally, the design of the pens prevents pests, ensuring better yield. With smart technology and improved design, farmers can now produce double the number of crickets, resulting in increased income.

Previously, with the same size of raising space, farmers could produce 16 kilograms per cycle in approximately 35 days. However, with Agri House's agri-tech system they can now double their production, reaching between 28 to 32 kilograms per cycle (around 35 to 40 days). Additionally, cricket farmers now only need to spend 15 to 20 minutes per day checking on the crickets, allowing them time for other activities.

This means their income would also double. One cricket raising farmer in Kampong Thom praised that “the use of solar system helps save energy costs; and the smart system and the raising technique in overall allow a better yield and profit.” Another added, “The technology is easy to use and environmentally friendly. Raising crickets using these smart kits allow us more time to do other things; we do not have to stay with the crickets as much as before; the fan and the water works on their own.”[SC1]

Recognizing the global demand for cricket products as an alternative, sustainable and climate-friendly protein source, Agri House also processes crickets into powder and exports the final products regionally.

To ensure a sufficient supply for the processing plant, Agri House has implemented a "buy-back scheme" where farmers can sell their crickets at market prices. This approach not only ensures farmers' financial stability but also helps Agri House maintain a consistent supply.

Agri House also produces cricket basedcricket-based snacks aimed at addressing malnutrition among primary school-aged children. Additionally, they produce their own plant basedplant-based cricket feed - a requirement for future exports to Europe - ensuring a high quality safe and nutritious food, as crickets are sensitive to the quality of their diet, especially those that are exposed to chemicals.

Key Steps in Integrating Digital Technology into Cricket Raising

1. Validation of assumptions: Agri House conducted extensive desk and practical field research over the course of one year and developed a prototype with predefined parameters that created optimum cricket living and breeding conditions. Through this "trial and error" approach, they tested various parameter values to achieve the best results.

2. Continuous validations: Considering geographic variations across Cambodia, Agri House applies customized parameters for temperature, humidity, and feed in different regions. They collect and incorporate data from local partners and farmers using the smart kits to improve effectiveness. This continuous feedback loop has been critical in reducing conditions that may cause failure and ensure that yields are increasing and kept consistently high.

3. Early adoption by farmers: Initially, farmers were skeptical about the new technology of the semi-automatic kits and preferred following traditional methods. One co-founder shared that those farmers preferred following the elder's advice who had many years of experience raising crickets, though these were relying on traditional methods that produced low yields and high death rates of crickets. However, after experiencing the effectiveness of the agri-tech enabled cricket kits within the first or second cycle, they embraced the technology. Successful farmers who achieved positive results became role models and actively promoted the kits among their peers.

4. Training and support: Agri House provides training to farmers on cricket farming and the use of smart controllers when they first purchase the kits. For post-sales support they offer continuous technical support, also visiting communities when farmers encounter problems. Farmers are also able to seek support through Agri House's Facebook page or by sharing pictures and communicating via Telegram. Video tutorials are also available to support farmers with low literacy levels.

Challenges

1. Capital requirements, income generation and cashflow

Agri House has demonstrated a strong commitment to promoting the insect sector through technology, despite the fact that it entails a significant investment in terms of both money and time for validation. Therefore, as an independent business, it becomes imperative for Agri House to generate their main income stream from the business as quickly as possible. However, the cricket market presents a challenge, and the company is currently engaged in promoting their products both in the local and export markets to find a balance for their income streams.

2. Limited sectoral support

Despite the high-income generating potential for smallholder farmers, the insect farming sector, including Agri House, receives limited attention from the government and major development funders and programs, which focus more on other agricultural products such as rice, cassava, cashews and chili.

Agri House intends to develop an app connecting cricket farmers, suppliers, and buyers on a single platform, to provide the necessary data to shift recognition of a multi-million-dollar informal market, to a recognised formal market that can have significant impact on the local economy and nutrition of Cambodians. However, this tech development also requires support from relevant stakeholders, especially the government, starting with a shift of mindset that crickets aren't just a fried roadside snack.

