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The Digital Divide Amongst MSMEs in ASEAN

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The Digital Divide Amongst MSMEs in ASEAN

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List of Abbreviations

ACCEC	ASEAN Coordinating Committee on Electronic Commerce
ACRF	ASEAN Comprehensive Recovery Framework
ADB	Asian Development Bank
ADM	ASEAN Digital Masterplan 2025
AEC	ASEAN Economic Community
AI	artificial intelligence
AIFS	ASEAN Integrated Food Security
AMEICC	AEM–METI Economic and Industrial Cooperation Committee
AMS	ASEAN Member State/s
AOSD	ASEAN Online Sale Day
APT	ASEAN Plus Three
AR	augmented reality
ASEAN	Association of Southeast Asian Nations
BI	Bank Indonesia
BNM	Bank Negara Malaysia
BSBR	Bandar Seri Begawan Roadmap
CAP	common agricultural policy
CERT	computer emergency response team
CJK	China, Japan, and Republic of Korea
CSA	Cyber Security Agency of Singapore
DEFA	Digital Economy Framework for Action
DESI	Digital Economy and Society Index
DIFAP	Digital Integration Framework Action Plan
DSM	Digital Single Market
EC3	European Cybercrime Centre
EDI	electronic data interchange
EDIH	European Digital Innovation Hub

EEN	Enterprise Europe Network
EGNC	e-Government National Centre
EIF	European Investment Fund
EIP-AGRI	European Innovation Partnership for Agricultural Productivity and Sustainability
EIT	European Institute of Innovation and Technology
ENISA	European Union Agency for Cybersecurity
ERIA	Economic Research Institute for ASEAN and East Asia
ERP	enterprise resource planning
ESIF	European Structural and Investment Funds
EU	European Union
FAS	food and agricultural sector
GDP	gross domestic product
GDPR	General Data Protection Regulation
ICT	information and communication technology
IMDA	Infocomm Media Development Authority
IoT	internet of things
IT	information technology
JETRO	Japan External Trade Organisation
JICA	Japanese International Cooperation Agency
Lao PDR	Lao People's Democratic Republic
MDEC	Malaysian Digital Economy Corporation
MNC	multinational corporation
mPOS	mobile point-of-sale
MSMEs	micro, small, and medium-sized enterprises
NAFTA	North America Free Trade Agreement
NGO	non-governmental organisation
NIS	network and information security
NPO	non-profit organisation
OECD	Organisation for Economic Co-operation and Development

OSMEP	Office of SMEs Promotion
RFID	Radio Frequency Identification
SME	small and medium-sized enterprises
SMP	Single Market Programme
SNS	social networking service
SPA-FS	Strategic Plan of Action on Food Security
TTC	Trade and Technology Council
UNCTAD	United Nations Conference on Trade and Development
WTO	World Trade Organization

Chapter 1
Introduction

1. Background and Objectives

According to the Organisation for Economic Co-operation and Development (OECD, 2001), the digital divide refers to the disparity that exists between individuals, households, businesses, and geographic areas of different socio-economic levels in terms of their access to information and communication technologies (ICTs) and their utilisation of the internet for various activities. Riggins and Dewan (2005) also highlighted that the digital divide has two types of effects: first-order effects about inequality in ICT access and second-order effects relating to the disparity in ICT usage amongst those that already have access.

The significance of addressing digital disparities amongst micro, small, and medium-sized enterprises (MSMEs) to attain inclusive and sustainable growth has been widely recognised by the Association of Southeast Asian Nations (ASEAN). The coronavirus disease (COVID-19) pandemic has resulted in the rapid proliferation of digital services throughout society. However, a significant digital divide is emerging amongst companies within the ASEAN region, particularly MSMEs, due to various factors, such as limited digital skills amongst employees and financial constraints in implementing digital tools. Nevertheless, existing studies on the digital divide in MSMEs need to be expanded regarding their research scope. For instance, a study conducted by the Japan External Trade Organization (JETRO, 2020) focused on barriers to digital technology adoption based on a questionnaire survey, but its coverage was limited to Japanese foreign-affiliated firms in ASEAN. Thus, a survey with a broader reach – encompassing ASEAN local MSMEs – would be valuable. It is imperative to accurately assess the extent of the digital divide in the region and take the necessary measures to bridge this gap. In this context, on 13 September 2021, the 24th ASEAN Economic Ministers Plus Three Consultation noted Japan's proposal to conduct research on closing the digital divide amongst MSMEs in the region. Subsequently, the Senior Economic Officials' Meeting Plus Three endorsed the concept note on 27 April 2022. The ASEAN Secretariat then requested the Economic Research Institute for ASEAN and East Asia (ERIA) to undertake the ASEAN Plus Three Research Project for Closing the Digital Divide in MSMEs.

To examine the state of the regional digital divide, the project team conducted a large-scale questionnaire survey targeting MSMEs in the region. The survey solicited responses from a diverse range of MSMEs, taking into account their company size, industry, and geographical location. This study also includes case studies conducted from two distinct dimensions. The first dimension explores initiatives to encourage digitalisation and

mitigate the digital divide – within ASEAN and within ASEAN Member States (AMS). This aims to shed light on the measures and strategies implemented to foster digitalisation and bridge the digital divide amongst MSMEs in ASEAN. The second dimension of the case studies focuses on initiatives undertaken to promote digitalisation and address the digital divide in regions and countries outside ASEAN. By examining these initiatives, the study aims to provide a broader perspective on global efforts to foster digitalisation and bridge the digital divide, drawing insights and lessons that could inform and inspire digitalisation efforts within ASEAN. Finally, this study concludes by presenting policy recommendations. These recommendations serve as actionable guidance and insights derived from the findings and analysis of the questionnaire and case studies. They offer practical measures and strategies that policymakers, stakeholders, and relevant actors can consider to address the digital divide and advance digitalisation efforts within ASEAN. The policy recommendations include how China, Japan, and the Republic of Korea (CJK) can support ASEAN in implementing such measures and strategies.

ERIA conducted this research in collaboration with Deloitte Consulting Southeast Asia and Nomura Research Institute Thailand.

2. Data Analysis

Two types of surveys were conducted: a web survey and a phone survey. The web survey was conducted in all AMS to obtain a broad picture of the digital divide in ASEAN, and responses were collected from large companies to understand the difference between them and MSMEs. The phone survey was conducted in three target countries (Indonesia, Malaysia, and Viet Nam) to collect responses from the companies, including those that may not have access to the internet, which the web survey would not cover.

The web and phone survey data show the following trends in the digital tool implementation situations of the three countries where the phone survey was conducted:[1]

- Amongst large companies, nearly 100% adopt digital tools for intra-company management tools (i.e. mobile devices, computers), emphasising the value of digitalisation for efficiency and communication. More than 90% use e-payments and social networking services (SNS).
- Medium-sized companies show strong adoption of intra-company management tools, (more than 90%), but scored lower (ranging from around 50%–80%) for the tools to

[1] For all the digital tools, implementation analysis was used in the phone survey data. This is because the project team compiled the phone survey data by weighing the number of companies in the three countries to identify the trends with a closer view of reality. Additionally, the phone survey data are considered to represent the status of the digital divide more accurately than the web survey data due to the attributes of the respondents, as it covered respondents who do not have access to the internet, which is not the case in the web survey.

improve internal operational efficiencies (i.e. sales management, automation tools such as Salesforce).

- Small companies show low scores amongst all digital tools, especially internal communication tools (i.e. email and/or chat applications) and hardware (i.e. computers and mobile devices).
- Microenterprises tend to have the lowest adoption rates amongst all digital tools. Internal communication tools scored low, as for small companies. The implementation rate for SNS is significantly low.

By assessing the digitalisation progress across businesses, considering the number of digital tools implemented, the results by segment were revealed as follows:

- Across countries where the phone survey was conducted, Indonesia and Malaysia outperform, especially with large and medium-sized companies implementing about 20 of the 24 available digital tools. In contrast, Viet Nam generally exhibits lower rates of digital tool implementation.
- By company size, large and medium-sized companies demonstrate higher implementation rates than micro and small companies. In Malaysia, large and medium-sized companies averaged 20 digital tools compared with less than five amongst small or micro firms. The result implies that larger companies have sufficient resources and technical investments, which can be lacking amongst smaller companies.
- By industry, the agriculture, forestry, and fishing sectors lag in digitalisation, compared with the other two industries (i.e. services and manufacturing). Heavy manufacturing is the most progressed industry.
- By location (i.e. urban and rural), a significant difference was not observed in general.

The report provides a comprehensive digitalisation framework for ASEAN MSMEs, outlining a systematic process for effective digitalisation. The analysed data focus on Viet Nam due to the data consistency. The report identifies a three-step pathway to digitalisation. The overview of the steps is as follows:[2]

- The first step includes adopting basic digital tools like mobile devices, computers, e-payment systems, and cybersecurity software, which are fundamental for modern business communication and operations.
- The second stage involves digitising customer communication and sales processes, emphasising the use of social media, e-commerce, and e-payments for sales and marketing.

[2] The detailed analysis by industry is provided in Chapter 6.

- The final step is adopting advanced cutting-edge digital tools like 3D printing, artificial intelligence (AI), augmented reality (AR), drones, the internet of things (IoT) devices, and robotics. The adoption rate for these tools is still widely low amongst the surveyed companies, which can be assumed to be due to high implementation costs and technical challenges.

The factors causing the region's digital divide are identified throughout the study.[3] The survey provides insights into these factors, which fall broadly into two categories: MSMEs' internal factors (i.e. human resources and finance); and MSMEs' external factors (i.e. infrastructure, digital tool provision from the market, cyberattacks, e-government, the micro environment, and the macro environment).

- MSMEs' internal factors
    - Human resources

      (Business capability of business owners)

      The study reveals the influence of decision makers on MSMEs' digitalisation. Most ASEAN companies are owner-managed, particularly in small and micro-sized businesses (96.3% of small businesses and 99.0% of microenterprises based on the web survey). Notably, companies led by decision makers aged 42–57 consistently demonstrate high rates of digital tool implementation, potentially due to the balance of experience and adaptability. Micro and small companies tend to have a higher percentage of decision makers in the younger age group (aged 26–41) than larger companies. This prevalence of young decision makers in small and micro businesses can be attributed to lower start-up costs and fewer formal requirements for these types of companies.

      Education level also plays a role in digital tool implementation. Micro and small companies led by decision makers with higher education (e.g. post-secondary and graduate school) levels achieve higher implementation rates, at 76.6% and 83.0%, respectively. Micro and small companies with decision makers with lower education levels may face limitations in terms of resources, resulting in lower implementation rates.

      A significant gender gap exists in leadership roles amongst ASEAN companies, regardless of their size, with male decision makers representing the majority (69.5%) and female-led businesses (11.8%) lagging in quantity. However, regarding digital implementation rates, female-led micro and small enterprises are on a par with their male-led counterparts. Addressing barriers to women's access to leadership positions is crucial to promote gender equality and foster

[3] The implications of the MSMEs' internal and external factors are derived from both the web and phone surveys.

overall development in the business sector.

(Middle management and regular employees)

Addressing the skills gaps in business and information and communication technology (ICT) is crucial for AMS to bridge the digital divide. Governments, the private sector, and educational institutions must collaborate to provide comprehensive training programmes and support. The study reveals the following insights into both the business and ICT skills of human resources:

Business skills

Companies encounter difficulties gathering information and identifying the appropriate digital tools. The web survey shows that the major issues are the inability to diagnose company issues that may require digital tools (72.6%) and not knowing where to find relevant information or whom to consult (67.5%).

Middle management should be crucial in digital transformation by utilising their knowledge and experience. However, only 5.6% of the companies surveyed receive consultation on suitable solutions, and 5.3% for business matches with solution providers from the public sector. In contrast, 29.4% of the companies surveyed receive consultation on suitable solutions from the private sector and 27.1% for business matches with solution providers from the private sector amongst web-surveyed companies. Companies receiving support from the public sector are more likely to implement digital tools successfully.

The web survey showed that over half of the respondents expect the government to focus on addressing challenges related to limited human resources for designing operational flows and diagnosing company issues that can be resolved through digital solutions.

ICT skills

Both the web and phone surveys showed that the respondents cited limited information technology (IT) knowledge due to lack of internal IT human resources as a challenge in planning the implementation of digital tools.

During the adoption phase, 79.0% of web survey respondents cited lack of IT human resources who can plan and implement digital tools as the most common challenge. However, the phone survey scored 53.1% for this issue. The phone survey also highlighted limited solutions or a lack thereof for meeting business needs, and the inability to identify tools matching company issues or needs as primary challenges.

After implementing digital tools, employees struggle to use them effectively due to limited ICT skills. Both surveys reported employees' reluctance to adopt digital tools due to confusion and the assumption that those tools can increase their workload.

The provision of ICT skills training from the public and private sectors showed a different trend. Only 8.1% of companies participated in IT skills seminars or training provided by the public sector, while 27.5% received training from the private sector in the web survey. Companies that received IT skills training from the public sector demonstrated a higher implementation rate of digital tools.

Both surveys confirmed respondents' expectation that the government focus on limited human resources with IT knowledge or skills to plan and implement digital tools.

- Finance

  Addressing the financial gap is crucial for ASEAN governments to narrow the digital divide. Financial support from the government is a simple but very effective form of support.

  In the adoption phase of digital tools, limited financial resources to invest in digital tools present a significant challenge, identified by 76.1% of the web survey respondents. The phone survey reveals fewer financial challenges, indicating a lag in digitalisation for less digitalised companies facing knowledge and support issues.

  After the adoption of digital tools, 60.5% of web survey respondents and 34.6% of phone survey respondents lacked the budget to upgrade digital tools, hindering progress beyond implementation.

  The web survey shows that public sector financial support is limited, as it was received by less than 10% of web survey respondents, while the private sector provides more support, benefiting around 40% of companies. However, the phone survey suggests limited access to information including such financial support for respondents without internet access.

  Companies receiving financial support demonstrate high adoption rates – 93.2% for public sector support and 80.8% for private sector support – highlighting the effectiveness of public financial measures. Both the web and phone survey results confirm these trends.

  Some 52.2% of web survey respondents and 41.6% of phone survey respondents expect the government to address the limited funds for investing in digital tools, ranking fourth and second highest, respectively, following challenges related to human resources.

- MSMEs' external factors
  - Infrastructure

    Addressing internet infrastructure is crucial to bridge the digital divide in ASEAN. Specific attention is required for countries like Malaysia and Indonesia, small and medium-sized enterprises (SMEs), and rural companies.

Both the web (51.6%) and phone surveys (47.7%) cited internet instability, which affects consistent use during the digital tool adoption phase, as a significant challenge. The web survey data comparing the 10 AMS show that Malaysia (89.8%) and Indonesia (68.8%) reported higher proportions for this challenge. By company size, SMEs experience the greatest challenges, at more than 50%. By location, urban areas report 49.5% of companies facing internet instability, while rural areas show a higher figure of 59.6%.

However, only 28.5% of web survey respondents and 18.5% of phone survey respondents expect the government to address internet instability, as the shortage of human resources and funding issues rank higher than infrastructure issues.

- Digital tool provision from the market

  The companies surveyed stated that products and solutions on the market were not provided in the local language and did not fulfil the desired functionalities.

  Absence of local language products and services

  This is not the most significant challenge, but it is still a substantial issue for ASEAN MSMEs. About 30% of the web survey respondents underlined the importance of products and support being available in the local language.

  Moreover, the information-gathering phase of digital tools saw this as a significant issue, with 68.6% of web survey respondents facing difficulties searching and understanding the available information on the products and solutions, and 62.6% citing the limited information on the products and solutions in the local language.

  Absence of the desired functionalities

  The absence of the desired functionalities (i.e. localised functions) emerged as one of the challenges for surveyed companies that do not plan to implement any digital tools within the next 3 years (49.4% of web survey respondents and 62.8% of phone survey respondents).

  Additionally, factors such as lack of supporting bodies for companies to implement digital tools nearby and insufficient support from solutions providers in the country or area were identified as causes of difficulty in the information gathering and adoption phases of the digital tool implementation.

  Nearly half of the web survey respondents called for government emphasis on this issue, citing difficulties in finding suitable solutions due to limited localised options.

- Cyberattacks

  The web survey revealed that 55.3% of the respondents have already implemented cybersecurity or protection software, with larger companies showing higher adoption rates than smaller companies. Amongst the web-surveyed companies, 32.3% of micro and 43.1% of small companies have implemented cybersecurity or protection software, while the adoption rates are significantly higher for medium-sized (55.0%) and large companies (71.2%). Given the increasing complexity of the digital landscape and the heightened risk of cyberattacks, it is concerning when a considerable portion of micro and small companies in the web survey has yet to implement cybersecurity measures and a significant proportion of micro (40.6%) and small (41.1%) companies have no plans to implement such tools within the next 3 years.

  While 33.8% of the web survey respondents consider cybersecurity as an issue that the government should emphasise to encourage digital tool adoption, it ranks lower on the list of priorities for most companies (8th out of 14 options). This is particularly true for small and micro companies facing other pressing challenges such as ICT skills gaps, limited business knowledge, and financial constraints. Their lower prioritisation of cybersecurity may stem from their low adoption rates of digital tools and perceived lower risk of cyber threats. Malaysia stands out, with many companies seeking government assistance for cybersecurity, indicating a high level of awareness in the country. Companies seeking government assistance for cybersecurity are primarily concentrated in rural areas. Since companies in rural areas do not have easy access to information on cybersecurity and must take mitigation measures independently, they are more likely to seek government assistance.

  Although cybersecurity may not currently be a top priority for the surveyed companies, including micro and small enterprises, it is crucial to recognise the importance of mitigating the risk of cyberattacks as businesses progress in their digitalisation efforts.

- E-government

  The ASEAN Digital Masterplan 2025 emphasises the importance of AMS governments providing accessible digital services to all citizens. However, based on the findings of the surveys, the operational inconvenience caused by unstandardised e-government services is not a major concern for most surveyed companies. This lower prioritisation is particularly evident amongst small and micro companies facing more immediate challenges such as limited business knowledge and ICT skills, and financial constraints. The Philippines, the Lao People's Democratic Republic (Lao PDR), and Viet Nam exhibit the highest level of e-government concerns. The need for improved e-government initiatives is similar amongst companies in urban (30.3%) and rural areas

(29.0%). This trend indicates that e-government services are equally important for both urban and rural companies. It is important for governments to consider the unique needs and challenges faced by both urban and rural areas when developing and implementing e-government initiatives. Although e-government may not be the most pressing issue, governments should continue enhancing e-government services and creating an environment conducive to digital tool adoption amongst ASEAN companies.

- Micro-environment (i.e. market environment)

  The digitalisation efforts of companies are significantly influenced by the type of customers and suppliers they engage with. When companies interact with digitally advanced and demanding customers (e.g. large companies and multinational corporations) and collaborate with multinational suppliers, they are motivated to adopt digital tools in greater quantity and of a more advanced standard to meet the specific requirements of those stakeholders. On the other hand, based on the web survey, micro and small companies in ASEAN are primarily domestic companies that conduct their affairs in their home country (95.8% of micro and 95.1% of small companies), and mainly work with local suppliers and lack direct multi-channel network suppliers (over 88% of small and micro companies). According to the web survey, micro and small companies in ASEAN predominantly serve individual and household consumers (89.6% of micro and 70.5% of small companies) and MSMEs (11.5% of micro and 29.5% of small companies), rather than large companies (only 6.3% of micro and 6.0% of small companies). In addition, they have limited direct multinational corporation (MNC) customers (only 16.7% of micro and 11.9% of small companies in the web survey). As a result of these factors, the demand for adopting advanced digital tools to meet specific customer requirements is lower in micro and small companies.

  To promote digitalisation in these companies, ASEAN governments should encourage the adoption of digital tools throughout the entire ecosystem, including local customers and suppliers. Additionally, efforts should focus on reducing barriers that hinder the participation of micro and small enterprises in cross-border trade within the ASEAN region and globally. By enabling these businesses to connect with digitally advanced customers and suppliers, they will be motivated to adopt more digital tools, enhancing their competitiveness and contributing to the overall digital transformation of ASEAN.

- Macro environment (i.e. COVID-19 effect)

  Over the past few years, the COVID-19 pandemic has emerged as one of the most significant macro-environment factors influencing companies in ASEAN. The study reveals the influences of the pandemic on the digital adoption patterns of enterprises in the region.

According to the web survey, before the pandemic, a significant percentage of the surveyed companies had already implemented digital tools to enhance their operations, particularly intra-company management tools (i.e. email, chat applications, mobile devices, computers, and office suites), with 78.9%–83.0% of companies in ASEAN having implemented these tools before 2020. E-payment systems were also commonly utilised, indicating recognition of their benefits in business transactions. Micro companies in the web survey lagged larger companies in e-payment adoption before the pandemic, with only 49.0% in sales and marketing and 43.2% in procurement. However, following the regional trend, around 10% of micro companies embraced e-payment during the pandemic and 18% adopted it afterwards. As a result, the overall implementation rate of e-payment has reached 75.5% in sales and marketing and 74.0% in procurement.

During the pandemic, there was a notable shift in adoption patterns driven by the sudden need for remote work and virtual communication. Web meeting systems experienced a substantial increase in adoption, reflecting the reliance on virtual meetings and conferences. In fact, according to the web survey, 23.4% of micro and 28.6% of small companies implemented these during the pandemic. SNS also saw increased adoption, as companies recognised the importance of online channels for marketing and customer engagement. During the pandemic in ASEAN, SNS saw an adoption rate of 10.1%, adding to 75.3% of the companies that previously used them.

After the pandemic, adoption rates for most digital tools remained relatively stable or experienced slight changes. However, tools related to sales and marketing, such as e-commerce and sales management automation, observed a positive trend as companies adapted to the changing business environment.

The study highlights low implementation rates and plans for emerging technologies such as 3D printing, AI, AR, drones, and robotics. Companies, especially small and micro enterprises, showed less intention to adopt these advanced technologies in the next 3 years. Overall, the COVID-19 pandemic played a significant role in accelerating the adoption of digital tools in ASEAN. The crisis prompted companies to implement tools for remote work, virtual communication, and online operations. However, the impact of adopting advanced technologies was less pronounced and depended on individual companies' needs, requirements, characteristics, and resources.

3. Policy Recommendation

The following policy recommendations are provided to close the digital gap within the region by addressing both MSMEs' internal and external factors, observed through the study. Each policy item includes how CJK can assist ASEAN in implementing those recommendations.