3. Awareness raising

Whilst Agri House has been active on digital marketing platforms such as Facebook, LinkedIn, or their own business website, there is a recognised need to continue awareness raising in both digital and offline connections. Despite these challenges, the team are continuing to work with government ministries, university research partners, development sector funders and private sector partners to raise the profile of the value of cricket raising.

The Agri House team maintains a firm belief that cricket farming is a significantly climate friendly, low intensity and sustainable income generating opportunity for Cambodians from marginalised communities. The team is already working with women, indigenous communities and farmers living with disabilities, and are looking to increase their impact in the near future.

Solar panel for power support

Semi-automatic controller

Farmers harvesting crickets

Source: A video post from Agri House Facebook page on 9th March 2023

Case Study 2
Visit Kampot: Promoting Tourism through Digital Tools

Hong Panhaka was born and raised in Kampot Province; he has always intended to promote his province to the world, noticing that many have overlooked beautiful spots in the province while they mostly came and visited just a few well-known spots such as Kep Beach or Teuk Chhou Waterfall. For Panhaka, digital technology is the core of the initiative as he believes that with a click of the figure, people can access contacts, photos and maps of beautiful tourism destinations in the province; it is more efficient if compared to relying on a printed guidebook. Besides promoting his province, Panhaka also expected that this initiative would help local tourism plan their travel more effectively as they had not had a clear plan before. Moreover, he believes that once there are more tourists visiting the province, there will be more jobs created and thus the locals can earn more income who are willing to learn about the work and contribute to the community at the same time.

With this intention in mind, and his limited experience handling a restaurant Facebook page, he first established a Facebook page in 2018 called "Visit Kampot". Panhaka also had to spend every Monday taking pictures of beautiful places in his provinces using his iPhone 6 and shared through the Facebook page; those who are interested in the places that he posted on the page made enquires. He shared that it was no less than five people calling him and asking questions per day. It was a challenging situation for Panhaka that he had to operate the page all by himself, while working full-time for an NGO. Approximately one year later, he formed a team, that comprises of his friends who have technology expertise as well as young teenagers who were in high school and/or students in fresh year.

As people became aware of tourism destinations in Kampot Province, many people started asking more about the province, for example, "Is there other beautiful places around the areas? Is there any accommodation nearby? Is there a restaurant nearby?" With the increasing number of enquiries, he noted that the team spent not less than 15 minutes to answer these questions using their mobile device at that time. Consequently, he considered between a website and a mobile application. With the help of his friend who have technology expertise, he started off with a website. The team remained replying through Facebook page, however, an auto reply, "For more information, please visit our website." Is set if the team is not able to rely on time. However, the website at that time was not functioning technically well, as there are more features needed. Later, he had to consider again between a mobile application and a web-app. Finally, a web-app for "Visit Kampot" was launched in 2022. The Facebook page and the web-app have become popular today's Cambodians; there are more than 70,000 followers on Visit Kampot Facebook page, while there is an average of 800 visitors to the web-app every week. Today, besides Facebook page, the team has offered customers other digital channels such as Telegram (more than 6,000 members), YouTube (1.7 thousand subscribers) and Instagram (1.6 thousand followers). The team is now also promoting via Tik Tok, considering that many young Cambodians can be reach through this platform.

Panhaka's and his team's success cannot only be measured by the number of followers via their various digital promotion channels. It is inarguable that many more visitors, especially the locals, are visiting various beautiful locations in Kampot Province as a direct and indirect result of "Visit Kampot" via the likes and shares, in recent years; and the significant role of the team in promoting tourism through digital marketing has been increasingly recognized by the local community, including tourism-related businesses, business associations, local authority as well as the Ministry of Tourism. Recently, the team has been requested by the Ministry of Tourism to share knowledge and assist other provinces along the coastal area to promote their respective potential tourism attractions.

Being an information sharing platform that promotes the local community can be one reason that the platform can be widely recognized in just a few years; however, these following strategies also determine the success of utilizing the current digital tools.

1. Creative content while maintaining the core value as an information platform. The number of likes and shares depend mainly on the content created; therefore, even when promoting a business on the platform, they must be creative. Panhaka asserted that "people recognize us for being an information sharing platform, therefore, when diverting from what we are, people are not interested in our content. For example, when we promoted a 1960s-style coffee shop, we must make it a recommendation content that customers can enjoy beautiful view and antiques at the coffee shop."