- MSMEs' internal factors
  - Human resources

(a) Provision of guidance and assessment tools for MSMEs to go digital

MSMEs are struggling with not knowing how to utilise digital tools or even what kind of challenges can be addressed by digitalisation due to business owners' lack of business and ICT knowledge and/or experience, or the lack of awareness of digitalisation amongst middle management and regular employees. To address those challenges, ASEAN could consider providing guidance and assessment tools for MSMEs. This could contribute to MSMEs understanding their stage of digitalisation, help develop the necessary vision for digitalisation, identify the challenges to digitalisation, and create action plans. CJK could assist ASEAN through public sector collaboration on developing such schemes and researching projects by leveraging their existing domestic efforts to provide similar services.

(b) Sharing best practices of MSMEs' digitalisation journeys

MSMEs need help to address lack of awareness and knowledge about the available digital tools and limited access to technical support. Many MSMEs in the region are still operating with traditional business models and have yet to realise the benefits of digitalisation. ASEAN could share its success stories and case studies of how companies successfully achieve digitalisation through digital tool implementation. Sharing best practices could inspire and motivate MSMEs to move forward. When implementing this policy, it is desirable to align the information with the challenges and needs in digitalising different segments, such as by industry, location (rural or urban), and company size. CJK could leverage their expertise from the existing information-sharing schemes implemented in their countries. CJK could also offer technical support, training programmes, and capacity-building initiatives to assist AMS in enhancing their information-sharing capabilities. This could include providing CJK funding, technological infrastructure, and expertise to help ASEAN establish information-sharing platforms and effectively disseminate valuable knowledge on MSMEs' digitalisation.

(c) Talent development (i.e. training, coaching, and mentoring)

MSMEs' digitalisation can be led by both business owners and/or middle

management and regular employees. They need to realise the value of digital tool implementation, decide to implement them, and lead or oversee the digitalisation activities within MSMEs. The lack of such talent is a significant challenge that ASEAN should address. To ensure effective digital transformation in MSMEs, ASEAN could consider talent development programmes, such as improving the business capability of MSMEs' business owners through business management training or mentorship and coaching to equip them with business and ICT knowledge. For middle management and regular employees, ASEAN could provide skills development programmes, support MSMEs to develop internal training and knowledge-sharing schemes, strengthen collaboration schemes between ASEAN and educational institutions to facilitate reskilling opportunities for MSMEs, and equip students with the necessary educational background through a structured curriculum. From an educational perspective, it is especially important to strengthen digital education in primary and secondary schools, particularly ICT education. Ensuring a minimum level of digital readiness for most of the population is crucial. ASEAN could also develop training of trainers programmes to address the need for more educators, particularly in rural and island areas, by dispatching human resources with expertise in digital transformation and teaching methodologies. CJK could support ASEAN's talent development programmes, harnessing their extensive experience in developing talent pools, which has enabled them to reach their current level of economic development. Support schemes could be considered, such as developing educational programmes for digital talent, including reskilling programmes and primary and secondary education; and dispatching CJK personnel to develop digital human resources in ASEAN.

(d) Online platform to support MSMEs to go digital

MSMEs need access to information that assists them in going digital. The gap in information amongst them could cause a further digital divide. An online platform aimed at providing MSMEs with such information would serve as the hub for registration, enabling supporting entities and MSMEs to provide information and preferences, facilitating better matching between them. The platform could offer a comprehensive line-up of available support options, including mentorship, advisory services, training programmes, and funding opportunities. They should include diverse stakeholders, from both the public and private sectors, to provide comprehensive support for MSMEs. To ensure inclusivity, the platform should provide services in the local language and English, allowing for broader accessibility and engagement. CJK could support ASEAN in assisting MSMEs with digitalisation by developing and implementing a platform that provides online courses – leveraging their expertise from national online support programmes, including knowledge-

sharing-based sessions and e-learning courses.

(e) Facilitating offline business networking and community building

To address the gap in information access amongst MSMEs, offline platform schemes should be considered together with online platforms so that MSMEs without internet access can access them. Such offline platforms could facilitate face-to-face interactions, knowledge sharing, and networking opportunities. This policy could be achieved in the form of local hubs by establishing dedicated regional MSME networking platforms that connect stakeholders (e.g. businesses, support organisations, investors, and policymakers) for matchmaking and knowledge sharing, leveraging existing networks (e.g. chambers of commerce, industry associations, and business incubators) to facilitate networking activities. CJK could assist, e.g. by staffing the hub and encouraging private companies and stakeholders to participate in the ecosystem, so that ASEAN MSMEs can access CJK products and services, or perform matchmaking for direct support or future collaboration between ASEAN MSMEs and private entities in CJK.

- Finance

(f) Providing financial assistance for the implementation of digital tools

Lack of financial resources is a priority challenge for MSMEs going digital. ASEAN should provide comprehensive financial support targeting MSMEs by collaborating with multilateral development banks and other regional organisations to develop sufficient budget pools, and with the public and private sector to provide MSMEs with incentives to go digital, e.g. introducing subsidies, tax breaks, and credit facilities schemes. Such assistance could include the purchase of digital tools and training and skills development – covering the cost of training, business development, and market access for MSMEs, such as market research, product promotion, and participation in the events. CJK could assist ASEAN by providing direct financial support through bilateral support or transferring their knowledge to develop regional and/or national financial assistance programmes.

- MSMEs' external factors
  - Infrastructure

(g) Expansion of internet infrastructure

ASEAN should prioritise improving inclusive internet access throughout the region. Attention should be given to rural, including island, areas that experience limited connectivity and low internet penetration rates. These efforts should be made through collaboration with multiple stakeholders, including regional financial institutions, donor countries, and international

organisations, to seek financial support, technical expertise, and knowledge sharing. Additionally, public–private partnerships could expand their coverage of supporting the internet infrastructure. CJK could contribute by providing the technology, expertise, and infrastructure for new internet lines; collaborating with CJK private entities to introduce new line connection technology; and providing advanced technologies for cross-national circuit connectivity.

(h) Provision of high-speed connectivity

Along with addressing the lack of internet within ASEAN, a high-speed internet connection provides added value for a better online environment. Since the region's high-speed internet level varies amongst AMS, ASEAN should prioritise knowledge sharing amongst AMS to facilitate digital transformation for MSMEs. Experiences from successful cases, such as Singapore and Malaysia, can serve as valuable references for other AMS. This could be achieved through workshops, seminars, and collaborative platforms that facilitate sharing of best practices, lessons learnt, and technical expertise. CJK could support this by leveraging the infrastructure and technology expertise of CJK governments and the private sector and sharing the lessons learnt from successful cases of public–private collaboration.

- Digital tools on the market

(i) Software provision

The absence of products and solutions with the functionality that MSMEs require hinders MSMEs' adoption of digital tools. The questionnaire also reveals that the availability of such tools in the local language is an important factor. ASEAN could consider establishing partnerships with the private sector to secure free or discounted software licences for MSMEs following an assessment to identify the most critical basic solution tools that MSMEs require. Such partnerships could be formed with established software companies, start-ups, or through collaboration with relevant industry associations. This should be accompanied by capacity-building programmes to train MSMEs in utilising the software tools through workshops, training sessions, online tutorials, and mentorship programmes. CJK could support this by encouraging their private sector entities to join these efforts, e.g. by providing products under these schemes or developing the desired solutions by working with ASEAN. These efforts could provide MSMEs access to essential software tools, promote market entry for CJK firms, and facilitate the development of innovative software solutions for the benefit of ASEAN MSMEs.

(j) Proliferation of digital devices

ASEAN MSMEs need to catch up in implementing basic tools, such as PCs and smartphones. To promote widespread adoption, efforts should be made to distribute devices free of charge, especially in areas where digital devices are not widely utilised. ASEAN could implement this by collaborating with stakeholders such as non-profit organisations, non-governmental organisations, and foundations. ASEAN could also explore collaborating with the private sector, particularly in rural areas and industries facing significant shortages in basic digitalisation efforts. CJK could support this by providing discounts on hardware from CJK companies and incentivising local CJK companies to expand awareness and distribution networks for basic digital devices in ASEAN.

- Cyberattacks

(k) Strengthening cybersecurity for MSMEs

The risk of cyberattacks increases with digitalisation of MSMEs. While AMS have laws and regulations related to cybersecurity and data protection, ASEAN should enhance its regional policy so that all AMS are prepared for cyberattacks, and thus minimise the risks involved in digitalisation for MSMEs. ASEAN could establish a standardised set of rules for AMS to adhere to, reinforcing cybersecurity laws. ASEAN could also promote sharing of best practices amongst AMS to enhance collective cybersecurity efforts. Furthermore, ASEAN could facilitate collaboration between the public and private sectors to ensure a coordinated and effective response to cybersecurity challenges. CJK could play a significant role in assisting ASEAN's efforts to strengthen cybersecurity through their capability, knowledge sharing of best practices, building cybersecurity capacity, sharing threat intelligence, and leveraging expertise from CJK's private sector in developing and implementing cybersecurity solutions.

- E-government

(l) Improve e-government amongst AMS

Promoting e-government could improve MSMEs' awareness and implementation of digitalisation. With regional policy encouraging local governments in AMS to go digital, ASEAN could establish policy frameworks highlighting the importance of e-government services and set common goals for AMS, as in the European Union. This could be achieved by developing guidelines and standards to ensure interoperability, cross-border services, and seamless integration of digital technologies. Since the level of e-government varies significantly amongst AMS, ASEAN could promote knowledge sharing and exchange of best practices through

platforms to encourage AMS to share their experiences, success stories, and lessons learnt in implementing effective e-government services that benefit MSMEs. ASEAN encourages its developed Member States to support their developing counterparts, fostering knowledge sharing and collaboration, but it could also collaborate with international partners to leverage their expertise and experience in improving e-government services. CJK could support ASEAN through their expertise in e-government efforts, such as sharing knowledge on e-government, private–public sector collaboration, and guiding regulatory frameworks for e-government services.

- Micro-environment (i.e. market environment)

  (m) Promoting a digital single market in ASEAN

  To incentivise MSMEs to go digital, ASEAN should develop its regional market to make MSMEs realise the economic benefits of market access through digitalisation efforts. While ASEAN has taken significant steps in promoting a deeply integrated and cohesive ASEAN economy through regional initiatives, it could consider introducing a digital single market concept to create a seamless and unified digital marketplace across the region as a public initiative, make the digital economy profitable for MSMEs, and realise the full potential of cross-border business activities in the region. Efforts should be made to lower the barriers to entry to the online economy for MSMEs, such as harmonising customs procedures, streamlining logistics processes, facilitating payments by promoting digital payment systems, and developing common standards for payment processing within the region and the data governance framework. Such collaboration between the public and private sectors could play a key role in creating a more inclusive digital single market in ASEAN, as in the European Union. CJK could support enlarging the coverage of this connected market by collaborating so that ASEAN MSMEs can enjoy the regional market, including ASEAN and CJK, from all the above perspectives: harmonising customs procedures, streamlining logistics processes, facilitating payments, and promoting regional data governance.

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Chapter 2
Methodology

1. Introduction

This chapter introduces the methodology of this study, including research steps, interviews, and questionnaire surveys.

2. Research Steps

The project was divided into two phases to address the digital divide in the Association of Southeast Asian Nations (ASEAN) region comprehensively.

During the first phase – the interview survey – the main objective was to assess the state of the digital divide in the region and develop a hypothesis about the elements causing it. This phase involved conducting research, gathering data, interviewing experts, and analysing information to better understand the specific challenges different businesses face regarding digital access and connectivity.

In the second phase – the questionnaire survey – a large-scale questionnaire was distributed to companies operating in ASEAN. This aimed to test the hypotheses formulated in the interview survey and gather more detailed insights about the digital divide. Additionally, a desktop study was conducted to investigate the initiatives and efforts that ASEAN has undertaken thus far to address the digital divide. The information obtained was used in generating policy recommendations based on the results obtained from the questionnaire.

Furthermore, the project team examined global reference cases beyond ASEAN to identify successful strategies employed in other regions and countries to overcome similar challenges related to the digital divide. This comparative analysis helped to expand the knowledge base and draw insights from successful approaches implemented elsewhere.

In the questionnaire survey, policy recommendations were provided based on the findings from the questionnaire and the case studies from both ASEAN and other regions and countries. These policy recommendations aimed to provide actionable strategies and initiatives that could effectively bridge the digital divide within ASEAN, considering the unique challenges and opportunities presented.

3. Phase 1: Interview Survey

In Phase 1 of the project, the focus was on preparing the hypothesis related to the digital divide issues and developing questionnaire items. This was accomplished through mainly desktop research and expert interviews, each serving a specific purpose in gathering information and insights.

The desktop research thoroughly examined existing papers, reports, case studies, and publications addressing the digital divide. The goal was to identify information and relevant data associated with the challenges faced by micro, small, and medium-sized enterprises (MSMEs) in ASEAN Member States (AMS) regarding the digital divide. This literature review process aimed to uncover key insights and understand the characteristics and patterns of the digital divide across different segments. Such segments could include variations based on the country, urban or rural location, number of employees, industry type, and/or business activity.

Interviews were conducted with experts to gain a comprehensive understanding of the pain points faced by MSMEs in adopting digital technologies. These interviews provided an opportunity to delve deeper into the specific challenges and barriers experienced by MSMEs when it comes to embracing and utilising digital tools. The relevance and significance of various aspects related to the digital divide were analysed through these interviews. This analysis helped identify key drivers that could serve as dimensions for segmenting the digital divide amongst MSMEs.

Table 2.1 shows the four groups that were identified as interview targets.

Table 2.1. List of Interview Targets

Group	Interview objective	Interviewee
National government of AMS	To understand each country's situation in terms of the digital divide and viewpoint on support needed for MSMEs	Ministry of Post and Telecommunications (KHM), Ministry of Commerce (KHM), Coordinating Ministry for Economic Affairs (IDN), Ministry of Communications and Informatics (IDN), Ministry of Trade (IDN), Ministry of Industry (IDN), Malaysia Digital Economy Corporation, Ministry of Entrepreneur and Cooperatives Development (MYS), Thailand Board of Investment, Bangko Sentral ng Pilipinas (PHL), Bureau of Small and Medium Enterprise Development (PHL), Department of Information and Communications Technology (PHL), Department of Finance (PHL), Digital Economy Promotion Agency (THA), Electronic Transactions Development Agency (THA), Digital Transformation Office (VNM)
Local solutions company in ASEAN	To understand each country's status and prospects in terms of the digital divide as well as experience in serving MSMEs from the solution providers' point of view	IT consulting and/or solutions providers: Celcom Axiata Berhad (MYS) Philippines solutions provider Cambodian solutions provider SALT (IDN) E-banking service providers: Siam Commercial Bank (THA) Vietnamese e-banking service provider
Local MSMEs in ASEAN	To understand the status of digitalisation and the need for	Kang Lakheng Rice Mill (KHM) PT Ocommerce Capital Indonesia (IDN)

Group	Interview objective	Interviewee
	support from the end-user's standpoint	Bidor Kwong Heng (MYS) Hongkong Bazaar (PHL) Sriborisuth Forging Technology (THA) Alphatrans (VNM)
CJK solutions company	To understand differences in the digital divide amongst target countries as well as the support required for MSMEs in each target country from the third-party solution providers' point of view	Japan: solutions provider China: solutions provider Rep. of Korea: solutions provider

AMS = ASEAN Member State/s; ASEAN = Association of Southeast Asian Nations; CJK = China, Japan, and the Republic of Korea; IT = information technology; MSMEs = micro, small, and medium-sized enterprises.
Source: Authors.

4. Phase 2: Questionnaire Survey

In Phase 2 of the project, the primary focus was on conducting questionnaires, verifying the hypotheses formulated in Phase 1, and developing draft policy recommendations based on the deliverables from the previous phase.

Building upon the findings and insights obtained in Phase 1, Phase 2 involves the implementation of a questionnaire survey specifically designed for MSMEs in ASEAN. The objective is to collect responses from various MSMEs, considering their business size, industry sector, and geographical location. This approach ensures a comprehensive understanding of the digital divide, considering the varied contexts and challenges faced by different types of MSMEs.

It is worth noting that special attention needs to be given to the survey method, particularly when targeting small and micro enterprises. These smaller businesses can be more challenging to reach and gather responses from, as they may have limited resources and different operational characteristics. Therefore, careful consideration must be given to developing an approach suitable for collecting responses from these enterprises. This may involve employing alternative methods such as targeted outreach,

simplified questionnaires, or utilising local networks and associations to facilitate data collection.

Furthermore, as part of Phase 2, the hypotheses formulated in Phase 1 were verified. The questionnaire survey results were crucial in this process, providing empirical data to validate or refute the initial hypotheses. By analysing the survey data, the project team could assess the factors contributing to the digital divide and determine their significance in the context of the ASEAN MSME landscape. This verification process ensures that the policy recommendations developed in subsequent stages are based on reliable and evidence-based information.

Chapter 3
Questionnaire Methodology

1. Introduction

The project team conducted a questionnaire survey on the digital divide amongst micro, small, and medium-sized enterprises (MSMEs) in ASEAN Member States (AMS). The survey's primary purpose is to understand the actual conditions of relevant digital divide factors and how to overcome the obstacles MSMEs encounter to close the digital gaps amongst MSMEs in the Association of Southeast Asian Nations (ASEAN).

The survey's target countries are the 10 AMS: Brunei Darussalam (Brunei), Cambodia, Indonesia, the Lao People's Democratic Republic (Lao PDR), Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Viet Nam. The geographic scope of the survey encompasses both urban and rural areas within these countries. Urban and rural classification is derived from the World Urbanisation Prospects (United Nations, 2019). The questionnaire investigates five industries: (i) agriculture, forestry, and fishing; (ii) services; (iii) light manufacturing 1 (consumer goods or consumables); (iv) light manufacturing 2 (others); and (v) heavy manufacturing.[1] The industry classification is based on the United States (US) Standard Industrial Classification (SIC) 1987 and relevant industry and economic activity classifications by the World Bank (1991) and the United Nations Conference on Trade and Development (United Nations, 2008). Regarding company size, the questionnaire covers three categories: (i) micro and small companies, (ii) medium-sized companies, and (iii) large companies. Generally, the number of employees and the value of assets or sales are used as criteria to distinguish company

[1] (i) 'agriculture, forestry, fishing' includes all applicable sub-industries of agriculture, forestry, and fishing (Standard Industrial Classification (SIC) code: 01-09); (ii) services includes construction (15-17); transportation and public utilities (40-49); wholesale trade (50-51); retail trade (52-59); finance, insurance, and real estate (60-67); services (70-89); and public administration (91-99), from the United States' SIC 1987; (iii) 'light manufacturing 1 (consumer goods or consumables)' includes food and kindred products (20), tobacco products (21), textile mill products (22), and apparel and other finished products made from fabrics and similar material (23); (iv) 'light manufacturing (others)' includes lumber and wood products, except furniture (24); furniture and fixtures (25); paper and allied products (26); printing, publishing, and allied industries (27); rubber and miscellaneous plastics products (30); leather and leather products (31); and fabricated metal products, except machinery and transportation equipment (34); and (v) 'heavy manufacturing' includes mining (10-14); chemicals and allied products (28); petroleum refining and related industries (29); stone, clay, glass, and concrete products (32); primary metal industries (33); industrial and commercial machinery and computer equipment (35); electronic and other electrical equipment and components, except computer equipment (36); transportation equipment (37); measuring, analysing, and controlling instruments; photographic, medical, and optical goods; and watches and clocks (38).

size. However, specific cut-offs vary across countries and industries (ADB, 2017). For example, micro companies are defined as having up to 10 employees in Viet Nam but only up to four employees in Malaysia (ASEAN, 2015). Moreover, different government agencies within the same country may use different definitions. Countries also occasionally change the definition to adjust the monetary terms (assets, sales) as inflation erodes the real value, or to define which companies qualify for government support programmes (ADB, 2017). To ensure consistency in data collection and analysis, the study has taken into consideration different definitions in AMS and the ADB Asia SME Monitor 2022 database (ADB, 2022) to establish the following definitions for company size: (i) micro and small companies have 1–19 employees, (ii) medium-sized companies have 20–199 employees, and (iii) large companies have 200 or more employees.

The survey was conducted using a combination of web and phone surveys to collect responses from a wide range of companies in AMS. The web survey was conducted to collect responses from a broader range of companies to obtain a broad grasp of the trends in the digital divide in ASEAN. The phone survey was conducted to collect responses from micro and small companies to obtain the reality of the digital divide in a form more akin to an on-the-ground survey for three countries: Indonesia, Malaysia, and Viet Nam. Both the web and phone surveys were conducted under the facilitation and consultation of Deloitte.

For the web survey, Deloitte worked with SIS International Research to develop the online questionnaire form and to request and collect responses from companies using their panel of companies accumulated by SIS International Research. The panel has been developed over 35 years by SIS International Research, primarily from information available online such as search engines and map services provided by the private sector (i.e. Google Maps), including company websites and/or corporate official social networking accounts (e.g. Facebook and LinkedIn) and direct inquiries via email requesting information from the companies. The company information on the panel has been updated continuously through data collection activities and other relevant research operations by SIS International Research. The panel from SIS International Research used for the web survey does not match the official public statistics because of the nature of the panel, which was originally collected by SIS International Research through its own data collection method. When conducting direct inquiries by email to those companies, the chief executive officer (CEO) or business owners are the primary respondents, but senior management levels are also included, especially for the larger companies. In the web survey distribution, the companies were randomly selected from the panel based on the project's selection criteria, and the questionnaire was distributed to them.[2] Since the

[2] The segments of the web survey are the combination of the 10 AMS; three company sizes (micro and small, medium-sized, and large); two location types (urban and rural); and five industries (agriculture, forestry, and fisheries; services; light manufacturing 1 (consumer goods or consumables); light manufacturing 2 (others); and heavy manufacturing; the total of 300 segments.

project aimed to collect 6,000 responses for the web survey, segments that fell short of the target number of responses (20 per segment: 6,000 divided by 300 segments) were compensated by collecting more than the target number of responses in other segments.

For the phone survey, Deloitte worked with Global Market Studies and Pt. Intage Indonesia to request and collect responses using a list of companies provided by Deloitte. In developing the company list based on the company attributes, which are in line with the project interests, Deloitte referred to the companies whose global company database is provided by D&B Hoovers.[3] Deloitte referred to the company data on the database and randomised the companies to select based on the project's selection criteria.[4] The company data on the database are collected and updated continuously based on the national registries for foundational information (e.g. company names and addresses), but additional attributes are added (e.g. company size and industry) using many other sources and processes.[5] Since the project aimed to collect 3,000 responses for the phone survey, segments that fell short of the target number of responses (100 per segment: 3,000 divided by 30 segments) were compensated by collecting more than the target number of responses in other segments. However, due to limited company numbers or insufficient available company databases for the phone survey (i.e. the database from D&B Hoovers that the project team referred to in this study), the phone survey was unable to reach 100 responses per segment in 12 segments (i.e. agriculture, forestry, fishing (urban and rural); light manufacturing 1 (rural); and light manufacturing 2 (rural)). To supplement the lack of responses in these 12 segments, the study expanded the phone survey samples to include companies with 20–49 employees (Table 3.1). In short, out of the total 30 segments in the phone survey, 12 segments include a mix of companies with 1–19 employees and 20–49 employees, while the remaining 18 segments consist solely of companies with 1–19 employees.