2. Utilization of various digital platforms for successful sharing. The team knows that, even though FACEBOOK is their main platformmain platform, other channels are equally important. . Panhaka explained that they have to their presence in any channels that are most used today. He added, "Telegram is now popular amongst Cambodians; and they have a Telegram Channel to broadcast contents; once we post, our audience can be notified immediately." He continued, "We have an Instagram Account because we want to target more foreigners and high lifestyle people; we have Tik Tok as there are many young people on that channel."

3. Referring audience to web-app via social media and communication channels. Recognizing that most people do not prefer web-app yet, the strategy of the team is to provide a highlight of the post on Facebook and Telegram for instance, where the link to the web-app is provided, so that people can read the details of the place or event that they are interested in.

Despite the success, there are challenges that the team are dealing with.

1. The team is self-funded, meaning they currently do not receive financial support from any private or government body. Nonetheless, the team has a means to earn income, although it may not be sufficient on some occasions. First, the team provide other tourism services a tour agency where he could earn some commission from motorcycle booking and other tourism services, and non-tourism services such as photo shooting for businesses and pre-weddings. In addition, and more importantly, the team is promoting membership on "Visit Kampot" platform amongst business. When businesses pay for monthly membership fee, they can have benefits such as (1) their business account can post their services immediately on the "Visit Kampot" Facebook community without approval from the admin; (2) business will be listed on the web-app platform where people can read about their business details and contact them directly, plus a 35 percent discount on promotion picture shooting. Therefore, this requires that the team receives support from the business community via membership participation.

“Visit Kampot” web-app interface

“Vissit Kampot”, a Facebook post

“Visit Kampot” Telegram Channel

“Visit Kampot”, an Instagram post

8. Discussion

Findings from the study reveal significant implications. Regarding level of digital adoption, one can say that it is at an elementary level and mostly for the downstream linkage between the MSMEs and final customers; nonetheless, there is progress in adoption, especially in digital payments, social media marketing and e-commerce/OTA platforms, thanks to improvement in accessibility of necessary infrastructure such as internet and electricity. , MSMEs in both sectors are getting comfortable with adopting and using digital technologies that suit their business needs. First, they are able to utilize mobile communication applications such as Telegram, WhatsApp and e-mail; and they have computers and smartphones. Secondly, they know where to sell their products or services by participating in social media marketing platforms as well as e-commerce/OTA, although e-commerce platforms appear to be lagging for agro-processing MSMEs. Thirdly, they adopt the use of computer software, ranging from the simple use of MS Word and Excel to using accounting software, a POS system and channel manager. Instant messaging technologies, such as Telegram and WhatsApp, and digital payment such as KHQR are often easily and quickly adopted by everyone; therefore, MSMEs are no exception as these technologies are commonly perceived as creating convenience and reducing transaction cost.

Unlike payment and instant messaging technologies, social media and some platforms are necessarily adopted by MSMEs because they are readily available and can be used without monetary cost. From the semi-structured interview, adoption choice for social media amongst MSMEs is to increase business visibility as they believe it helps maintain their competitiveness level because the same businesses are adopting this marketing and sales strategy. Therefore, utilization of social media such as Facebook and Instagram, either with or without paid services, have become essential for business in the two sectors. However, MSMEs do not entirely depend on these platforms to sell their products; they continue to rely on networking or sales team in some cases. In addition, MSMEs are quite cautious with spending on social media; they are less inclined to spend on paid service on social media, especially when they experienced lower engagement or sales than expected due to limited knowledge in setting the target audience. In addition, when experiencing ineffective expenditure, they felt that boosting service is expensive. Moreover, they can rely on "like" and "share" marketing method to raise awareness about their business. As found by a qualitative study by Wahid and Asiati (2021), besides using a "paid service" on social media marketing, Indonesian women-MSMEs also practice other social media marketing methods such as "post and share" using attractive contents, family and friends repost as well as follow-to-follow, following others to be followed back and thus gain more audience.