[3] The D&B Hoovers database sources data from tens of thousands of sources, tens of millions of websites, and crowd-validating initiatives. Sources are continually monitored for changes, and the data cloud is updated accordingly. Inactive, dormant, out-of-business, and company records that cannot be confirmed are not included in the database.

[4] The project team referred to the D&B Hoovers database twice – on 16 March 2023 and 25 May 2023. The first reference on 16 March 2023 was for all 30 segments, and the size of the population was 63,926 for Indonesia; 59,019 for Malaysia; and 701,129 for Viet Nam. The additional population provided on 25 May 2023 was for six segments, only including companies with 20–49 employees for Malaysia (i.e. light manufacturing 1 and 2 (rural)) and Viet Nam (i.e. agriculture, forestry, fishing (urban and rural); and light manufacturing 1 and 2 (rural)). The size of the added population was 4,395 for Malaysia and 3,722 for Viet Nam.

[5] The database's company information relies on national registries, so the accuracy of the data is dependent on the national registration system and process.

Table 3.1. Number of Employees in Each Segment for Phone Survey Sampling

Country	Agriculture, Forestry, Fishing		Service		Light Manufacturing 1		Light Manufacturing 2		Heavy Manufacturing	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Indonesia	1–49	1–49	1–19	1–19	1–19	1–49	1–19	1–49	1–19	1–19
Malaysia	1–49	1–49	1–19	1–19	1–19	1–49	1–19	1–49	1–19	1–19
Viet Nam	1–49	1–49	1–19	1–19	1–19	1–49	1–19	1–49	1–19	1–19

Note: The numbers in the table show the number of employees for each attribute.
Source: Authors.

The partner companies (i.e. SIS International Research for the web survey and Global Market Studies and Pt. Intage Indonesia for the phone survey) followed up with the respondents from the population lists by email and/or phone calls at least twice to ask them to complete the survey.

As a result, the web survey distributed the questionnaire link to 14,586 companies amongst AMS and successfully collected 6,187 responses (response rate: 42.4%). In the phone survey, 18,601 companies were contacted and 3,111 responses were gathered (response rate: 16.7%).

The survey was carried out from 31 March 2023 to 7 July 2023. All the survey questions are available in the Appendix.

2. Factors Causing the Digital Divide

The interview survey conducted in this project identified factors causing the digital divide that can be broadly classified into two categories: (i) MSMEs' internal factors, and (ii) MSMEs' external factors. Internal factors are derived from MSMEs' internal resources. External factors refer to the external environment of MSMEs, which is outside their control. Both the internal and external factors are identified as follows.

(1) MSME's Internal Factors

- Human Resources

  Business Capability of Business Owners

  This refers to the inability of MSMEs' business owners to make decisions on implementing digital tools during their digitalisation journey. They need to cultivate a better understanding and sense of integration of business and information and communication technology (ICT) to understand the value of digital tools or to fully utilise the digital tools they have implemented by addressing their insufficient business knowledge or experience.

Middle Management and Regular Employees Equipped with Business and ICT skills

This refers to the lack of business knowledge and ICT skills, excluding the business owners, amongst the two layers of human resources: (i) management personnel who are leading the digitalisation journey, and (ii) regular employees who get involved in MSMEs' digitalisation journey.

The lack of business knowledge is due to employees' unequal business and entrepreneurial knowledge distribution. Some employees may have limited understanding of fundamental business concepts and practices, such as marketing, sales, and financial management. Others may lack specialised skills such as web design or social media marketing. Additionally, business knowledge encompasses essential soft skills, such as management and leadership abilities.

The lack of ICT skills refers to the difference in digital skills and knowledge amongst employees in a company. Some employees may lack basic digital literacy skills, such as using a computer or navigating the internet, while others may lack more advanced skills, like programming or data analysis.

- Finance

  This refers to the disparity in access to finance for adopting digital technologies and resources due to capital market imperfections. These imperfections include imperfect information on borrowers' investment projects from the lenders' viewpoint (adverse selection problem) and incentive problems of borrowers' activities after funding (principal–agent problem) (Hubbard, 1998). The financial gap is often observed between larger and smaller firms or between older and younger firms because smaller or younger firms tend to be less visible (not good customers) to lenders (Carreira and Silva, 2010).

(2) MSMEs' External Factors

- Infrastructure

  This refers to the disparity in access to physical infrastructure, such as broadband internet or other digital communication technologies, which can support MSMEs' use of digital technologies. It also refers to the unequal distribution of these resources, which can limit the ability of certain individuals or communities to access or use technology.

- Market availability of digital tools

  This refers to solution providers' supply of services and/or products for MSMEs on the market to enable them to progress on their digitalisation journey. Digital tool provision includes whether those services and/or products meet MSMEs' needs to facilitate operations and achieve business growth or not. This factor also considers if the solution is provided in the local language in AMS. The services and/or products should be provided at affordable prices.

- Cyberattacks

  This refers to cyberattacks that hinder MSMEs in implementing digital tools. The interview survey discovered that while hackers may show less interest in targeting MSMEs because of lower potential gains than with larger companies, cybersecurity remains a significant concern for MSMEs when embracing digital tools. Limited resources and lack of technical expertise may render smaller businesses more susceptible to cyberattacks, leading to the loss of sensitive data, financial setbacks, and reputational damage.

- e-Government

  This refers to the use of digital technologies by government agencies to provide information and services to citizens and businesses. e-Government initiatives are usually seen as improving the digital readiness of businesses because they can improve access to government services and streamline administrative processes. Meanwhile, e-government services should be designed in an MSME-friendly manner. Otherwise, they can exacerbate the digital divide amongst MSMEs. In addition, MSMEs may have limited resources or technical expertise to navigate complex e-government systems, particularly if their design does not consider the needs of small businesses. This can result in smaller businesses being excluded from access to government services and benefits, which can put them at a disadvantage compared with larger companies, which have the resources to navigate e-government systems.

- Other external micro-environment (i.e. market environment)

  This refers to the broader business environment that affects a company or group of companies in a specific sector, including market conditions, relevant regulations and/or standards, and customer and supplier relationships. The interview survey suggested that the market environment in which MSMEs conduct their business influences their digital tool implementation. For example, the degree of digitalisation of the companies with which MSMEs engage through their businesses may sometimes demand similar digitalisation, so MSMEs operating in such a business environment can make progress on their digitalisation. On the other hand, companies that do not conduct their businesses with such companies are not likely to progress in implementing digital tools.

- Other external macro environment (i.e. COVID-19 pandemic)

  This refers to the broader business environment that affects all companies, including disasters and changes in the natural environment. A significant trend over the past few years has been the COVID-19 pandemic. This worldwide trend worsened existing disparities in access to digital infrastructure and technologies, exacerbating the digital divide amongst MSMEs in the region. Many MSMEs face significant challenges related to reduced revenue, disrupted supply chains, shifting

consumer behaviour, etc. As a result, they have had to adapt to new digital technologies and platforms to continue operating and to reach customers in a digital environment. However, because of the gaps, not all MSMEs have equal access to the digital infrastructure and resources needed to adapt to the pandemic.

3. Questionnaire Structure

The questionnaire is made up of four parts and was used for both the web and phone surveys. The first part provides an overview of the surveyed companies, including the location (country and municipalities), industry, company size (number of employees), management and ownership type, customer segment, supplier type, and ultimate decision makers' characteristics. Management type specifies if the company is operated by the owner. Ownership type is categorised as (i) private (more than half the shares are held by the private sector) or (ii) state-owned (more than half the shares are held by the public sector). For customer segment and supplier type, respondents are asked to select one or more options amongst six categories: (i) consumer (individual or household), (ii) manufacturing MSMEs, (iii) manufacturing large companies, (iv) non-manufacturing MSMEs, (v) non-manufacturing large companies, and (vi) public institutions. The location of direct customers and suppliers is also required to be specified by the respondents. For ultimate decision makers, age group, gender, and the highest education level are collected. In addition, business performance, reflected through sales value and profit margin compared with the pre-pandemic level, is also covered.

The second part studies the digitalisation status of the surveyed companies. To begin, the respondents specify the stage of digital tool adoption for 24 digital tools, grouped into six categories: intra-company management (five tools), procurement (two tools), logistics (two tools), sales and marketing (five tools), overall company management (three tools), and others (seven tools). The five stages of digital tool adoption are (i) already implemented pre-pandemic, (ii) already implemented during the pandemic, (iii) already implemented post-pandemic, (iv) plan to implement in the next 3 years, and (v) no plan to implement within the next 3 years. The second part also seeks to ascertain the respondents' main objectives of digital tool adoption. For companies that have already implemented digital tools, the survey evaluates the level of success in meeting the implementation objectives and generating the anticipated benefits. For companies that indicate no plan to implement digital tools within the next 3 years, the survey inquiries into the factors considered important in the decision-making process related to digital tool adoption, such as price, function or features, and services.

The third part analyses the surveyed companies' difficulties and concerns regarding digital tool implementation. In detail, respondents answer questions on the internal causes (subjective capabilities and characteristics) and external causes (macro environment or situation) of their difficulties in three implementation phases: information gathering, adoption, and post-adoption. Respondents can choose one or more obstacles

that apply to their companies' digital tool implementation. In the information-gathering phase, possible causes of difficulties hinder companies from diagnosing business issues and obtaining knowledge or information about digital tools. In the adoption phase, difficulties are potentially derived from skills or financial shortages that unfavourably affect digital tool selection, budget allocation, and user training. In the post-adoption phase, causes of difficulties are related to deploying and using the tools in actual business operations, such as internal challenges (employees' inability to use digital tools due to limited skills, lack of budget for digital tools update) or external impediments (internet instability, limited customer support).

The fourth part collects the respondents' evaluation of the support they received from the public sector (i.e. government and public institutions) and private sector (i.e. industry associations, multinational companies, and local companies) in digital tool adoption. Types of support (i.e. knowledge or information provision, financial support), support outcomes, and future improvement points are clarified through relevant questions to respondents. The survey concludes by asking the respondents to specify the issues of ASEAN companies they think the government should emphasise to encourage digital adoption.

The questionnaire tool takes about 1 hour or more for the respondents to answer.

4. Questionnaire Results (total number of responses)

Of the respondents who completed the survey, several had duplicate company names, business IDs, or tax IDs. In this case, the respondent with the earliest response date was considered valid and the others were considered invalid. As a result, the number of valid responses is 6,048 out of 6,187 respondents who completed the web survey. The number of valid responses for the phone survey is 3,099 out of 3,111 respondents who completed the phone survey.

Table 3.2 reports the number of responses from the web and phone surveys and the total number from AMS.

Table 3.2. Total Number of Responses from the Countries

Country	Web survey	Phone survey	Total
Brunei	238	-	238
Cambodia	567	-	567
Indonesia	893	1,018	1,911
Lao PDR	160	-	160
Malaysia	930	1,039	1,969
Myanmar	360	-	360
Philippines	695	-	695
Singapore	645	-	645
Thailand	701	-	701
Viet Nam	859	1,042	1,901
Total	**6,048**	**3,099**	**9,147**

Notes: The phone survey was conducted only in Indonesia, Malaysia, and Viet Nam.
Source: Authors.

5. Conclusion

The questionnaire survey on the digital divide amongst MSMEs in AMS aimed to understand the factors behind the digital divide and how to overcome obstacles amongst MSMEs in ASEAN. Both surveys covered 10 AMS, urban and rural areas, and five industries. The web survey covered four company sizes: micro, small, medium-sized, and large. The phone survey covered micro and small companies. The questionnaire survey collected responses through web and phone surveys, focusing on internal factors (human resources, finance) and external factors (infrastructure, digital tool provision, cyberattacks, e-government, micro-environment, and macro environment). The questionnaire consisted of four parts, covering company information, digitalisation status, implementation difficulties, and support evaluation. A total of 9,147 valid responses was obtained. The survey's findings provide insights into the digital divide and can guide strategies to bridge the gap and support digital transformation amongst MSMEs in ASEAN. The questionnaire results and analysis are provided in the following chapters.

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Chapter 4

Web Survey Results

1. Introduction

The survey results provide valuable insights into various aspects of businesses in ASEAN Member States (AMS). The findings reveal the breakdown of respondents by industry, company size, and location type. The industry breakdown shows the distribution of respondents across sectors, highlighting the predominant industries in each country. The company size distribution provides an understanding of the composition of businesses based on their size categories. The location type breakdown reveals the distribution of businesses in urban and rural areas, offering insights into geographic concentration. Overall, these results contribute to a comprehensive understanding of the business landscape in AMS.

2. Questionnaire Results (Web Survey)

This section presents the web survey results. All data cover the 10 AMS.

▪ Overview of Respondents

This section provides an overview of the respondents by several segments: industry, company size, and location type.

Table 4.1 provides a breakdown of the surveyed respondents by industry, categorising them according to the industry in which they operate.

Table 4.1. Breakdown of Respondents by Industry

Country	Agriculture, Forestry, Fishing	Services	Manufacturing (light mfg. 1 – consumer goods or consumables)	Manufacturing (light mfg. 2 – others)	Manufacturing (heavy mfg.)
Brunei	9 (3.8%)	136 (57.1%)	17 (7.1%)	37 (15.5%)	39 (16.4%)
Cambodia	74 (13.1%)	158 (27.9%)	81 (14.3%)	112 (19.8%)	142 (25.0%)
Indonesia	115 (12.9%)	320 (35.8%)	184 (20.6%)	146 (16.3%)	128 (14.3%)
Lao PDR	20 (12.5%)	88 (55.0%)	22 (13.8%)	23 (14.4%)	7 (4.4%)
Malaysia	113 (12.2%)	501 (53.9%)	107 (11.5%)	122 (13.1%)	87 (9.4%)
Myanmar	24 (6.7%)	138 (38.3%)	75 (20.8%)	54 (15.0%)	69 (19.2%)
Philippines	42 (6.0%)	196 (28.2%)	125 (18.0%)	146 (21.0%)	186 (26.8%)
Singapore	75 (11.6%)	194 (30.1%)	174 (27.0%)	94 (14.6%)	108 (16.7%)
Thailand	131 (18.7%)	170 (24.3%)	97 (13.8%)	151 (21.5%)	152 (21.7%)

Country	Agriculture, Forestry, Fishing	Services	Manufacturing (light mfg. 1 – consumer goods or consumables)	Manufacturing (light mfg. 2 – others)	Manufacturing (heavy mfg.)
Viet Nam	144 (16.8%)	225 (26.2%)	149 (17.3%)	163 (19.0%)	178 (20.7%)
Total	**747 (12.4%)**	**2,126 (35.2%)**	**1,031 (17.0%)**	**1,048 (17.3%)**	**1,096 (18.1%)**

Mfg. = manufacturing.
Notes: The sub-industries under each industry are available in the Appendix. Amongst the sub-industries, 'construction' is included in 'services' and 'mining' is included in 'manufacturing (heavy mfg.)'. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding row country. (Q4-1. Which industry is your company's main business? (If multiple options exist, please select the business with the largest percentage of sales.) [SINGLE CHOICE: choose one option]. Q4-2. Please select the detail of your company's main business [SINGLE CHOICE: choose one option])
Source: Authors.

Table 4.2 shows the survey respondents by company size, categorising them into four groups: micro, small, medium-sized, and large.

Table 4.2. Breakdown of Respondents by Company Size

Country	Large	Medium-sized	Small	Micro
Brunei	27 (11.3%)	105 (44.1%)	73 (30.7%)	33 (13.9%)
Cambodia	82 (14.5%)	318 (56.1%)	151 (26.6%)	16 (2.8%)
Indonesia	360 (40.3%)	300 (33.6%)	153 (17.1%)	80 (9.0%)
Lao PDR	20 (12.5%)	81 (50.6%)	53 (33.1%)	6 (3.8%)
Malaysia	170 (18.3%)	504 (54.2%)	217 (23.3%)	39 (4.2%)
Myanmar	74 (20.6%)	202 (56.1%)	73 (20.3%)	11 (3.1%)
Philippines	177 (25.5%)	347 (49.9%)	141 (20.3%)	30 (4.3%)
Singapore	156 (24.2%)	348 (54.0%)	135 (20.9%)	6 (0.9%)
Thailand	177 (25.2%)	317 (45.2%)	157 (22.4%)	50 (7.1%)
Viet Nam	240 (27.9%)	356 (41.4%)	256 (29.8%)	7 (0.8%)
Total	**1,483 (24.5%)**	**2,878 (47.6%)**	**1,409 (23.3%)**	**278 (4.6%)**

Notes: 'Micro' represents companies with 1–4 employees. 'Small' represents companies 5–19 employees. 'Medium-sized' represents companies with 20–199 employees. 'Large' represents companies with more than 200 employees. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding column country. (Q5. How many regular employees does your company have? [SINGLE CHOICE: choose one option])
Source: Authors.

This survey also includes information on the municipality where the respondents are located to get a more precise picture of the digital divide. Table 4.3 reports whether the respondents are located in urban or rural areas.

Table 4.3. Breakdown of Respondents by Location Type

Country	Urban	Rural
Brunei	90 (37.8%)	148 (62.2%)
Cambodia	430 (75.8%)	137 (24.2%)
Indonesia	860 (96.3%)	33 (3.7%)
Lao PDR	95 (59.4%)	65 (40.6%)
Malaysia	398 (42.8%)	532 (57.2%)
Myanmar	302 (83.9%)	58 (16.1%)
Philippines	500 (71.9%)	195 (28.1%)
Singapore	645 (100.0%)	0 (0.0%)
Thailand	481 (68.6%)	220 (31.4%)
Viet Nam	514 (59.8%)	345 (40.2%)
Total	**4,315 (71.3%)**	**1,733 (28.7%)**

Notes: 'Urban' is the sum of respondents who selected any cities in Q2-2. 'Rural' is the sum of respondents who selected 'others' in Q2-2. The shares are shown in parentheses. Singapore has no rural areas. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding column country. (Q2-1. Please provide your company's location. [SINGLE CHOICE: choose one option], Q2-2. Please select the name of the municipality in which your company is located. [SINGLE CHOICE: choose one option])
Source: Authors.

- Company Overview

Table 4.4 provides a breakdown of the survey respondents by the location of their operations (with and without overseas operations).

Table 4.4. Location of Business Operations (With and Without Overseas Operations)

Location of Operations	Number
Overseas operation	4,957 (82.0%)
No overseas operation	1,091 (18.0%)

Notes: Location shares are shown in parentheses. The percentage of 'overseas operation' is calculated by dividing the total number of responses answered by any of the answer options, excluding the respondents who answered 'no overseas operation', by the total number of respondents. The percentage of 'no overseas operation' is calculated by dividing the total number of responses answered by this answer option by the total number of respondents. (Q3. Besides the country where your company is located, which country does your business operate in? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 4.5 shows the overseas locations where the respondents operate their businesses.

Table 4.5. Overseas Locations Where Companies Operate Their Businesses

Location	Number
United States	325 (29.8%)
Malaysia	192 (17.6%)
China	173 (15.9%)
Japan	169 (15.5%)
Singapore	151 (13.8%)
Europe (member states of the European Union)	119 (10.9%)
Thailand	106 (9.7%)
Indonesia	96 (8.8%)
Viet Nam	87 (8.0%)
India	86 (7.9%)
Republic of Korea	80 (7.3%)
Middle East	80 (7.3%)
Hong Kong	79 (7.2%)
Taiwan	78 (7.1%)
Cambodia	74 (6.8%)
Philippines	64 (5.9%)
Myanmar	49 (4.5%)
Lao PDR	40 (3.7%)
Brunei	27 (2.5%)
Central and South America	27 (2.5%)
Mexico	9 (0.8%)
Other Asian countries	195 (17.9%)
Others	133 (12.2%)

Notes: Location shares are shown in parentheses. The percentage of each country is calculated by dividing the total number of responses for each answer option by the total number of respondents who answered any of the countries, excluding the respondents who answered 'no overseas operation'. (Q3. Besides the country where your company is located, which country does your business operate in? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 4.6 provides a breakdown of the service industry in the Association of Southeast Asian Nations (ASEAN) by country.

Table 4.6. Breakdown of Service Industry in ASEAN by Country

Country	Construction	Finance, Insurance, Real Estate	Public Administration	Retail Trade	Services[a]	Transportation & Public Utilities	Wholesale Trade
Brunei	25 (18.4%)	18 (13.2%)	0 (0.0%)	34 (25.0%)	21 (15.4%)	12 (8.8%)	26 (19.1%)
Cambodia	23 (14.6%)	16 (10.1%)	21 (13.3%)	14 (8.9%)	50 (31.6%)	18 (11.4%)	16 (10.1%)
Indonesia	64 (20.0%)	33 (10.3%)	19 (5.9%)	48 (15.0%)	75 (23.4%)	34 (10.6%)	47 (14.7%)
Lao PDR	4 (4.5%)	17 (19.3%)	3 (3.4%)	25 (28.4%)	21 (23.9%)	9 (10.2%)	9 (10.2%)
Malaysia	135 (26.9%)	86 (17.2%)	7 (1.4%)	36 (7.2%)	182 (36.3%)	32 (6.4%)	23 (4.6%)
Myanmar	25 (18.1%)	26 (18.8%)	0 (0.0%)	30 (21.7%)	29 (21.0%)	17 (12.3%)	11 (8.0%)
Philippines	34 (17.3%)	40 (20.4%)	20 (10.2%)	25 (12.8%)	32 (16.3%)	28 (14.3%)	17 (8.7%)
Singapore	15 (7.7%)	25 (12.9%)	22 (11.3%)	25 (12.9%)	35 (18.0%)	49 (25.3%)	23 (11.9%)
Thailand	29 (17.1%)	27 (15.9%)	6 (3.5%)	27 (15.9%)	39 (22.9%)	25 (14.7%)	17 (10.0%)
Viet Nam	37 (16.4%)	40 (17.8%)	5 (2.2%)	36 (16.0%)	41 (18.2%)	35 (15.6%)	31 (13.8%)
Total	**391 (18.4%)**	**328 (15.4%)**	**103 (4.8%)**	**300 (14.1%)**	**525 (24.7%)**	**259 (12.2%)**	**220 (10.3%)**

ASEAN = Association of Southeast Asian Nations.

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents from services in the corresponding row country. (Q4-2. Please select the detail of your company's main business [SINGLE CHOICE: choose one option])

[a] For example, hotel, amusement & recreation, automotive repair, health, and legal.

Source: Authors.

Table 4.7 shows manufacturing (light manufacturing 1 – consumer goods or consumables) in ASEAN by country.

Table 4.7. Breakdown of Manufacturing (Light Mfg. 1 – Consumer Goods or Consumables) in ASEAN by Country

Country	Apparel and Other Finished Products Made from Fabrics and Similar Material	Food and Kindred Products	Textile Mill Products	Tobacco Products
Brunei	2 (11.8%)	13 (76.5%)	2 (11.8%)	0 (0.0%)
Cambodia	20 (24.7%)	31 (38.3%)	11 (13.6%)	19 (23.5%)
Indonesia	31 (16.8%)	108 (58.7%)	38 (20.7%)	7 (3.8%)
Lao PDR	7 (31.8%)	5 (22.7%)	8 (36.4%)	2 (9.1%)
Malaysia	23 (21.5%)	62 (57.9%)	19 (17.8%)	3 (2.8%)
Myanmar	21 (28.0%)	31 (41.3%)	19 (25.3%)	4 (5.3%)
Philippines	26 (20.8%)	39 (31.2%)	47 (37.6%)	13 (10.4%)
Singapore	24 (13.8%)	24 (13.8%)	14 (8.0%)	112 (64.4%)
Thailand	34 (35.1%)	39 (40.2%)	22 (22.7%)	2 (2.1%)
Viet Nam	32 (21.5%)	64 (43.0%)	36 (24.2%)	17 (11.4%)
Total	**220 (21.3%)**	**416 (40.3%)**	**216 (21.0%)**	**179 (17.4%)**

ASEAN = Association of Southeast Asian Nations, Mfg. = manufacturing.
Notes: No answers were obtained from 'miscellaneous manufacturing industries', 'transportation equipment', or 'wholesale trade'. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents from manufacturing (light mfg. 1 – consumer goods or consumables) in the corresponding row country. (Q4-2. Please select the detail of your company's main business [SINGLE CHOICE: choose one option])
Source: Authors.

Table 4.8 shows manufacturing (light manufacturing 2 – others) in ASEAN by country.

Table 4.8. Breakdown of Manufacturing (Light Mfg. 2 – Others) in ASEAN by Country

Country	Fabricated Metal Products, Except Machinery and Transport Equipment	Furniture and Fixtures	Leather and Leather Products	Lumber and Wood Products, Except Furniture	Misc. Mfg. Industries[a]	Paper and Allied Products	Printing, Publishing, and Allied Industries	Rubber and Misc. Plastics Products
Brunei	2 (5.4%)	6 (16.2%)	2 (5.4%)	7 (18.9%)	0 (0.0%)	0 (0.0%)	19 (51.4%)	1 (2.7%)
Cambodia	14 (12.5%)	18 (16.1%)	18 (16.1%)	18 (16.1%)	0 (0.0%)	14 (12.5%)	16 (14.3%)	14 (12.5%)
Indonesia	8 (5.5%)	36 (24.7%)	14 (9.6%)	13 (8.9%)	18 (12.3%)	10 (6.8%)	21 (14.4%)	26 (17.8%)
Lao PDR	1 (4.3%)	6 (26.1%)	0 (0.0%)	3 (13.0%)	0 (0.0%)	7 (30.4%)	2 (8.7%)	4 (17.4%)
Malaysia	21 (17.2%)	22 (18.0%)	2 (1.6%)	11 (9.0%)	4 (3.3%)	16 (13.1%)	23 (18.9%)	23 (18.9%)
Myanmar	3 (5.6%)	22 (40.7%)	2 (3.7%)	6 (11.1%)	1 (1.9%)	5 (9.3%)	3 (5.6%)	12 (22.2%)
Philippines	20 (13.7%)	15 (10.3%)	19 (13.0%)	22 (15.1%)	4 (2.7%)	39 (26.7%)	10 (6.8%)	17 (11.6%)
Singapore	10 (10.6%)	21 (22.3%)	7 (7.4%)	8 (8.5%)	0 (0.0%)	15 (16.0%)	20 (21.3%)	13 (13.8%)
Thailand	16 (10.6%)	21 (13.9%)	19 (12.6%)	24 (15.9%)	3 (2.0%)	22 (14.6%)	24 (15.9%)	22 (14.6%)
Viet Nam	21 (12.9%)	31 (19.0%)	20 (12.3%)	22 (13.5%)	1 (0.6%)	20 (12.3%)	21 (12.9%)	27 (16.6%)
Total	**116 (11.1%)**	**198 (18.9%)**	**103 (9.8%)**	**134 (12.8%)**	**31 (3.0%)**	**148 (14.1%)**	**159 (15.2%)**	**159 (15.2%)**

ASEAN = Association of Southeast Asian Nations, Mfg. = manufacturing, misc. = miscellaneous.

[a] For example, jewellery, silverware, plated ware, musical instruments, dolls, toys, pens, and pencils.

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents from manufacturing (light mfg. 2 – others) in the corresponding row country. (Q4-2. Please select the detail of your company's main business [SINGLE CHOICE: choose one option])

Source: Authors.

Table 4.9 provides a breakdown of manufacturing (heavy manufacturing) in ASEAN by country.

Table 4.9. Breakdown of Manufacturing (Heavy Mfg.) in ASEAN by Country

Country	Mining	Chemicals and allied products	Electronic and other electrical equipment and components, except computer equipment	Industrial and commercial machinery and computer equipment	Measuring, analysing, and controlling instruments; photographic, medical, and optical goods; watches and clocks	Petroleum refining and related industries	Primary metal industries	Stone, clay, glass, and concrete products	Transportation equipment
Brunei	1 (2.6%)	13 (33.3%)	9 (23.1%)	2 (5.1%)	1 (2.6%)	4 (10.3%)	3 (7.7%)	4 (10.3%)	2 (5.1%)
Cambodia	19 (13.4%)	20 (14.1%)	17 (12.0%)	8 (5.6%)	23 (16.2%)	8 (5.6%)	16 (11.3%)	14 (9.9%)	17 (12.0%)
Indonesia	21 (16.4%)	28 (21.9%)	17 (13.3%)	13 (10.2%)	12 (9.4%)	3 (2.3%)	10 (7.8%)	16 (12.5%)	8 (6.3%)
Lao PDR	0 (0.0%)	2 (28.6%)	2 (28.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (42.9%)	0 (0.0%)
Malaysia	19 (21.8%)	10 (11.5%)	29 (33.3%)	5 (5.7%)	1 (1.1%)	2 (2.3%)	5 (5.7%)	9 (10.3%)	7 (8.0%)
Myanmar	6 (8.7%)	17 (24.6%)	25 (36.2%)	11 (15.9%)	4 (5.8%)	0 (0.0%)	1 (1.4%)	3 (4.3%)	2 (2.9%)
Philippines	21 (11.3%)	14 (7.5%)	19 (10.2%)	20 (10.8%)	38 (20.4%)	18 (9.7%)	18 (9.7%)	18 (9.7%)	20 (10.8%)
Singapore	10 (9.3%)	9 (8.3%)	14 (13.0%)	20 (18.5%)	17 (15.7%)	5 (4.6%)	12 (11.1%)	12 (11.1%)	9 (8.3%)
Thailand	13 (8.6%)	23 (15.1%)	29 (19.1%)	17 (11.2%)	14 (9.2%)	6 (3.9%)	16 (10.5%)	20 (13.2%)	14 (9.2%)
Viet Nam	11 (6.2%)	24 (13.5%)	27 (15.2%)	20 (11.2%)	19 (10.7%)	10 (5.6%)	24 (13.5%)	24 (13.5%)	19 (10.7%)
Total	**121 (11.0%)**	**160 (14.6%)**	**188 (17.2%)**	**116 (10.6%)**	**129 (11.8%)**	**56 (5.1%)**	**105 (9.6%)**	**123 (11.2%)**	**98 (8.9%)**

ASEAN = Association of Southeast Asian Nations, Mfg. = manufacturing.

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents from manufacturing (heavy mfg.) in the corresponding row country. (Q4-2. Please select the detail of your company's main business [SINGLE CHOICE: choose one option])

Source: Authors.

Table 4.10 shows the percentages of regular employees involved in digital-related tasks in ASEAN.

Table 4.10. Breakdown of the Percentage of Regular Employees Involved in Digital-Related Tasks in ASEAN by Country

Country	None	Less than 5%	5%–9%	10%–19%	20%–29%	30%–39%	40%–49%	More than 50%
Brunei	4 (1.7%)	118 (49.6%)	64 (26.9%)	50 (21.0%)	1 (0.4%)	0 (0.0%)	0 (0.0%)	1 (0.4%)
Cambodia	1 (0.2%)	236 (41.6%)	259 (45.7%)	52 (9.2%)	7 (1.2%)	2 (0.4%)	2 (0.4%)	8 (1.4%)
Indonesia	58 (6.5%)	126 (14.1%)	160 (17.9%)	155 (17.4%)	143 (16.0%)	84 (9.4%)	57 (6.4%)	110 (12.3%)
Lao PDR	6 (3.8%)	46 (28.8%)	65 (40.6%)	22 (13.8%)	9 (5.6%)	1 (0.6%)	3 (1.9%)	8 (5.0%)
Malaysia	3 (0.3%)	183 (19.7%)	140 (15.1%)	81 (8.7%)	45 (4.8%)	245 (26.3%)	160 (17.2%)	73 (7.8%)
Myanmar	16 (4.4%)	175 (48.6%)	102 (28.3%)	30 (8.3%)	9 (2.5%)	7 (1.9%)	6 (1.7%)	15 (4.2%)
Philippines	6 (0.9%)	213 (30.6%)	306 (44.0%)	64 (9.2%)	45 (6.5%)	23 (3.3%)	13 (1.9%)	25 (3.6%)
Singapore	1 (0.2%)	90 (14.0%)	97 (15.0%)	131 (20.3%)	143 (22.2%)	89 (13.8%)	70 (10.9%)	24 (3.7%)
Thailand	8 (1.1%)	244 (34.8%)	14 (2.0%)	238 (34.0%)	130 (18.5%)	34 (4.9%)	15 (2.1%)	18 (2.6%)
Viet Nam	10 (1.2%)	280 (32.6%)	275 (32.0%)	204 (23.7%)	50 (5.8%)	11 (1.3%)	12 (1.4%)	17 (2.0%)
Total	**113 (1.9%)**	**1,711 (28.3%)**	**1,482 (24.5%)**	**1,027 (17.0%)**	**582 (9.6%)**	**496 (8.2%)**	**338 (5.6%)**	**299 (4.9%)**

ASEAN = Association of Southeast Asian Nations.

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding row country. (Q6. Of the regular employees you answered in Q5, what percentage are involved in digital-related tasks? (e.g. those in charge of consideration and planning, implementation of digitalisation within the company including in-house engineers) [SINGLE CHOICE: choose one option])

Source: Authors.

Table 4.11 provides the breakdown of company ownership in ASEAN.

Table 4.11. Breakdown of Company Ownership in ASEAN by Country

Country	Private Enterprise	State-owned Company
Brunei	236 (99.2%)	2 (0.8%)
Cambodia	552 (97.4%)	15 (2.6%)
Indonesia	816 (91.4%)	77 (8.6%)
Lao PDR	151 (94.4%)	9 (5.6%)
Malaysia	906 (97.4%)	24 (2.6%)
Myanmar	349 (96.9%)	11 (3.1%)
Philippines	667 (96.0%)	28 (4.0%)
Singapore	618 (95.8%)	27 (4.2%)
Thailand	685 (97.7%)	16 (2.3%)
Viet Nam	825 (96.0%)	34 (4.0%)
Total	**5,805 (96.0%)**	**243 (4.0%)**

ASEAN = Association of Southeast Asian Nations.
Notes: Private enterprise indicates that more than half the shares are held by the private sector. State-owned company indicates that more than half of the shares are held by the public sector. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding row country. (Q7. What is your company's ownership type? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 4.12 shows whether the respondents' location is the company headquarters.

Table 4.12. Is the Respondents' Location the Company Headquarters?

Country	Yes	No
Brunei	234 (98.3%)	4 (1.7%)
Cambodia	538 (94.9%)	29 (5.1%)
Indonesia	763 (85.4%)	130 (14.6%)
Lao PDR	142 (88.8%)	18 (11.3%)
Malaysia	893 (96.0%)	37 (4.0%)
Myanmar	342 (95.0%)	18 (5.0%)
Philippines	643 (92.5%)	52 (7.5%)
Singapore	591 (91.6%)	54 (8.4%)
Thailand	654 (93.3%)	47 (6.7%)
Viet Nam	768 (89.4%)	91 (10.6%)
Total	**5,568 (92.1%)**	**480 (7.9%)**

ASEAN = Association of Southeast Asian Nations.
Notes: 'Yes' means the company is the headquarters. 'No' means the company is not the headquarters (e.g. a subsidiary). The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding row country. (Q8: Is your company the headquarters? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 4.13 provides the breakdown of company management status in ASEAN by country.

Table 4.13. Company Management Status in ASEAN

Country	Managed by the Owner	Not Managed by the Owner
Brunei	223 (93.7%)	15 (6.3%)
Cambodia	513 (90.5%)	54 (9.5%)
Indonesia	823 (92.2%)	70 (7.8%)
Lao PDR	136 (85.0%)	24 (15.0%)
Malaysia	838 (90.1%)	92 (9.9%)
Myanmar	314 (87.2%)	46 (12.8%)
Philippines	651 (93.7%)	44 (6.3%)
Singapore	563 (87.3%)	82 (12.7%)
Thailand	638 (91.0%)	63 (9.0%)
Viet Nam	681 (79.3%)	178 (20.7%)
Total	**5,380 (89.0%)**	**668 (11.0%)**

ASEAN = Association of Southeast Asian Nations.
Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding row country. (Q9. Is your company managed by the owner? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 4.14 provides the breakdown of company affiliated status in ASEAN by country.

Table 4.14. Company Affiliated Status in ASEAN by Country

Country	Domestic Company	Foreign-affiliated Company
Brunei	233 (97.9%)	5 (2.1%)
Cambodia	496 (87.5%)	71 (12.5%)
Indonesia	806 (90.3%)	87 (9.7%)
Lao PDR	141 (88.1%)	19 (11.9%)
Malaysia	905 (97.3%)	25 (2.7%)
Myanmar	324 (90.0%)	36 (10.0%)
Philippines	499 (71.8%)	196 (28.2%)
Singapore	580 (89.9%)	65 (10.1%)
Thailand	631 (90.0%)	70 (10.0%)
Viet Nam	798 (92.9%)	61 (7.1%)
Total	**5,413 (89.5%)**	**635 (10.5%)**

ASEAN = Association of Southeast Asian Nations.
Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding row country. (Q10-1. Please tell us whether your company is domestic or foreign-affiliated company [SINGLE CHOICE: choose one option])
Source: Authors.

Table 4.15 shows the company ownership of a separate base for sales, production, and procurement apart from the company site in ASEAN by country.

Table 4.15. Ownership of Separate Base for Sales, Production, and Procurement Apart from the Company Site by Country

Country	Sales		Production		Procurement	
	Yes	No	Yes	No	Yes	No
Brunei	90 (37.8%)	148 (62.2%)	83 (34.9%)	155 (65.1%)	77 (32.4%)	161 (67.6%)
Cambodia	115 (20.3%)	452 (79.7%)	90 (15.9%)	477 (84.1%)	76 (13.4%)	491 (86.6%)
Indonesia	515 (57.7%)	378 (42.3%)	452 (50.6%)	441 (49.4%)	427 (47.8%)	466 (52.2%)
Lao PDR	61 (38.1%)	99 (61.9%)	43 (26.9%)	117 (73.1%)	40 (25.0%)	120 (75.0%)
Malaysia	706 (75.9%)	224 (24.1%)	669 (71.9%)	261 (28.1%)	655 (70.4%)	275 (29.6%)
Myanmar	260 (72.2%)	100 (27.8%)	231 (64.2%)	129 (35.8%)	230 (63.9%)	130 (36.1%)
Philippines	245 (35.3%)	450 (64.7%)	257 (37.0%)	438 (63.0%)	254 (36.5%)	441 (63.5%)
Singapore	437 (67.8%)	208 (32.2%)	365 (56.6%)	280 (43.4%)	425 (65.9%)	220 (34.1%)
Thailand	408 (58.2%)	293 (41.8%)	285 (40.7%)	416 (59.3%)	195 (27.8%)	506 (72.2%)
Viet Nam	461 (53.7%)	398 (46.3%)	422 (49.1%)	437 (50.9%)	305 (35.5%)	554 (64.5%)
Total	**3,298 (54.5%)**	**2,750 (45.5%)**	**2,897 (47.9%)**	**3,151 (52.1%)**	**2,684 (44.4%)**	**3,364 (55.6%)**

Notes: The respondents chose 'yes' or 'no' for each of sales, production, and procurement. Therefore, adding 'yes' and 'no' for each base yields 100%. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding row country. (Q11. Does your company have separate base for sales, production, and procurement apart from your company's site? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 4.16 provides the breakdown of customer segments by country.

Table 4.16. Breakdown of Customer Segments by Country

Country	Consumer	Mfg. MSMEs	Mfg. Large Companies	Non-mfg. MSMEs	Non-mfg. Large Companies	Public Institutions
Brunei	221 (92.9%)	32 (13.4%)	21 (8.8%)	139 (58.4%)	76 (31.9%)	31 (13.0%)
Cambodia	425 (75.0%)	184 (32.5%)	52 (9.2%)	330 (58.2%)	68 (12.0%)	34 (6.0%)
Indonesia	511 (57.2%)	310 (34.7%)	303 (33.9%)	230 (25.8%)	197 (22.1%)	157 (17.6%)
Lao PDR	112 (70.0%)	45 (28.1%)	13 (8.1%)	63 (39.4%)	26 (16.3%)	22 (13.8%)
Malaysia	494 (53.1%)	226 (24.3%)	126 (13.5%)	694 (74.6%)	276 (29.7%)	91 (9.8%)
Myanmar	279 (77.5%)	154 (42.8%)	82 (22.8%)	183 (50.8%)	111 (30.8%)	97 (26.9%)
Philippines	482 (69.4%)	249 (35.8%)	92 (13.2%)	267 (38.4%)	85 (12.2%)	56 (8.1%)
Singapore	406 (62.9%)	331 (51.3%)	175 (27.1%)	154 (23.9%)	99 (15.3%)	57 (8.8%)
Thailand	579 (82.6%)	208 (29.7%)	115 (16.4%)	416 (59.3%)	269 (38.4%)	35 (5.0%)
Viet Nam	538 (62.6%)	343 (39.9%)	169 (19.7%)	327 (38.1%)	128 (14.9%)	42 (4.9%)
Total	**4,047 (66.9%)**	**2,082 (34.4%)**	**1,148 (19.0%)**	**2,803 (46.3%)**	**1,335 (22.1%)**	**622 (10.3%)**

Mfg. = manufacturing; MSMEs = micro, small, and medium-sized enterprises.
Notes: Consumer includes individual or household consumers. Manufacturing MSMEs mean the company provides parts or components to a small-scale assembly company. Manufacturing large companies mean the company provides parts or components to a large-scale assembly company. Non-manufacturing MSMEs mean the company provides final goods to a small-scale wholesale or retail company. Non-manufacturing large companies mean the company provides final goods to a large-scale wholesale or retail company. Public institutions include central or local governments. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding row country. (Q12. Which segment is your customer? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 4.17 presents the breakdown of multinational companies as direct customers (including joint venture companies where at least one owner is a foreign company) for companies in ASEAN by country.

Table 4.17. Breakdown of Multinational Companies as Direct Customers in ASEAN by Country

Country	Yes	No
Brunei	8 (3.4%)	230 (96.6%)
Cambodia	166 (29.3%)	401 (70.7%)
Indonesia	441 (49.4%)	452 (50.6%)
Lao PDR	24 (15.0%)	136 (85.0%)
Malaysia	126 (13.5%)	804 (86.5%)
Myanmar	47 (13.1%)	313 (86.9%)
Philippines	196 (28.2%)	499 (71.8%)
Singapore	210 (32.6%)	435 (67.4%)
Thailand	132 (18.8%)	569 (81.2%)
Viet Nam	110 (12.8%)	749 (87.2%)
Total	**1,460 (24.1%)**	**4,588 (75.9%)**

ASEAN = Association of Southeast Asian Nations.

Notes: 'Yes' means the company has direct customers from multinational companies, including joint venture companies where at least one owner is a foreign company. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding row country. (Q13-1. Does your company have direct customers that include multinational companies, including joint venture companies where at least one owner is a foreign company? [SINGLE CHOICE: choose one option])

Source: Authors.

Table 4.18 shows where multinational companies are located as direct customers for businesses in ASEAN by country.

Table 4.18. Location of Multinational Companies as Direct Customers for Business in ASEAN by Country

Country	Domestic	Domestic & Overseas	Overseas
Brunei	4 (50.0%)	2 (25.0%)	2 (25.0%)
Cambodia	113 (68.1%)	47 (28.3%)	6 (3.6%)
Indonesia	317 (71.9%)	64 (14.5%)	60 (13.6%)
Lao PDR	9 (37.5%)	6 (25.0%)	9 (37.5%)
Malaysia	81 (64.3%)	27 (21.4%)	18 (14.3%)
Myanmar	20 (42.6%)	5 (10.6%)	22 (46.8%)
Philippines	77 (39.3%)	73 (37.2%)	46 (23.5%)
Singapore	101 (48.1%)	11 (5.2%)	98 (46.7%)
Thailand	49 (37.1%)	42 (31.8%)	41 (31.1%)
Viet Nam	38 (34.5%)	32 (29.1%)	40 (36.4%)
Total	**809 (55.4%)**	**309 (21.2%)**	**342 (23.4%)**

ASEAN = Association of Southeast Asian Nations.

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding row country. (Q13-2. If you selected 'Yes' in Q13-1, please tell us where your direct customers are based [MULTIPLE CHOICE: choose all options that apply])

Source: Authors.

Table 4.19 presents the breakdown of overseas direct customers for companies in ASEAN by country.