For agro-processing sector, besides social media, third-party e-commerce platforms have not played a crucial role yet for MSMEs. One possible reason is that while the market is limited for these processed products domestically and abroad, customer behaviour towards ordering such processing products on an e-commerce platform is scarce, unlike goods such as cooked food, which customers can order through delivery applications such as FoodPanda or Grab. Customers may prefer communication and making inquiry directly with the business either through Telegram or Facebook messenger as well as a formal channel like e-mail. Nonetheless, MSMEs show willingness to participate in these platforms as long as they are only charged commission once the order had been placed without any monthly or other fees.

For the tourism sector, third-party platforms, such as Booking.com, Agoda and TripAdvisor, are essential, especially to those in accommodation business. Before the Covid-19 outbreak in 2020, these businesses relied on foreign visitors who frequently make their travel decision based on these platforms. Frequently, foreign visitors view a property's availability, cost and quality through platforms and other customers' experience shared through reviews affect them significantly. Therefore, they must work hard to ensure good reputation on these platforms, or they would face bad reviews which can result in low rankings and decline in number of customers. The reliance on these wide-audience platforms sometimes resulted in pricing pressure as business had to provide

discounts to attract more customers; sometimes misunderstanding between business and platforms also cause a loss or reduction in profit margin for MSMEs. To become less reliant on these OTA platforms, accommodation MSMEs are turning towards local visitors who can currently be approached via social media, such as Facebook, because these target customers are not much familiar with using OTA platforms yet.

Even though women as a whole may be found to be less likely having access to digital technology, the findings did not indicate that women entrepreneurs are less likely to adopt digital technology, or they do at a slower rate because what matters is the knowledge and skills as well as their perception on digital technologies, which causes them to adopt more of one technology over another. In addition, women entrepreneurs were able to cope during the Covid-19 pandemic thanks to the adoption of social media and digital marketing platforms (ADB, 2021a), implying they are a fast adopters. Furthermore, women have often been targeted for digital-related programs such as financial literacy program by the National Bank of Cambodia and the Technovation 2023, the training and competition program for female students. Nevertheless, this effort needs to be continued to ensure that women entrepreneurs have access to digital technology and its related knowledge and skills, as the data tends to indicate that women are less active in acquiring these knowledge and skills, which allow them to create more value from such technologies.

Data analytics capability is essential for business. As argued by (Ciampi et al., 2021), big data analytics leads to innovation in business model of firms. However, even amongst the OECD countries, which can have an implication for other developing countries, data analytics adoption is minor and slower for smaller firms (OECD, 2019). Therefore, it is not surprising when MSMEs in the studied sector lack the ability to utilize available data to improve business performance. This is owing to the lack of digital talents, as cited in a report by SquareSpace in 2018 (Kem & Sou, 2018), these talents are mostly working for large firms for higher salary and career advancement. With this regard, MSMEs may have competitive disadvantage in recruiting digital tech talents because they offer lower pay while their location is often dispersed in provinces, less preferred by most digital professionals. In addition, MSMEs do not invest adequately in skill development, including digital skills, for their workforce, and the lack of financial resource is frequently cited as one of the main reasons. Availability of data, however, is limited for MSMEs.

Even though MSMEs are at the early stage of digital adoption, they can improve the speed of digital adoption if they have adequate knowledge and skills as well as capital to invest in the technologies. To present, digital ecosystem in the country has been improved significantly that leads to gradual elimination of barriers to digital adoption. The broadband internet coverage has been increased widely, allowing MSMEs to better access to the internet, where they can utilize digital technologies in businesses such as digital payment, management and sales software, digital marketing and sales platforms, and search for digital-related as well as knowledge in other areas. Government portals such as Go Digital Cambodia was created to provide citizens as well as businesses, including MSMEs, knowledge and skills on digital technologies. In addition, MSMEs can have access to digital-related trainings, workshops and other financial and technical supports, which are provided by some government body such as Khmer Enterprise, Techo Startup Center, and relevant ministries, and non-government bodies such as development partners, venture capitals and business and startups accelerators. Besides, polices and legal framework have been and are being established to assist MSMEs in digital adoption. These policies and legal framework, such as E-Commerce Strategy and E-Commerce Law, seek to assist MSMEs in performing safely on e-commerce platforms. Meanwhile the draft of cyber security and personal data protection law has been completed and the Ministry of Post and Telecommunications is awaiting comments from relevant stakeholders.