Table 4.19. Overseas Direct Customers by ASEAN Member State

Overseas Direct Customers	BRN	KHM	IDN	LAO	MYS	MMR	PHL	SGP	THA	VNM	Total
Japan	2 (50.0%)	2 (3.8%)	40 (32.3%)	4 (26.7%)	15 (33.3%)	3 (11.1%)	16 (13.4%)	11 (10.1%)	18 (21.7%)	19 (26.4%)	130 (20.0 %)
China	2 (50.0%)	8 (15.1%)	34 (27.4%)	8 (53.3%)	22 (48.9%)	6 (22.2%)	18 (15.1%)	19 (17.4%)	21 (25.3%)	17 (23.6%)	155 (23.8 %)
Hong Kong	0 (0.0%)	4 (7.5%)	20 (16.1%)	1 (6.7%)	14 (31.1%)	2 (7.4%)	12 (10.1%)	28 (25.7%)	9 (10.8%)	7 (9.7%)	97 (14.9 %)
Taiwan	1 (25.0%)	2 (3.8%)	18 (14.5%)	3 (20.0%)	10 (22.2%)	1 (3.7%)	4 (3.4%)	6 (5.5%)	10 (12.0%)	8 (11.1%)	63 (9.7%)
Rep. of Korea	1 (25.0%)	0 (0.0%)	23 (18.5%)	2 (13.3%)	9 (20.0%)	2 (7.4%)	3 (2.5%)	23 (21.1%)	9 (10.8%)	12 (16.7%)	84 (12.9 %)
Brunei	0 (0.0%)	0 (0.0%)	6 (4.8%)	1 (6.7%)	12 (26.7%)	0 (0.0%)	1 (0.8%)	2 (1.8%)	4 (4.8%)	4 (5.6%)	30 (4.6%)
Cambodia	2 (50.0%)	0 (0.0%)	5 (4.0%)	3 (20.0%)	9 (20.0%)	0 (0.0%)	2 (1.7%)	7 (6.4%)	17 (20.5%)	9 (12.5%)	54 (8.3%)
Indonesia	2 (50.0%)	2 (3.8%)	0 (0.0%)	2 (13.3%)	21 (46.7%)	4 (14.8%)	10 (8.4%)	17 (15.6%)	22 (26.5%)	10 (13.9%)	90 (13.8 %)
Lao PDR	2 (50.0%)	2 (3.8%)	0 (0.0%)	0 (0.0%)	3 (6.7%)	0 (0.0%)	0 (0.0%)	4 (3.7%)	10 (12.0%)	3 (4.2%)	24 (3.7%)

Overseas Direct Customers	BRN	KHM	IDN	LAO	MYS	MMR	PHL	SGP	THA	VNM	Total
Malaysia	0 (0.0%)	4 (7.5%)	42 (33.9%)	2 (13.3%)	0 (0.0%)	3 (11.1%)	13 (10.9%)	24 (22.0%)	23 (27.7%)	12 (16.7%)	123 (18.9 %)
Myanmar	2 (50.0%)	3 (5.7%)	4 (3.2%)	4 (26.7%)	9 (20.0%)	0 (0.0%)	2 (1.7%)	6 (5.5%)	19 (22.9%)	7 (9.7%)	56 (8.6%)
Philippines	1 (25.0%)	3 (5.7%)	13 (10.5%)	3 (20.0%)	9 (20.0%)	1 (3.7%)	0 (0.0%)	7 (6.4%)	15 (18.1%)	6 (8.3%)	58 (8.9%)
Singapore	3 (75.0%)	4 (7.5%)	56 (45.2%)	2 (13.3%)	20 (44.4%)	8 (29.6%)	18 (15.1%)	0 (0.0%)	13 (15.7%)	9 (12.5%)	133 (20.4 %)
Thailand	3 (75.0%)	4 (7.5%)	18 (14.5%)	10 (66.7%)	16 (35.6%)	8 (29.6%)	7 (5.9%)	13 (11.9%)	0 (0.0%)	9 (12.5%)	88 (13.5 %)
Viet Nam	1 (25.0%)	5 (9.4%)	7 (5.6%)	5 (33.3%)	14 (31.1%)	2 (7.4%)	5 (4.2%)	16 (14.7%)	12 (14.5%)	0 (0.0%)	67 (10.3 %)
India	1 (25.0%)	1 (1.9%)	10 (8.1%)	2 (13.3%)	8 (17.8%)	3 (11.1%)	4 (3.4%)	8 (7.3%)	20 (24.1%)	14 (19.4%)	71 (10.9 %)
Other Asian countries	0 (0.0%)	39 (73.6%)	14 (11.3%)	1 (6.7%)	12 (26.7%)	2 (7.4%)	65 (54.6%)	8 (7.3%)	12 (14.5%)	15 (20.8%)	168 (25.8 %)
United States	0 (0.0%)	3 (5.7%)	22 (17.7%)	1 (6.7%)	10 (22.2%)	4 (14.8%)	34 (28.6%)	70 (64.2%)	20 (24.1%)	26 (36.1%)	190 (29.2 %)
Mexico	0 (0.0%)	0 (0.0%)	3 (2.4%)	0 (0.0%)	2 (4.4%)	0 (0.0%)	1 (0.8%)	2 (1.8%)	1 (1.2%)	1 (1.4%)	10 (1.5%)

Overseas Direct Customers	BRN	KHM	IDN	LAO	MYS	MMR	PHL	SGP	THA	VNM	Total
European Union	1 (25.0%)	3 (5.7%)	12 (9.7%)	4 (26.7%)	16 (35.6%)	1 (3.7%)	20 (16.8%)	9 (8.3%)	20 (24.1%)	22 (30.6%)	108 (16.6 %)
Middle East	0 (0.0%)	1 (1.9%)	15 (12.1%)	2 (13.3%)	11 (24.4%)	1 (3.7%)	11 (9.2%)	8 (7.3%)	14 (16.9%)	8 (11.1%)	71 (10.9 %)
Central and South America	1 (25.0%)	1 (1.9%)	6 (4.8%)	0 (0.0%)	2 (4.4%)	0 (0.0%)	8 (6.7%)	2 (1.8%)	4 (4.8%)	4 (5.6%)	28 (4.3%)
Others	0 (0.0%)	1 (1.9%)	3 (2.4%)	1 (6.7%)	5 (11.1%)	2 (7.4%)	3 (2.5%)	7 (6.4%)	1 (1.2%)	8 (11.1%)	31 (4.8%)

ASEAN = Association of Southeast Asian Nations, BRN = Brunei, KHM = Cambodia, IDN = Indonesia, LAO = Lao PDR, MYS = Malaysia, MMR = Myanmar, PHL = Philippines, SGP = Singapore, THA = Thailand, and VNM = Viet Nam.

Notes: The percentage of each column is calculated by dividing the total number of responses for each answer option by the total number of respondents that selected 'overseas' in Q13-2 in the corresponding column country. (Q13-3. If you selected 'overseas' in Q13-2, please specify the countries where your direct customers are based. [MULTIPLE CHOICE: choose all options that apply])

Source: Authors.

Table 4.20 shows the presence of indirect customers, including multinational companies in ASEAN, by country.

Table 4.20. Breakdown of Indirect Customers Including Multinational Companies in ASEAN by Country

Country	Yes	No	Not sure
Brunei	6 (2.5%)	219 (92.0%)	13 (5.5%)
Cambodia	89 (15.7%)	457 (80.6%)	21 (3.7%)
Indonesia	369 (41.3%)	370 (41.4%)	154 (17.2%)
Lao PDR	16 (10.0%)	129 (80.6%)	15 (9.4%)
Malaysia	84 (9.0%)	728 (78.3%)	118 (12.7%)
Myanmar	25 (6.9%)	295 (81.9%)	40 (11.1%)
Philippines	177 (25.5%)	451 (64.9%)	67 (9.6%)
Singapore	205 (31.8%)	402 (62.3%)	38 (5.9%)
Thailand	149 (21.3%)	409 (58.3%)	143 (20.4%)
Viet Nam	142 (16.5%)	498 (58.0%)	219 (25.5%)
Total	**1,262 (20.9%)**	**3,958 (65.4%)**	**828 (13.7%)**

ASEAN = Association of Southeast Asian Nations.
Notes: 'Yes' means the company has indirect customers from multinational companies, including companies acting as secondary suppliers to multinational companies. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total respondents of the corresponding row country. (Q14. Does your company have indirect customers that include multinational companies (e.g. your company is a secondary supplier to multinational companies)? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 4.21 presents the breakdown of multinational companies as direct suppliers for companies in ASEAN by country.

Table 4.21. Breakdown of Multinational Companies as Direct Suppliers for Companies in ASEAN by Country

Country	Yes	No
Brunei	10 (4.2%)	228 (95.8%)
Cambodia	164 (28.9%)	403 (71.1%)
Indonesia	371 (41.5%)	522 (58.5%)
Lao PDR	14 (8.8%)	146 (91.3%)
Malaysia	62 (6.7%)	868 (93.3%)
Myanmar	34 (9.4%)	326 (90.6%)
Philippines	189 (27.2%)	506 (72.8%)
Singapore	98 (15.2%)	547 (84.8%)
Thailand	81 (11.6%)	620 (88.4%)
Viet Nam	72 (8.4%)	787 (91.6%)

Country	Yes	No
Total	1,095 (18.1%)	4,953 (81.9%)

ASEAN = Association of Southeast Asian Nations.
Notes: 'Yes' means the company has multinational companies as direct customers, including joint venture companies where at least one owner is a foreign company. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total respondents of the corresponding row country. (Q15-1. Does your company have direct suppliers that include multinational companies, including joint venture companies where at least one owner is a foreign company? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 4.22 provides the breakdown of direct suppliers' locations for companies in ASEAN by country.

Table 4.22. Breakdown of Direct Suppliers' Locations for Companies in ASEAN by Country

Country	Domestic	Overseas
Brunei	6 (60.0%)	6 (60.0%)
Cambodia	142 (86.6%)	71 (43.3%)
Indonesia	304 (81.9%)	112 (30.2%)
Lao PDR	8 (57.1%)	7 (50.0%)
Malaysia	46 (74.2%)	28 (45.2%)
Myanmar	19 (55.9%)	20 (58.8%)
Philippines	135 (71.4%)	121 (64.0%)
Singapore	60 (61.2%)	49 (50.0%)
Thailand	42 (51.9%)	48 (59.3%)
Viet Nam	40 (55.6%)	46 (63.9%)
Total	802 (73.2%)	508 (46.4%)

ASEAN = Association of Southeast Asian Nations.
Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total respondents that selected 'yes' in Q15-1 in the corresponding row country. (Q15-2. If you selected 'yes' in Q15-1, please tell us where your direct suppliers are based. [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 4.23 provides the breakdown of direct suppliers' locations overseas for companies in ASEAN by country.

Table 4.23. Breakdown of Overseas Direct Suppliers' Locations for Companies in ASEAN by Country

Direct Supplier Location	BRN	KHM	IDN	LAO	MYS	MMR	PHL	SGP	THA	VNM	Total
Japan	2 (33.3%)	3 (4.2%)	29 (25.9%)	1 (14.3%)	12 (42.9%)	4 (20.0%)	13 (10.7%)	15 (30.6%)	16 (33.3%)	8 (17.4%)	103 (20.3%)
China	2 (33.3%)	14 (19.7%)	35 (31.3%)	3 (42.9%)	15 (53.6%)	1 (5.0%)	20 (16.5%)	16 (32.7%)	11 (22.9%)	16 (34.8%)	133 (26.2%)
Hong Kong	0 (0.0%)	1 (1.4%)	11 (9.8%)	1 (14.3%)	2 (7.1%)	2 (10.0%)	9 (7.4%)	8 (16.3%)	4 (8.3%)	3 (6.5%)	41 (8.1%)
Taiwan	0 (0.0%)	3 (4.2%)	10 (8.9%)	0 (0.0%)	8 (28.6%)	0 (0.0%)	5 (4.1%)	4 (8.2%)	6 (12.5%)	4 (8.7%)	40 (7.9%)
Rep. of Korea	0 (0.0%)	2 (2.8%)	16 (14.3%)	0 (0.0%)	6 (21.4%)	0 (0.0%)	2 (1.7%)	6 (12.2%)	6 (12.5%)	12 (26.1%)	50 (9.8%)
Brunei	0 (0.0%)	1 (1.4%)	7 (6.3%)	0 (0.0%)	1 (3.6%)	0 (0.0%)	1 (0.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	10 (2.0%)
Cambodia	0 (0.0%)	0 (0.0%)	1 (0.9%)	1 (14.3%)	2 (7.1%)	0 (0.0%)	2 (1.7%)	4 (8.2%)	5 (10.4%)	1 (2.2%)	16 (3.1%)
Indonesia	4 (66.7%)	3 (4.2%)	0 (0.0%)	1 (14.3%)	8 (28.6%)	0 (0.0%)	5 (4.1%)	8 (16.3%)	9 (18.8%)	6 (13.0%)	44 (8.7%)
Lao PDR	0 (0.0%)	2 (2.8%)	1 (0.9%)	0 (0.0%)	1 (3.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (2.1%)	0 (0.0%)	5 (1.0%)
Malaysia	2 (33.3%)	4 (5.6%)	24 (21.4%)	1 (14.3%)	0 (0.0%)	2 (10.0%)	9 (7.4%)	14 (28.6%)	6 (12.5%)	3 (6.5%)	65 (12.8%)

Direct Supplier Location	BRN	KHM	IDN	LAO	MYS	MMR	PHL	SGP	THA	VNM	Total
Myanmar	0 (0.0%)	2 (2.8%)	3 (2.7%)	0 (0.0%)	2 (7.1%)	0 (0.0%)	0 (0.0%)	2 (4.1%)	3 (6.3%)	2 (4.3%)	14 (2.8%)
Philippines	0 (0.0%)	1 (1.4%)	3 (2.7%)	0 (0.0%)	1 (3.6%)	1 (5.0%)	0 (0.0%)	4 (8.2%)	5 (10.4%)	2 (4.3%)	17 (3.3%)
Singapore	0 (0.0%)	5 (7.0%)	33 (29.5%)	1 (14.3%)	6 (21.4%)	7 (35.0%)	13 (10.7%)	0 (0.0%)	6 (12.5%)	12 (26.1%)	83 (16.3%)
Thailand	1 (16.7%)	5 (7.0%)	7 (6.3%)	3 (42.9%)	7 (25.0%)	6 (30.0%)	4 (3.3%)	7 (14.3%)	0 (0.0%)	3 (6.5%)	43 (8.5%)
Viet Nam	0 (0.0%)	6 (8.5%)	6 (5.4%)	1 (14.3%)	5 (17.9%)	0 (0.0%)	3 (2.5%)	7 (14.3%)	6 (12.5%)	0 (0.0%)	34 (6.7%)
India	0 (0.0%)	2 (2.8%)	6 (5.4%)	0 (0.0%)	6 (21.4%)	1 (5.0%)	9 (7.4%)	2 (4.1%)	7 (14.6%)	7 (15.2%)	40 (7.9%)
Other Asian countries	1 (16.7%)	44 (62.0%)	7 (6.3%)	1 (14.3%)	6 (21.4%)	0 (0.0%)	77 (63.6%)	3 (6.1%)	6 (12.5%)	4 (8.7%)	149 (29.3%)
United States	0 (0.0%)	16 (22.5%)	13 (11.6%)	2 (28.6%)	9 (32.1%)	2 (10.0%)	32 (26.4%)	15 (30.6%)	11 (22.9%)	15 (32.6%)	115 (22.6%)
Mexico	0 (0.0%)	0 (0.0%)	2 (1.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (2.0%)	0 (0.0%)	0 (0.0%)	3 (0.6%)
Middle East	0 (0.0%)	0 (0.0%)	3 (2.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (4.1%)	4 (8.2%)	4 (8.3%)	1 (2.2%)	17 (3.3%)
Central and South America	0 (0.0%)	0 (0.0%)	1 (0.9%)	0 (0.0%)	1 (3.6%)	0 (0.0%)	8 (6.6%)	0 (0.0%)	4 (8.3%)	0 (0.0%)	14 (2.8%)

Direct Supplier Location	BRN	KHM	IDN	LAO	MYS	MMR	PHL	SGP	THA	VNM	Total
Others	0 (0.0%)	0 (0.0%)	2 (1.8%)	0 (0.0%)	0 (0.0%)	1 (5.0%)	1 (0.8%)	8 (16.3%)	1 (2.1%)	2 (4.3%)	15 (3.0%)

ASEAN = Association of Southeast Asian Nations, BRN = Brunei, KHM = Cambodia, IDN = Indonesia, LAO = Lao PDR, MYS = Malaysia, MMR = Myanmar, PHL = Philippines, SGP = Singapore, THA = Thailand, and VNM = Viet Nam.

Notes: The percentage of each column is calculated by dividing the total number of responses for each answer option by the total respondents that selected 'overseas' in Q15-2 in the corresponding column country. (Q15-3. If you selected 'overseas' in Q15-2, please specify the countries where your direct suppliers are based. [MULTIPLE CHOICE: choose all options that apply])

Source: Authors.

Table 4.24 provides the breakdown of multinational companies as indirect customers for companies in ASEAN by country.

Table 4.24. Breakdown of Multinational Companies as Indirect Customers for Companies in ASEAN by Country

Country	Yes	No	Not sure
Brunei	4 (1.7%)	224 (94.1%)	10 (4.2%)
Cambodia	74 (13.1%)	478 (84.3%)	15 (2.6%)
Indonesia	330 (37.0%)	409 (45.8%)	154 (17.2%)
Lao PDR	11 (6.9%)	133 (83.1%)	16 (10.0%)
Malaysia	40 (4.3%)	769 (82.7%)	121 (13.0%)
Myanmar	16 (4.4%)	304 (84.4%)	40 (11.1%)
Philippines	167 (24.0%)	452 (65.0%)	76 (10.9%)
Singapore	162 (25.1%)	464 (71.9%)	19 (2.9%)
Thailand	113 (16.1%)	476 (67.9%)	112 (16.0%)
Viet Nam	108 (12.6%)	544 (63.3%)	207 (24.1%)
Total	**1,025 (16.9%)**	**4,253 (70.3%)**	**770 (12.7%)**

ASEAN = Association of Southeast Asian Nations.
Notes: 'Yes' means the company has multinational companies as indirect suppliers, including those acting as secondary customers to multinational companies. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents of the corresponding row country. (Q16. Does your company have indirect suppliers that include multinational companies (e.g. your company is a secondary customer to multinational companies)? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 4.25 provides the breakdown of the company establishment timeline in ASEAN by country.

Table 4.25. Breakdown of Company Establishment Timeline in ASEAN by Country

Country	Before 1900–1949	1950–1999	2000–Present
Brunei	5 (2.1%)	73 (30.7%)	160 (67.2%)
Cambodia	12 (2.1%)	116 (20.5%)	439 (77.4%)
Indonesia	6 (0.7%)	234 (26.2%)	653 (73.1%)
Lao PDR	1 (0.6%)	38 (23.8%)	121 (75.6%)
Malaysia	6 (0.6%)	323 (34.7%)	601 (64.6%)
Myanmar	3 (0.8%)	93 (25.8%)	264 (73.3%)
Philippines	34 (4.9%)	226 (32.5%)	435 (62.6%)
Singapore	5 (0.8%)	177 (27.4%)	463 (71.8%)
Thailand	14 (2.0%)	325 (46.4%)	362 (51.6%)

Country	Before 1900–1949	1950–1999	2000–Present
Viet Nam	14 (1.6%)	168 (19.6%)	677 (78.8%)
Total	**100 (1.7%)**	**1,773 (29.3%)**	**4,175 (69.0%)**

ASEAN = Association of Southeast Asian Nations.
Notes: Before 1900–1949 consists of combined information from before 1900, 1900–1910, 1910–1919, 1920–1929, 1930–1939, and 1940–1949; 1950–1999 consists of combined information from 1950–1959, 1960–1969, 1970–1979, 1980–1989, and 1990–1999; and 2000–present consists of combined information from 2000–2009, 2010–2019, and 2020–present. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents of the corresponding row country. (Q17. Which year was your company established? (Please answer your company's information, not the parent company) [SINGLE CHOICE: choose one option])
Source: Authors.

Table 4.26 provides the age group breakdown for the company's ultimate decision maker in ASEAN by country.

Table 4.26. Age Group Breakdown for the Company's Ultimate Decision Maker in ASEAN by Country

Country	≤ 25 years old	26–41 years old	42–57 years old	58–76 years old	77 years old and over
Brunei	1 (0.4%)	78 (32.8%)	138 (58.0%)	21 (8.8%)	0 (0.0%)
Cambodia	1 (0.2%)	87 (15.3%)	254 (44.8%)	220 (38.8%)	5 (0.9%)
Indonesia	40 (4.5%)	303 (33.9%)	459 (51.4%)	88 (9.9%)	3 (0.3%)
Lao PDR	0 (0.0%)	56 (35.0%)	97 (60.6%)	6 (3.8%)	1 (0.6%)
Malaysia	5 (0.5%)	144 (15.5%)	579 (62.3%)	194 (20.9%)	8 (0.9%)
Myanmar	6 (1.7%)	134 (37.2%)	198 (55.0%)	22 (6.1%)	0 (0.0%)
Philippines	19 (2.7%)	74 (10.6%)	243 (35.0%)	333 (47.9%)	26 (3.7%)
Singapore	11 (1.7%)	147 (22.8%)	413 (64.0%)	73 (11.3%)	1 (0.2%)
Thailand	3 (0.4%)	228 (32.5%)	373 (53.2%)	96 (13.7%)	1 (0.1%)
Viet Nam	0 (0.0%)	305 (35.5%)	482 (56.1%)	69 (8.0%)	3 (0.3%)
Total	**86 (1.4%)**	**1,556 (25.7%)**	**3,236 (53.5%)**	**1,122 (18.6%)**	**48 (0.8%)**

ASEAN = Association of Southeast Asian Nations.
Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents of the corresponding row country. (Q18. What age group does your company's ultimate decision maker belong to? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 4.27 provides the gender breakdown for the company's ultimate decision maker in ASEAN by country.

Table 4.27. Gender Breakdown for the Company's Ultimate Decision Maker in ASEAN by Country

Country	Male	Female	Rather not specify
Brunei	188 (79.0%)	20 (8.4%)	30 (12.6%)
Cambodia	442 (78.0%)	30 (5.3%)	95 (16.8%)
Indonesia	702 (78.6%)	165 (18.5%)	26 (2.9%)
Lao PDR	120 (75.0%)	19 (11.9%)	21 (13.1%)
Malaysia	395 (42.5%)	34 (3.7%)	501 (53.9%)
Myanmar	274 (76.1%)	57 (15.8%)	29 (8.1%)
Philippines	574 (82.6%)	92 (13.2%)	29 (4.2%)
Singapore	540 (83.7%)	57 (8.8%)	48 (7.4%)
Thailand	582 (83.0%)	66 (9.4%)	53 (7.6%)
Viet Nam	591 (68.8%)	123 (14.3%)	145 (16.9%)
Total	**4,408 (72.9%)**	**663 (11.0%)**	**977 (16.2%)**

ASEAN = Association of Southeast Asian Nations.
Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents of the corresponding row country. (Q19. What is the gender of your company's ultimate decision maker? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 4.28 provides the breakdown of the highest level of education of the company's ultimate decision maker in ASEAN by country.

Table 4.28. Breakdown of Highest Level of Education of the Company's Ultimate Decision Maker in ASEAN by Country

Country	A	B	C	D	E	F	G
Brunei	2 (0.8%)	0 (0.0%)	6 (2.5%)	38 (16.0%)	72 (30.3%)	98 (41.2%)	22 (9.2%)
Cambodia	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (0.5%)	58 (10.2%)	299 (52.7%)	207 (36.5%)
Indonesia	5 (0.6%)	2 (0.2%)	9 (1.0%)	103 (11.5%)	38 (4.3%)	481 (53.9%)	255 (28.6%)
Lao PDR	0 (0.0%)	1 (0.6%)	1 (0.6%)	9 (5.6%)	56 (35.0%)	61 (38.1%)	32 (20.0%)
Malaysia	1 (0.1%)	0 (0.0%)	3 (0.3%)	69 (7.4%)	141 (15.2%)	551 (59.2%)	165 (17.7%)
Myanmar	2 (0.6%)	1 (0.3%)	19 (5.3%)	37 (10.3%)	122 (33.9%)	95 (26.4%)	84 (23.3%)
Philippines	0 (0.0%)	0 (0.0%)	0 (0.0%)	6 (0.9%)	31 (4.5%)	355 (51.1%)	303 (43.6%)
Singapore	0 (0.0%)	34 (5.3%)	60 (9.3%)	19 (2.9%)	52 (8.1%)	246 (38.1%)	234 (36.3%)
Thailand	0 (0.0%)	1 (0.1%)	15 (2.1%)	85 (12.1%)	242 (34.5%)	253 (36.1%)	105 (15.0%)
Viet Nam	0 (0.0%)	0 (0.0%)	19 (2.2%)	87 (10.1%)	256 (29.8%)	375 (43.7%)	122 (14.2%)
Total	**10 (0.2%)**	**39 (0.6%)**	**132 (2.2%)**	**456 (7.5%)**	**1,068 (17.7%)**	**2,814 (46.5%)**	**1,529 (25.3%)**

ASEAN = Association of Southeast Asian Nations, A = never been educated in an educational institution, B = elementary school or earlier, C = middle school, D = high school, E = vocational school, F = post-secondary education institution, G = graduate school or higher.
Notes: Post-secondary education institution includes university and colleges. Graduate school or higher includes master's, doctoral, and post-doctoral studies. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents of the corresponding row country. (Q20. What is the highest level of education of your company's ultimate decision maker? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 4.29 provides the breakdown of current sales value in 2022 compared with the pre-pandemic level (2019) for companies in ASEAN by country.

Table 4.29. Breakdown of Current Sales Value in 2022 Compared with the Pre-Pandemic Level (2019) for Companies in ASEAN by Country

Country	More than the Pre-pandemic Level	Almost the Same Level	Less than the Pre-pandemic Level	Company did Not Exist Before Pandemic
Brunei	91 (38.2%)	128 (53.8%)	13 (5.5%)	6 (2.5%)
Cambodia	276 (48.7%)	220 (38.8%)	18 (3.2%)	53 (9.3%)
Indonesia	418 (46.8%)	283 (31.7%)	162 (18.1%)	30 (3.4%)
Lao PDR	60 (37.5%)	77 (48.1%)	20 (12.5%)	3 (1.9%)
Malaysia	290 (31.2%)	535 (57.5%)	67 (7.2%)	38 (4.1%)
Myanmar	99 (27.5%)	143 (39.7%)	100 (27.8%)	18 (5.0%)
Philippines	178 (25.6%)	405 (58.3%)	55 (7.9%)	57 (8.2%)
Singapore	171 (26.5%)	323 (50.1%)	98 (15.2%)	53 (8.2%)
Thailand	349 (49.8%)	315 (44.9%)	20 (2.9%)	17 (2.4%)
Viet Nam	273 (31.8%)	468 (54.5%)	87 (10.1%)	31 (3.6%)
Total	**2,205 (36.5%)**	**2,897 (47.9%)**	**640 (10.6%)**	**306 (5.1%)**

ASEAN = Association of Southeast Asian Nations.

Notes: Almost the same level means in the range of –1% to 1%. The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents of the corresponding row country. (Q21. What is your company's current sales value (in 2022) compared to the pre-pandemic level (in 2019)? [SINGLE CHOICE: choose one option])

Source: Authors.

Table 4.30 provides the breakdown of the company's profit margin ratio in 2022 compared with the pre-pandemic level (2019) for companies in ASEAN by country.

Table 4.30. Breakdown of Company's Profit Margin Ratio in 2022 Compared with the Pre-Pandemic Level (2019) for Companies in ASEAN by Country

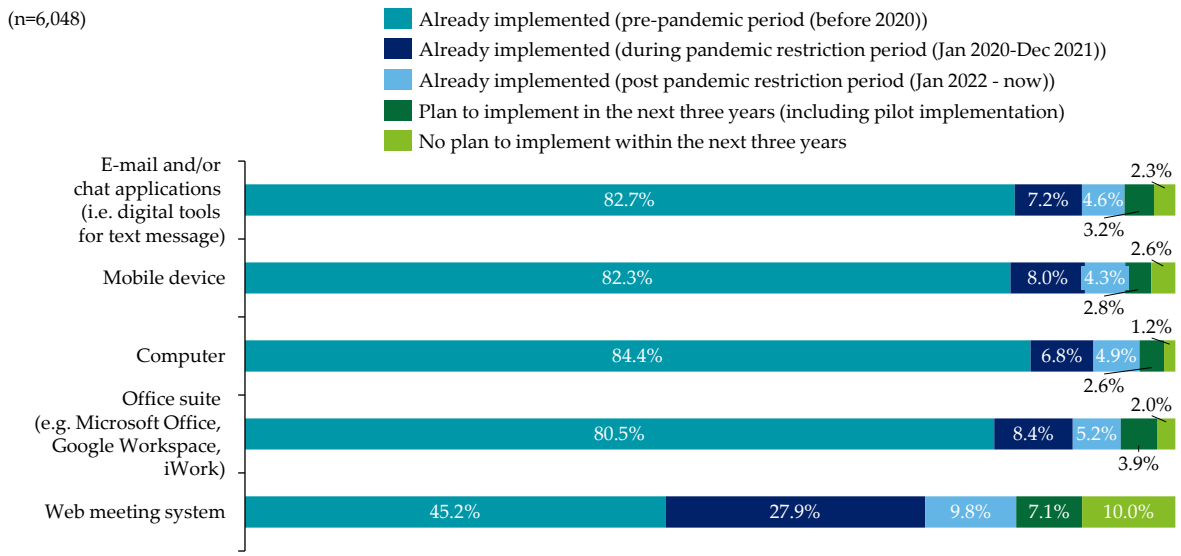
Country	More than the Pre-pandemic Level	Almost the Same Level	Less than the Pre-pandemic Level	Company Did Not Exist Before Pandemic
Brunei	89 (37.4%)	132 (55.5%)	11 (4.6%)	6 (2.5%)
Cambodia	280 (49.4%)	216 (38.1%)	18 (3.2%)	53 (9.3%)
Indonesia	424 (47.5%)	280 (31.4%)	159 (17.8%)	30 (3.4%)
Lao PDR	62 (38.8%)	76 (47.5%)	19 (11.9%)	3 (1.9%)
Malaysia	291 (31.3%)	539 (58.0%)	62 (6.7%)	38 (4.1%)
Myanmar	98 (27.2%)	144 (40.0%)	100 (27.8%)	18 (5.0%)
Philippines	186 (26.8%)	397 (57.1%)	55 (7.9%)	57 (8.2%)
Singapore	169 (26.2%)	343 (53.2%)	80 (12.4%)	53 (8.2%)
Thailand	352 (50.2%)	313 (44.7%)	19 (2.7%)	17 (2.4%)
Viet Nam	267 (31.1%)	469 (54.6%)	92 (10.7%)	31 (3.6%)
Total	**2,218 (36.7%)**	**2,909 (48.1%)**	**615 (10.2%)**	**306 (5.1%)**

ASEAN = Association of Southeast Asian Nations.
Notes: Almost the same level means in the range of –1% to 1%. The percentage of each row is calculated by dividing the total number of responses for each answer by the total number of respondents of the corresponding row country. (Q22. What is your company's profit margin ratio (i.e. operating profit divided by total sales) (in 2022) compared to the pre-pandemic level (in 2019)? [SINGLE CHOICE: choose one option])
Source: Authors.

- Digitalisation Status

Figure 4.1 presents the stage of consideration for ASEAN companies implementing intra-company management tools in a given period. Combining the three-answer option representing 'already implemented', e-mail and/or chat applications, mobile devices, computers, and office suite scored almost 100%. The least implemented tool in intra-company management is web meeting systems.

Figure 4.1. Stage of Consideration for Implementing Intra-Company Management Tools



Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents of the corresponding row answer option. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 4.2 shows the same data as Figure 4.1 by country. Combining the three-answer option representing 'already implemented', more than 80% of the companies in all countries have already implemented email and/or chat applications, mobile devices, computers, and office suites. Web meeting systems are the least implemented tool, with about 60% of companies in all countries having already implemented this tool within the pre-pandemic period and during the pandemic restriction period.

Figure 4.2. Stage of Consideration for Implementing Each of the Intra-Company Management Tools by Country

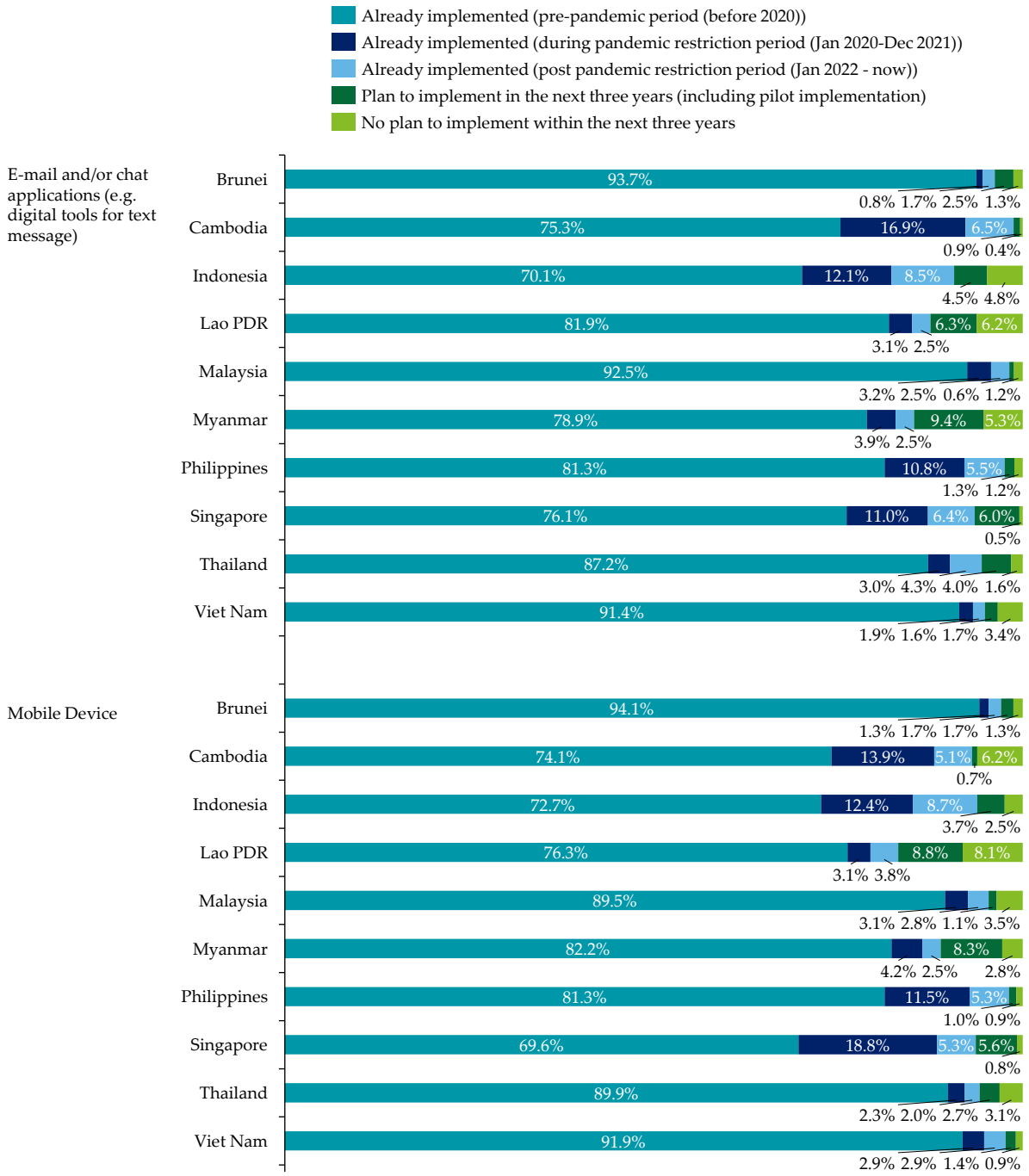
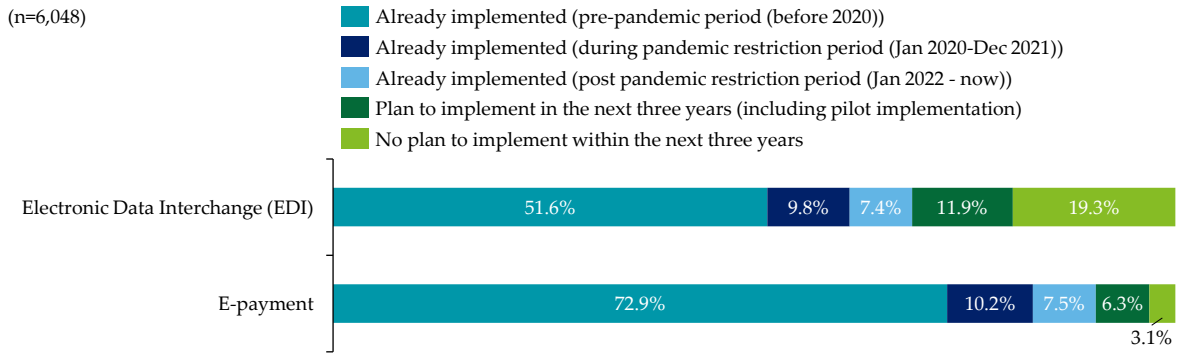


Figure 4.2. *Continued*

Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents in the corresponding row country. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 4.3 presents the stage of consideration in ASEAN companies for implementing procurement tools in a given period. Combining the three-answer option representing 'already implemented', e-payment scored the highest at over 90%. The least implemented tool is electronic data interchange (EDI) at 68.8%.

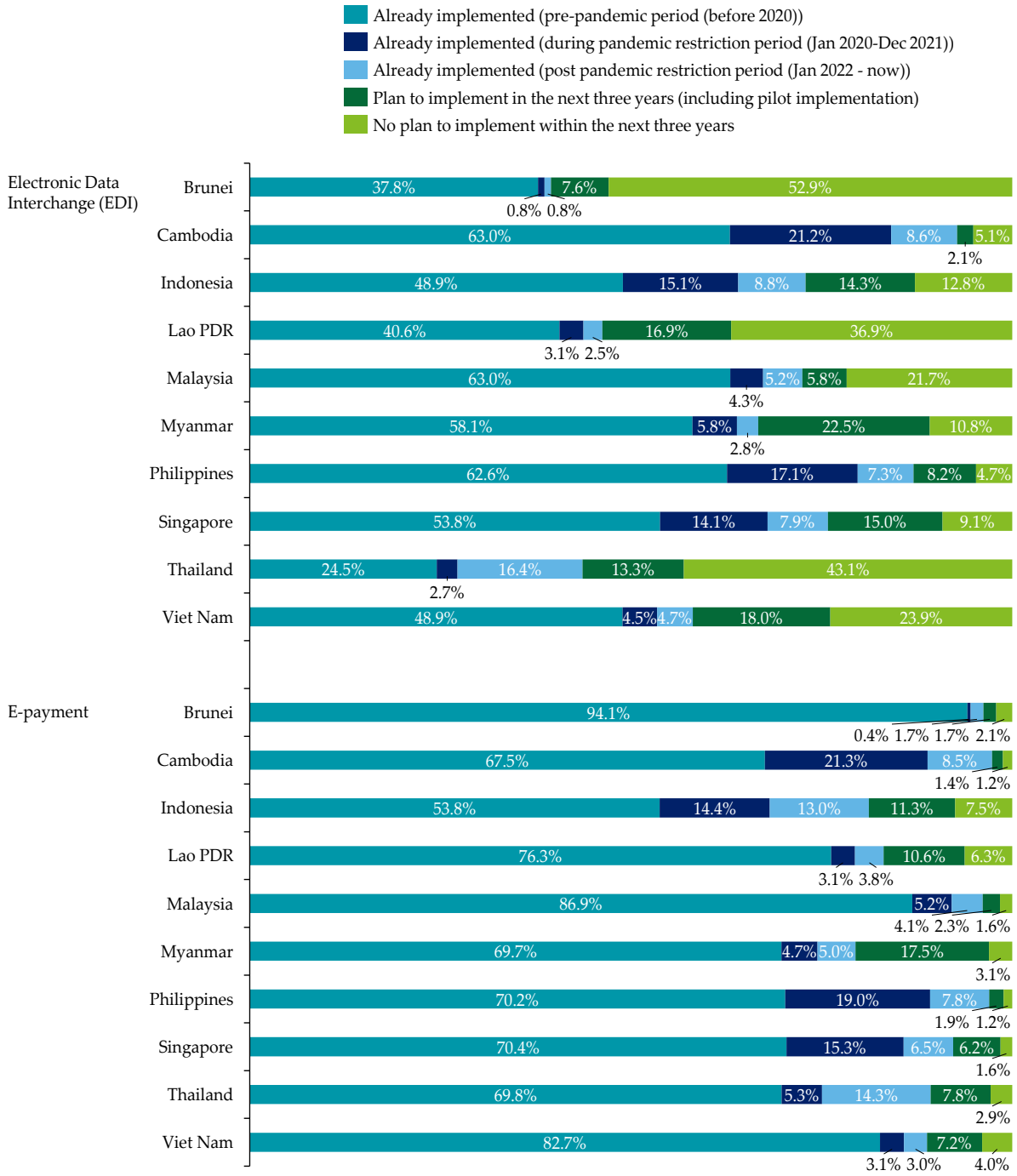
Figure 4.3. Stage of Consideration for Implementing the Procurement Tools



Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents of the corresponding row answer option. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 4.4 shows the same data as Figure 4.3 by country. Combining the three-answer option representing 'already implemented', more than 70% of companies in all countries have already implemented e-payments. EDI is the least implemented tool, with more than half of the companies in seven countries having already implemented this tool, except in Brunei, the Lao People's Democratic Republic (Lao PDR), and Thailand, at about 40%.

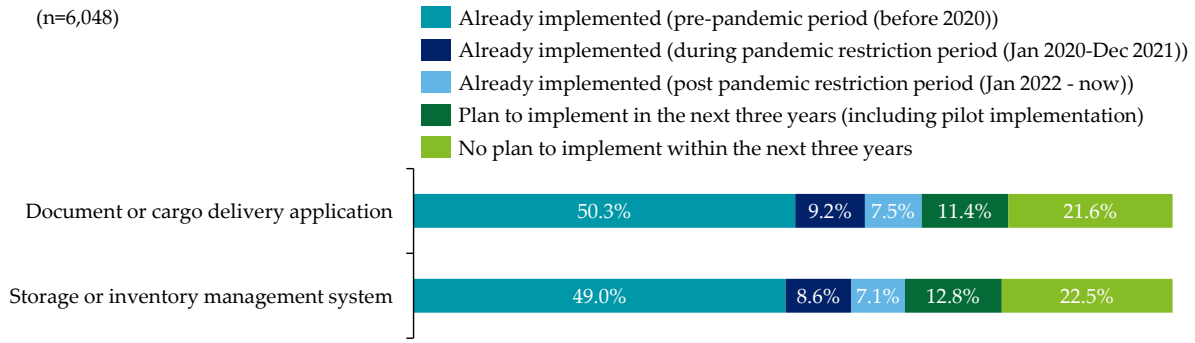
Figure 4.4. Stage of Consideration for Implementing Each of the Procurement Tools by Country



Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents in the corresponding row country. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 4.5 provides the stage of consideration in ASEAN companies for implementing logistics tools in a given period. Combining the three-answer option representing 'already implemented', document or cargo delivery application scored the highest at 67.0%. The least implemented tool is storage or inventory management system at 64.7%.