9. Policy Recommendations

Cambodia has made a remarkable improvement in digital technology adoption, within the government and amongst citizens and business. In businesses, there is an emerging present of tech startups, including digital technology such as digital platform developers for e-commerce and marketing as well as transportation and logistics. Meanwhile, businesses, including MSMEs, are going digital. For MSMEs who adopted some digital technologies, the challenge is how to increase the uptake volume and to utilize it effectively as they are shortfall of necessary knowledge and skills, for instance, language ability and data analytics, both of their own and their employees, that enable them to make the best of each technology. On the other hand, those who do not adopt digital technologies at all or in a specific way do so because they are initially unaware or lack even basic knowledge of them; thus, they are hesitant to adopt or find it unnecessary.

From the study findings and with the current effort of all stakeholders including the government, development partners and business associations, following policy recommendations are drawn.

1. Supporting policies and programs are in the right direction to digital development for MSMEs in Cambodia. However, to increase the uptake amongst MSMEs, particularly in the studied sectors, expanding the scope of digital literacy from the basic level is essential as it can be a fundamental to digital adoption in production, operation as well as sales and marketing process.

2. A clear training and support plan should be established in a way that ensure prospective MSMEs can gain the knowledge and skills from basic to advanced so that they can catchup and are willing to continue their digital adoption. This also means that training courses should not be redundant; as some of the interviewed reported they received the same training each time they are invited, e.g., digital marketing using Facebook, which make them reluctant to participate. Therefore, it is necessary that stakeholders such as the government, development partners and NGOs who are supporting MSMEs should work together when providing training supports.

3. It is also critical to ensure that support is available for the majority of, if not all, MSMEs. There should be a well-established agency or platform through which MSMEs can gain access to both technical and knowledge and information support. This may require that the agency, which is likely to be from the government, have sufficient knowledge to answer all digital technology-related questions raised by MSMEs.

4. The government and other relevant stakeholders such venture capitals, development partners, as well as universities or other educational institutions to continue supports (digital) tech startups that are highly user-friendly and affordable for MSMEs, who will contribute to gradual digital technology adoption amongst MSMEs at all levels of initial digital knowledge and skills.

5. Continuation of the support for women entrepreneurs through increasing their business opportunity and participation in business associations as well as other platforms that they can have access to all kind of supports, including access to digital-related knowledge and skills. Therefore, a database on women-led business should be available and that they can be effortlessly mobilized to participate in relevant platforms and access to those supports. This might also increase the participation by women entrepreneurs in rural areas.

6. Government bodies working on women empowerment issues such as Ministry of Woman Affairs, should work with stakeholders such as development partners, NGOs, and business associations, to raise awareness about women entrepreneurs amongst men as well as general people so that their mindset change and can provide supports needed by women entrepreneurs, such as sharing unpaid childcare burden by the husband and/or as well as mental support from other family members and friends.

7. The government as well as relevant stakeholders as mentioned above should further assess the challenges faced women entrepreneurs, including challenges to digital adoption, and provide viable solutions accordingly.

8. The government should assess the impact of digital technology on labour market and other socio-economic development dimensions so that preventive measure can be taken on time, e.g., for example skill upgrading to prevent job loss from automation.

9. The government and relevant stakeholders should encourage women's participation in STEM education via raising awareness campaigns as well as creating a labour market condition that enable employment opportunities for female students in this area.

10. Effectiveness of the government e-commerce platform should be regularly assessed so that solutions to any shortcomings can be timely identified. In addition, all businesses listed in the platform should be aware of or have access to all instruction on how to operate on the platform so that technical issues can be reduced. Moreover, awareness of the platforms should be raised amongst not businesses who are potential vendors but also amongst potential local as well as international customers.

11. The Government should continue and accelerate the implementation of the policy and legal framework that have been approved, and the scope of existing should be expanded so that other small businesses, especially those in rural areas can have access to these supports.

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