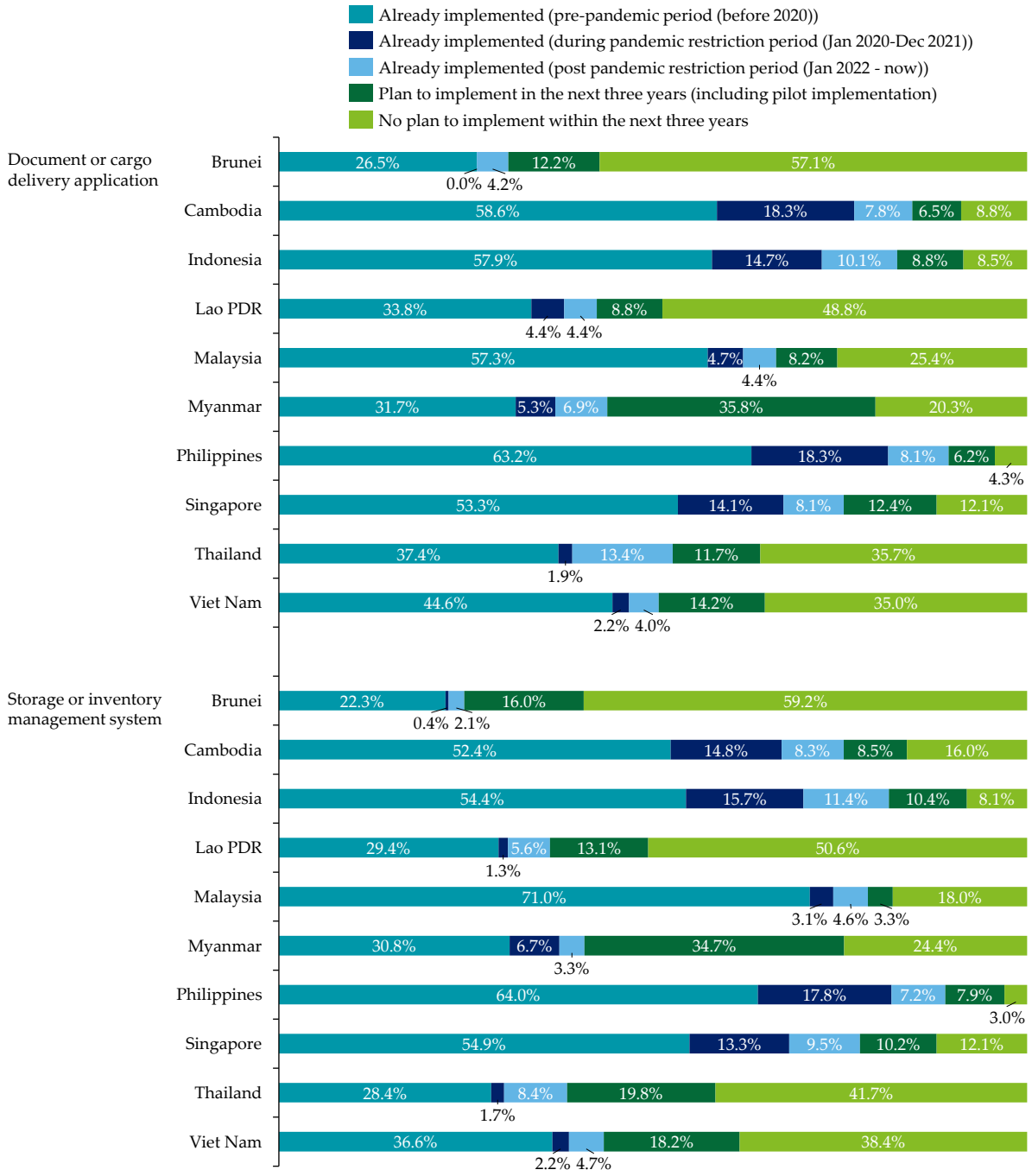
Figure 4.5. Stage of Consideration for Implementing the Logistic Tools



Notes: 'Document or cargo delivery application' includes the application for logistics documents or cargo delivery management. The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents of the corresponding row answer option. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 4.6 shows the same data as Figure 4.5 by country. Combining the three-answer option representing 'already implemented', more than 60% of companies in seven countries have already implemented document or cargo delivery application, except Brunei, the Lao PDR, and Myanmar. For storage or inventory management systems, more than 50% of companies in Cambodia, Indonesia, Malaysia, the Philippines, and Singapore have already implemented this tool. The country with the lowest level of implementation for storage or inventory management systems is Brunei at less than 30%.

Figure 4.6. Stage of Consideration for Implementing the Logistic Tools by Country

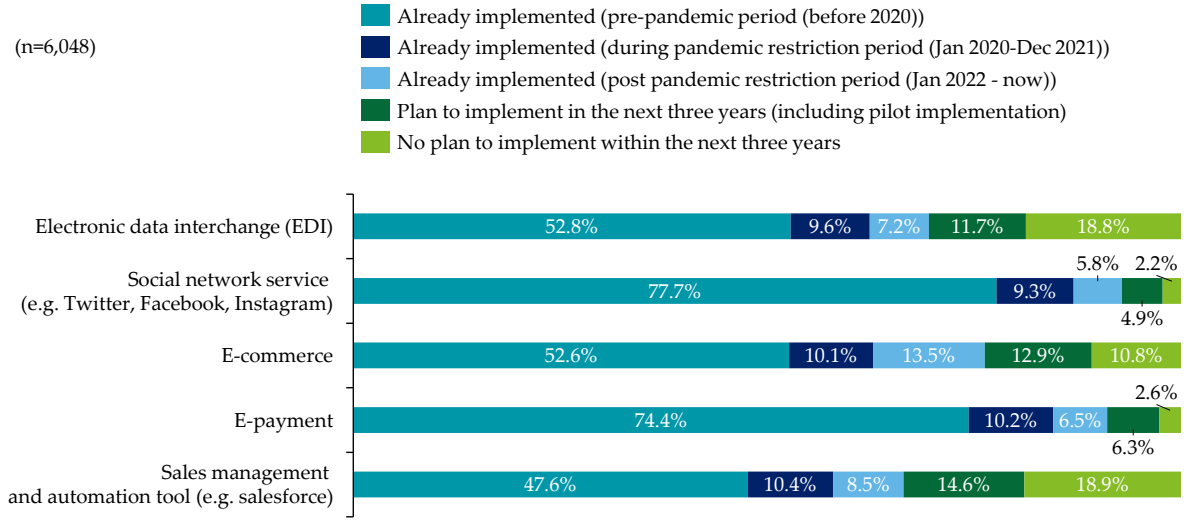


Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents in the corresponding row country. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])

Source: Authors.

Figure 4.7 presents the stage of consideration in ASEAN companies for implementing sales and marketing tools in a given period. Combining the three-answer option representing 'already implemented', social network service and e-payment scored the highest at more than 90%. The least implemented tools are EDI and sales management and automation tools at less than 70%.

Figure 4.7. Stage of Consideration for Implementing the Sales and Marketing Tools



Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents of the corresponding row answer option. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 4.8 shows the same data as Figure 4.7 by country. Combining the three-answer option representing 'already implemented', more than 75% of companies in all countries have already implemented social network services and e-payments. For EDI, more than 60% of companies in several countries have implemented this tool, except Brunei, the Lao PDR, Thailand, and Viet Nam. For sales management and automation tools, the implementation rate in Cambodia, Indonesia, Malaysia, the Philippines, Singapore, and Viet Nam is more than 70%.

Figure 4.8. Stage of Consideration for Implementing the Sales and Marketing Tools by Country

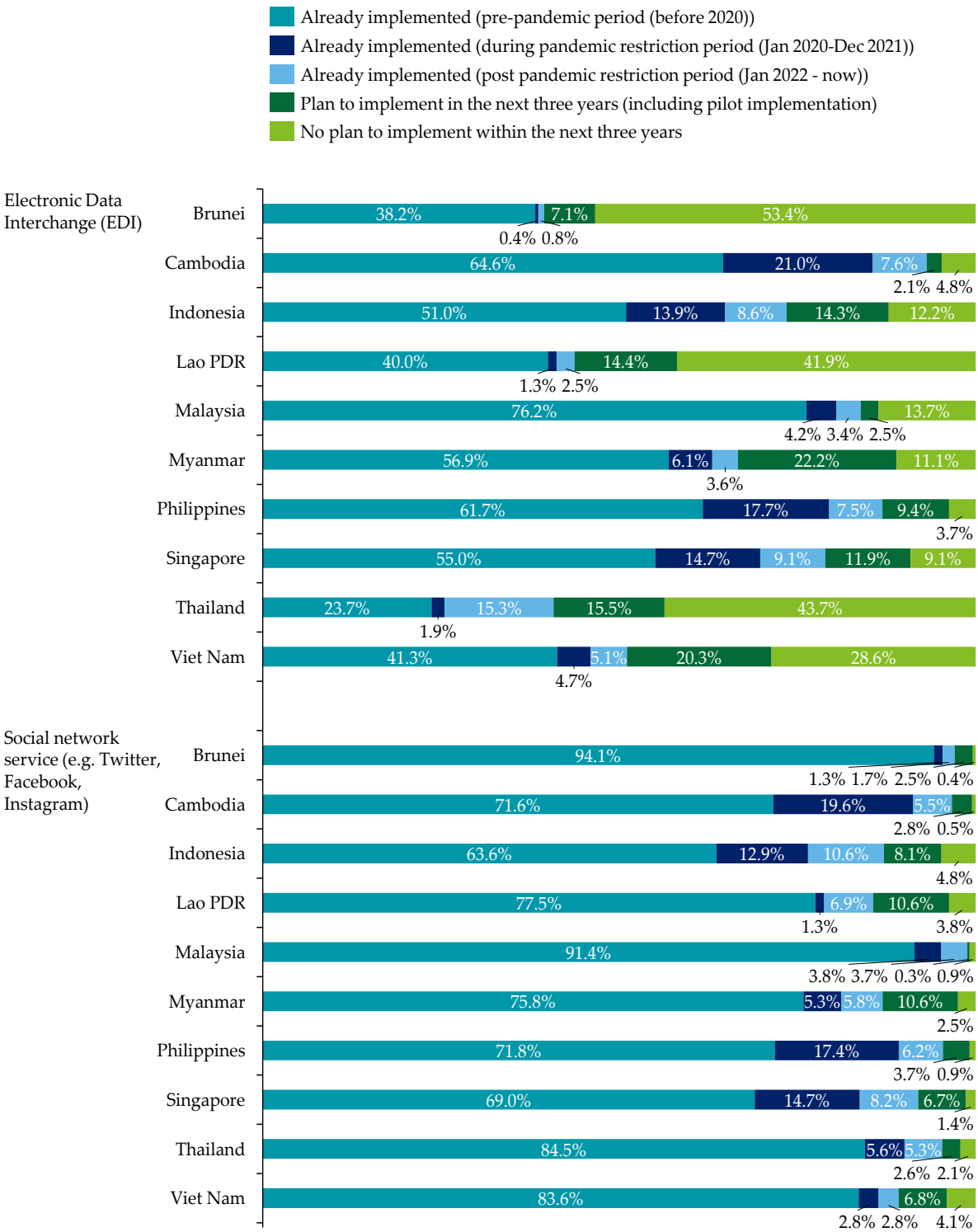
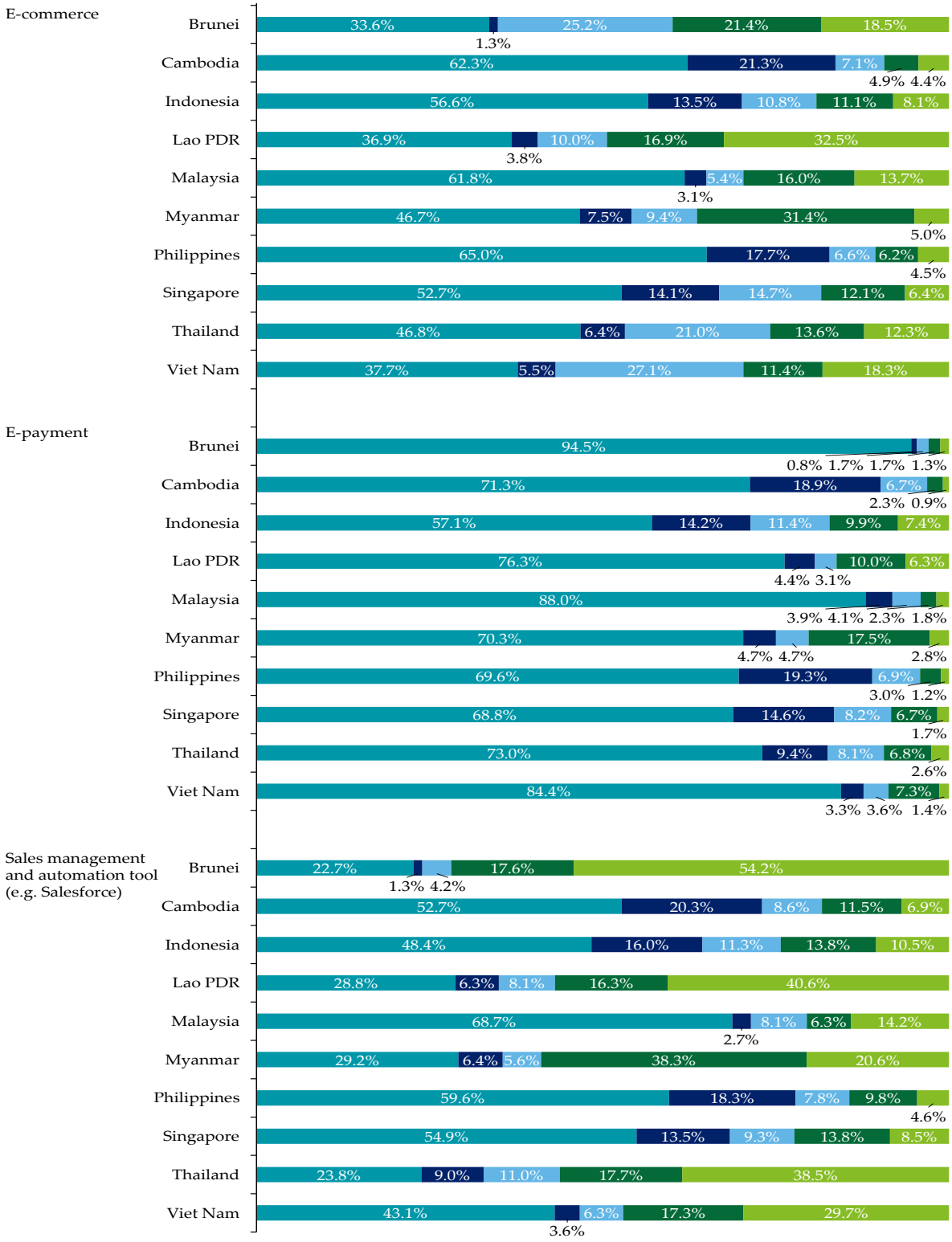


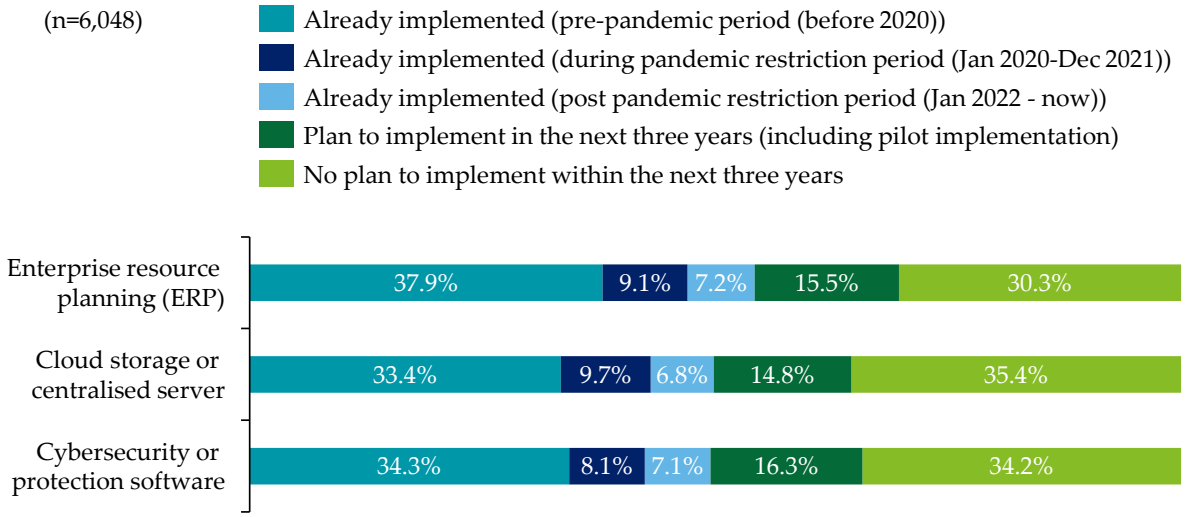
Figure 4.8. *Continued*



Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents to the corresponding bar answer option. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 4.9 presents the stage of consideration in ASEAN companies for overall company operation tools in a given period. Combining the three-answer option representing 'already implemented', the implementation rate of enterprise resource planning, cloud storage or centralised server, and cybersecurity or protection software are all around 50%.

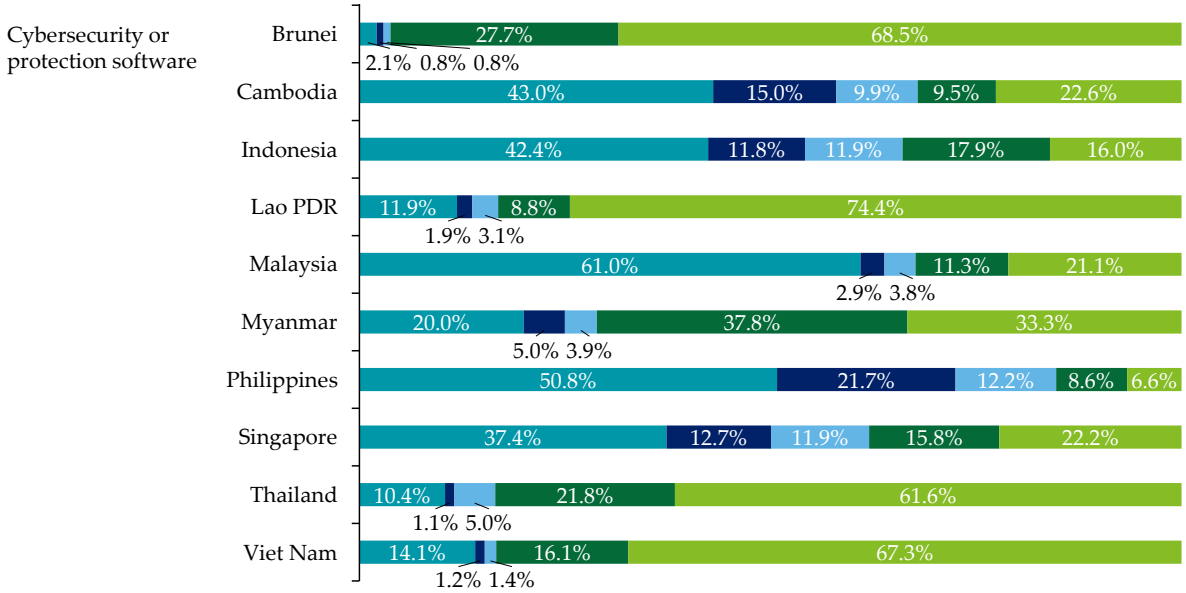
Figure 4.9. Stage of Consideration for Implementing the Overall Company Operation Tools



Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents to the corresponding bar answer option. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 4.10 shows the same data as Figure 4.9 by country. Combining the three-answer option representing 'already implemented', more than 50% of companies in five countries have already implemented enterprise resource planning, cloud storage or centralised servers, and cybersecurity or protection software.

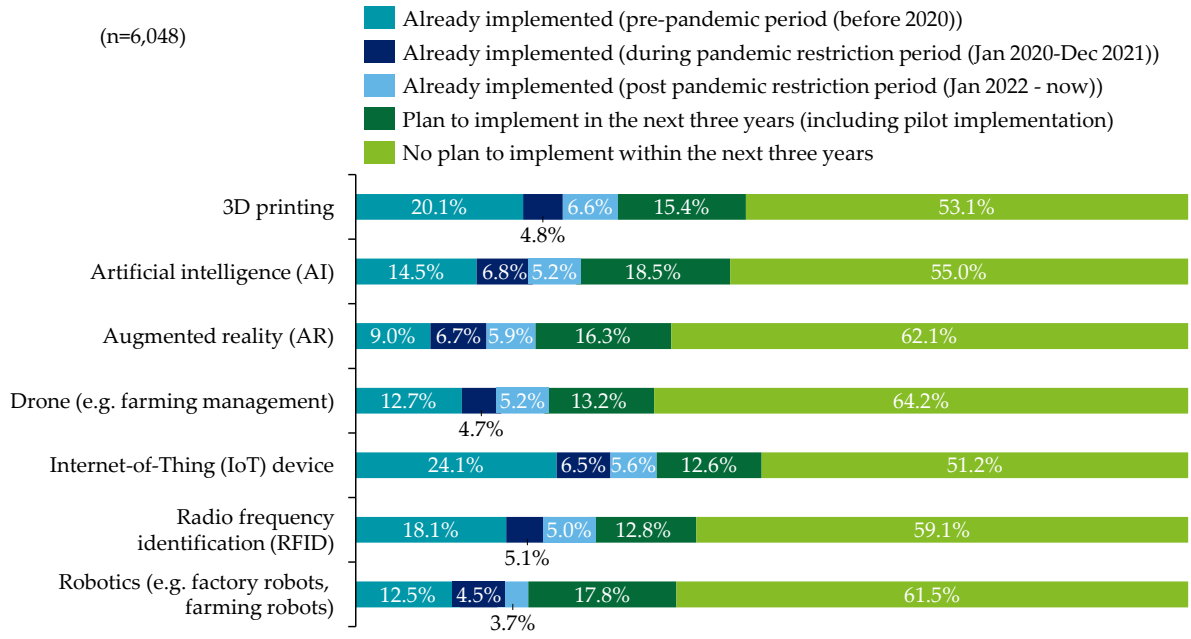
Figure 4.10. Stage of Consideration for Implementing the Overall Company Operation Tools by Country



Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents in the corresponding bar country. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 4.11 provides the stage of consideration in ASEAN companies for other advanced tools in a given period. Combining the three-answer option representing 'already implemented', the implementation rate of 3D printing and internet of things devices is about 35%. Robotics is the least implemented tool at about 20%.

Figure 4.11, Stage of Consideration for Implementing Other Advanced Tools



Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents of the corresponding bar answer option. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 4.12 shows the same data as Figure 4.11 by country. Combining the three-answer option representing 'already implemented', Indonesia, Malaysia, Singapore, and the Philippines are the most advanced countries.

Figure 4.12. Stage of Consideration for Implementing Other Advanced Tools by Country

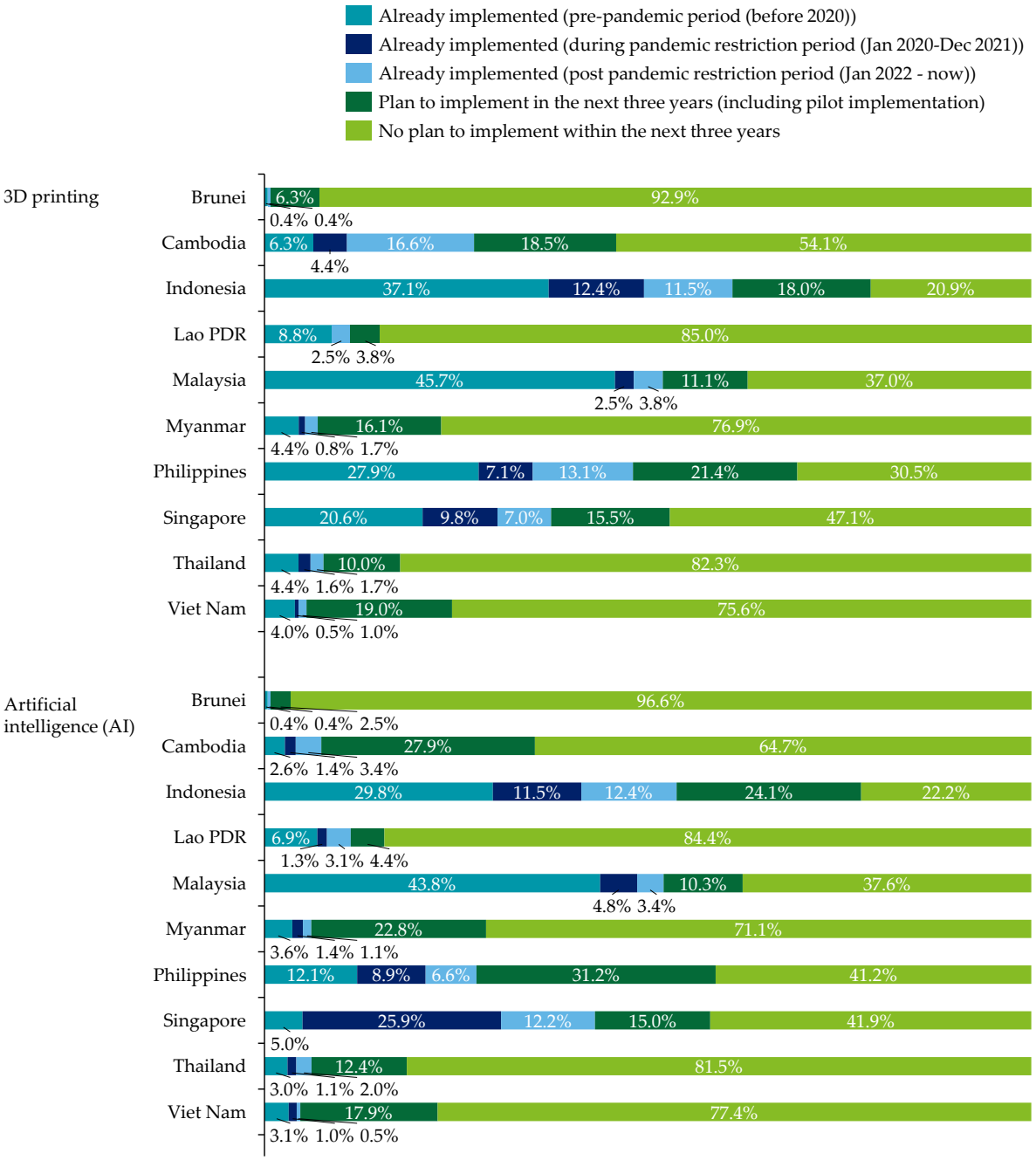


Figure 4.12. *Continued*

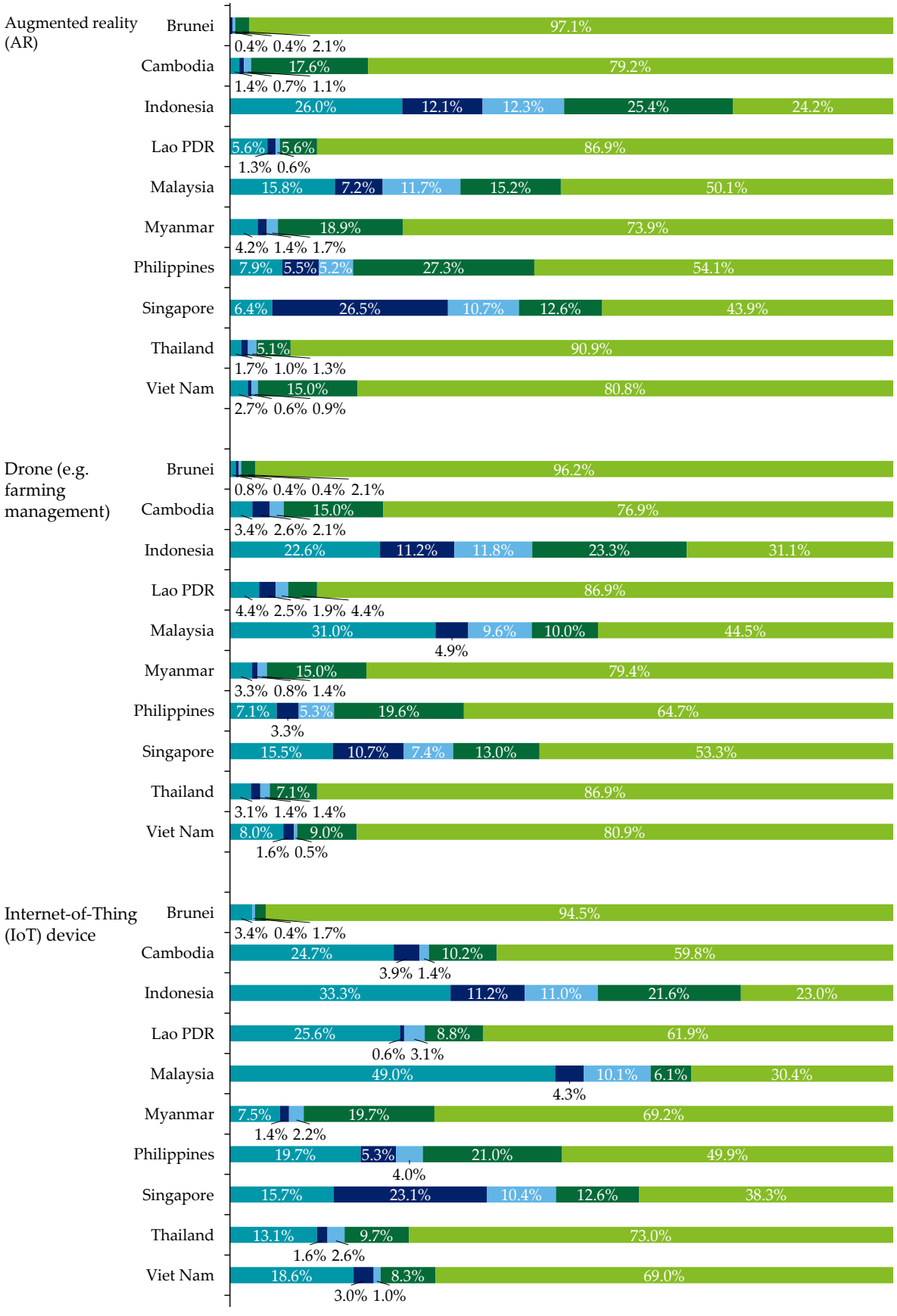
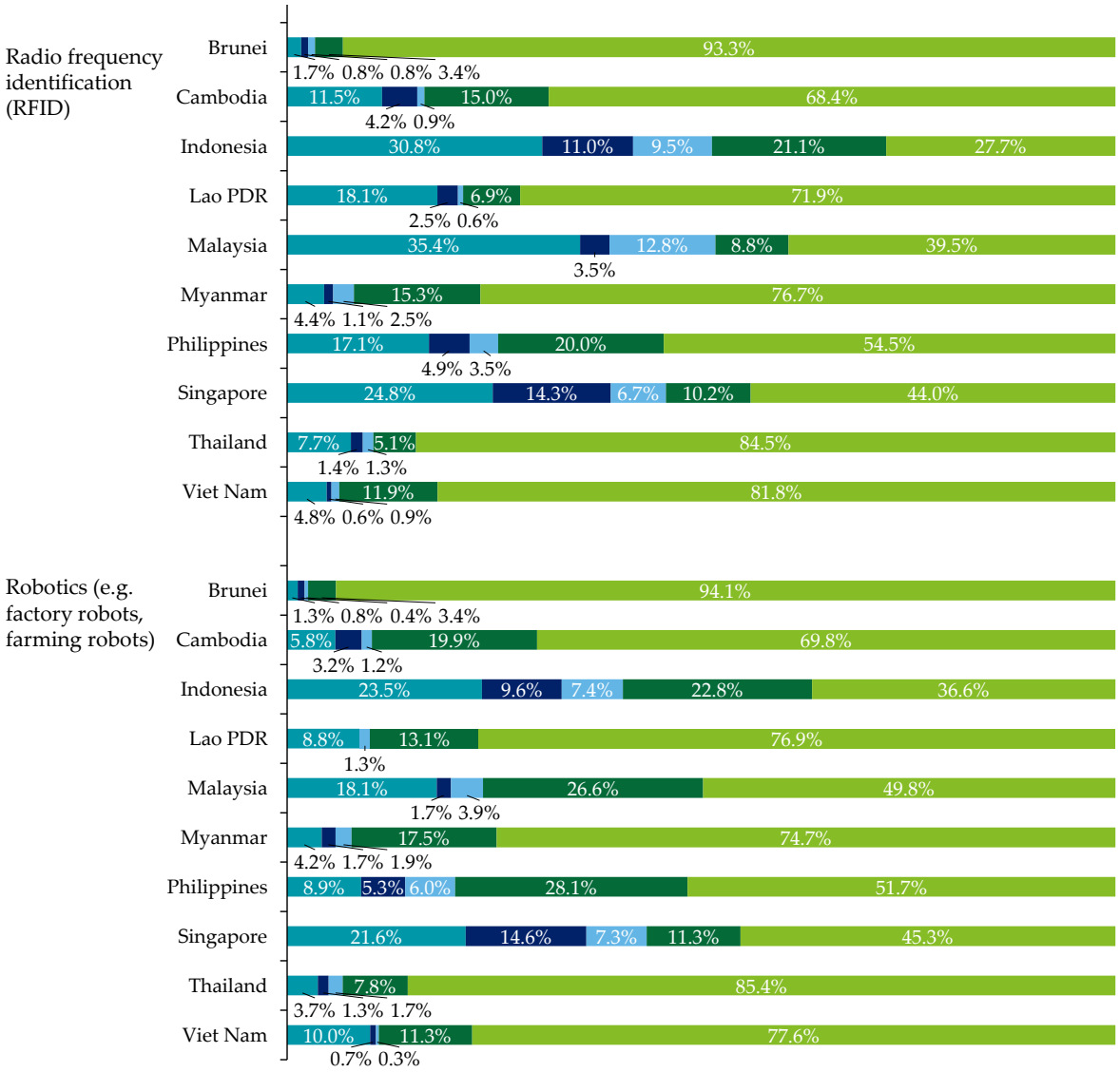


Figure 4.12. *Continued*

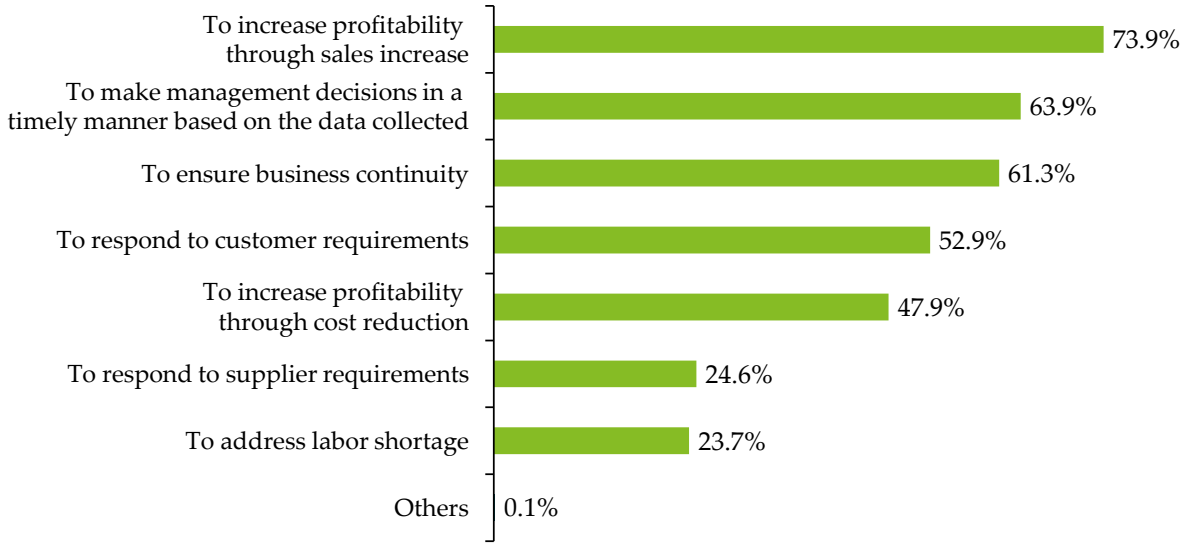


Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents in the corresponding bar country. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 4.13 provides the breakdown of the major objectives of digital tool adoption. Some 73.9% of respondents selected to increase profitability by increasing sales, followed by making timely management decisions based on data collected (63.9%) and ensuring business continuity (61.3%).

Figure 4.13. Breakdown of Major Objectives of Digital Tool Adoption

(n=6,048)



Notes: The percentage of each bar is calculated by dividing the total number of responses to the corresponding bar by the total questionnaire respondents. (Q24-1. What are the major objectives of digital tools adoption? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 4.31 shows the same data as Figure 4.13 by country. Amongst AMS, increasing profitability through sales is the top priority, with Viet Nam the most concerned country (85.2%) and Singapore the least (45.3%). The second objective is making timely management decisions based on collected data, with Brunei the highest (90.3%) and Indonesia the lowest (42.3%). The third highest objective is ensuring business continuity, with Malaysia the most concerned (83.8%) and Singapore the least concerned (41.2%).

Table 4.31. Breakdown of Major Objectives of Digital Tool Adoption by Country

Country	To increase profitability through sales increase	To increase profitability through cost reduction	To ensure business continuity	To address labour shortage	To make management decisions in a timely manner based on the data collected	To respond to customer requirements[a]	To respond to supplier requirements[b]	Others
Brunei	179 (75.2%)	97 (40.8%)	170 (71.4%)	28 (11.8%)	215 (90.3%)	155 (65.1%)	63 (26.5%)	0 (0.0%)
Cambodia	466 (82.2%)	347 (61.2%)	378 (66.7%)	190 (33.5%)	339 (59.8%)	354 (62.4%)	156 (27.5%)	0 (0.0%)
Indonesia	683 (76.5%)	407 (45.6%)	498 (55.8%)	293 (32.8%)	378 (42.3%)	391 (43.8%)	280 (31.4%)	2 (0.2%)
Lao PDR	94 (58.8%)	47 (29.4%)	102 (63.8%)	45 (28.1%)	120 (75.0%)	66 (41.3%)	14 (8.8%)	1 (0.6%)
Malaysia	792 (85.2%)	606 (65.2%)	779 (83.8%)	278 (29.9%)	638 (68.6%)	576 (61.9%)	304 (32.7%)	2 (0.2%)
Myanmar	280 (77.8%)	153 (42.5%)	273 (75.8%)	92 (25.6%)	266 (73.9%)	214 (59.4%)	138 (38.3%)	1 (0.3%)
Philippines	531 (76.4%)	438 (63.0%)	357 (51.4%)	221 (31.8%)	393 (56.5%)	418 (60.1%)	214 (30.8%)	1 (0.1%)
Singapore	292 (45.3%)	311 (48.2%)	266 (41.2%)	62 (9.6%)	396 (61.4%)	338 (52.4%)	129 (20.0%)	0 (0.0%)

Thailand	575 (82.0%)	283 (40.4%)	307 (43.8%)	104 (14.8%)	475 (67.8%)	367 (52.4%)	77 (11.0%)	0 (0.0%)
Viet Nam	580 (67.5%)	206 (24.0%)	575 (66.9%)	119 (13.9%)	643 (74.9%)	319 (37.1%)	110 (12.8%)	1 (0.1%)
Total	**4,472 (73.9%)**	**2,895 (47.9%)**	**3,705 (61.3%)**	**1,432 (23.7%)**	**3,863 (63.9%)**	**3,198 (52.9%)**	**1,485 (24.6%)**	**8 (0.1%)**

[a] For example, the customer's risk management policies that are implemented by responding to their customers' requests.

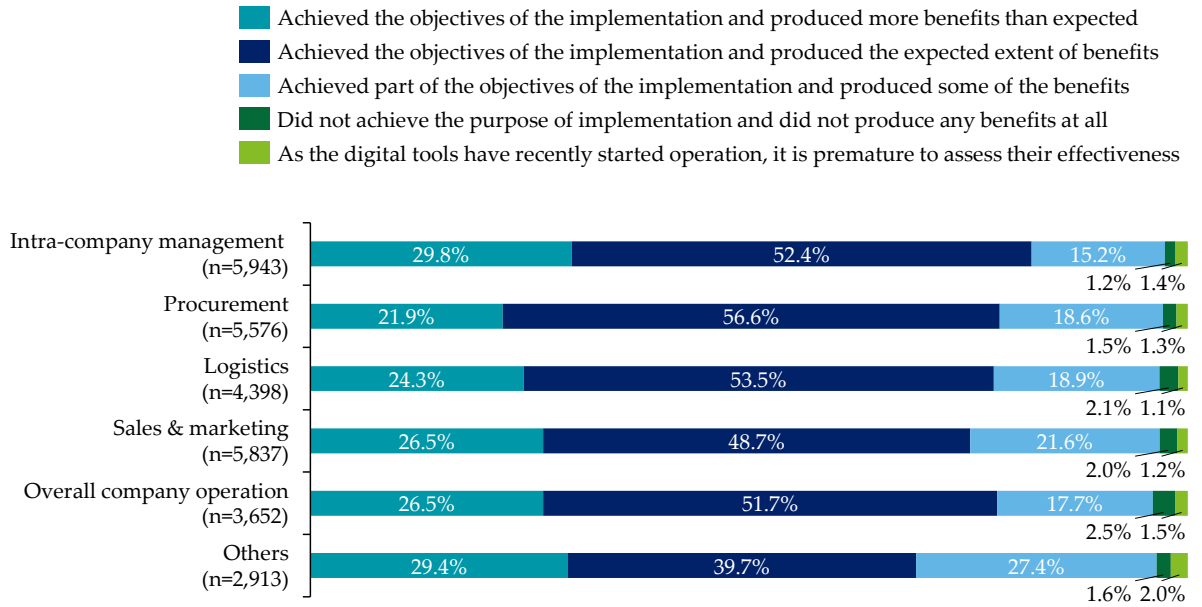
[b] For example, the supplier's risk management policies that are implemented by responding to their suppliers' requests.

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding row. (Q24-1. What are the major objectives of digital tools adoption? [MULTIPLE CHOICE: choose all options that apply])

Source: Authors.

Figure 4.14 provides the breakdown of digital tools' success in meeting implementation objectives and generating benefits. Combining the three-answer option representing 'achieved the objectives and part of objectives', more than 90% of companies achieved their objectives in all categories.

Figure 4.14. Breakdown of Digital Tools' Success in Meeting Implementation Objectives and Generating Benefits



Notes: The percentage of each bar is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding bar. (Q25. How successful has the implementation of the corresponding digital tools been in meeting implementation objectives and generating benefits? If you have experienced multiple cases of implementation, please answer based on your average experience. [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 4.15 shows the same data as Figure 4.14 by country. Combining the three-answer option representing 'achieved the objectives and part of objectives', more than 80% of companies in all countries have achieved successful implementation objectives and generated benefits in all digital tools.

Figure 4.15. Breakdown of Digital Tools' Success in Meeting Implementation Objectives and Generating Benefits by Country

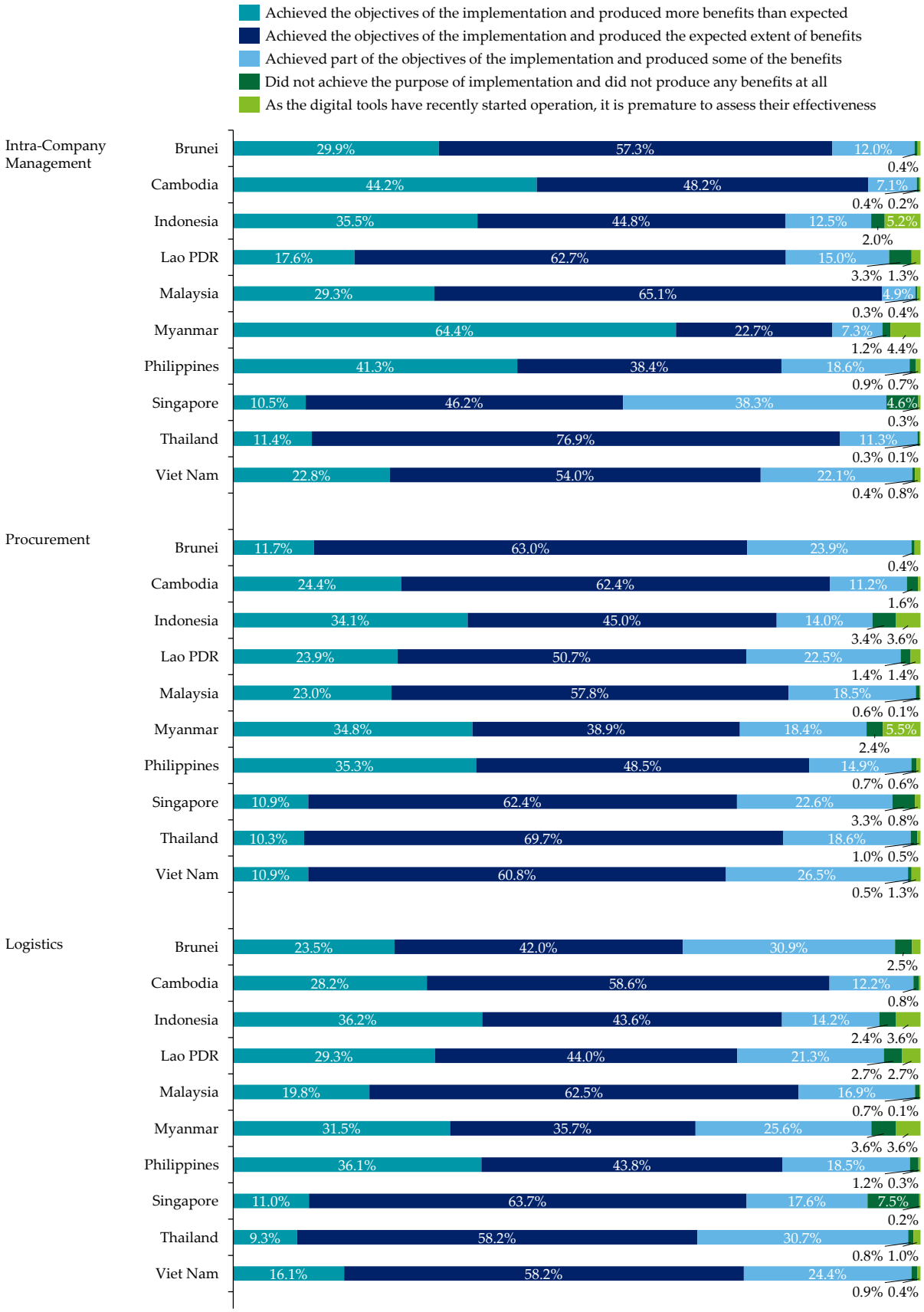
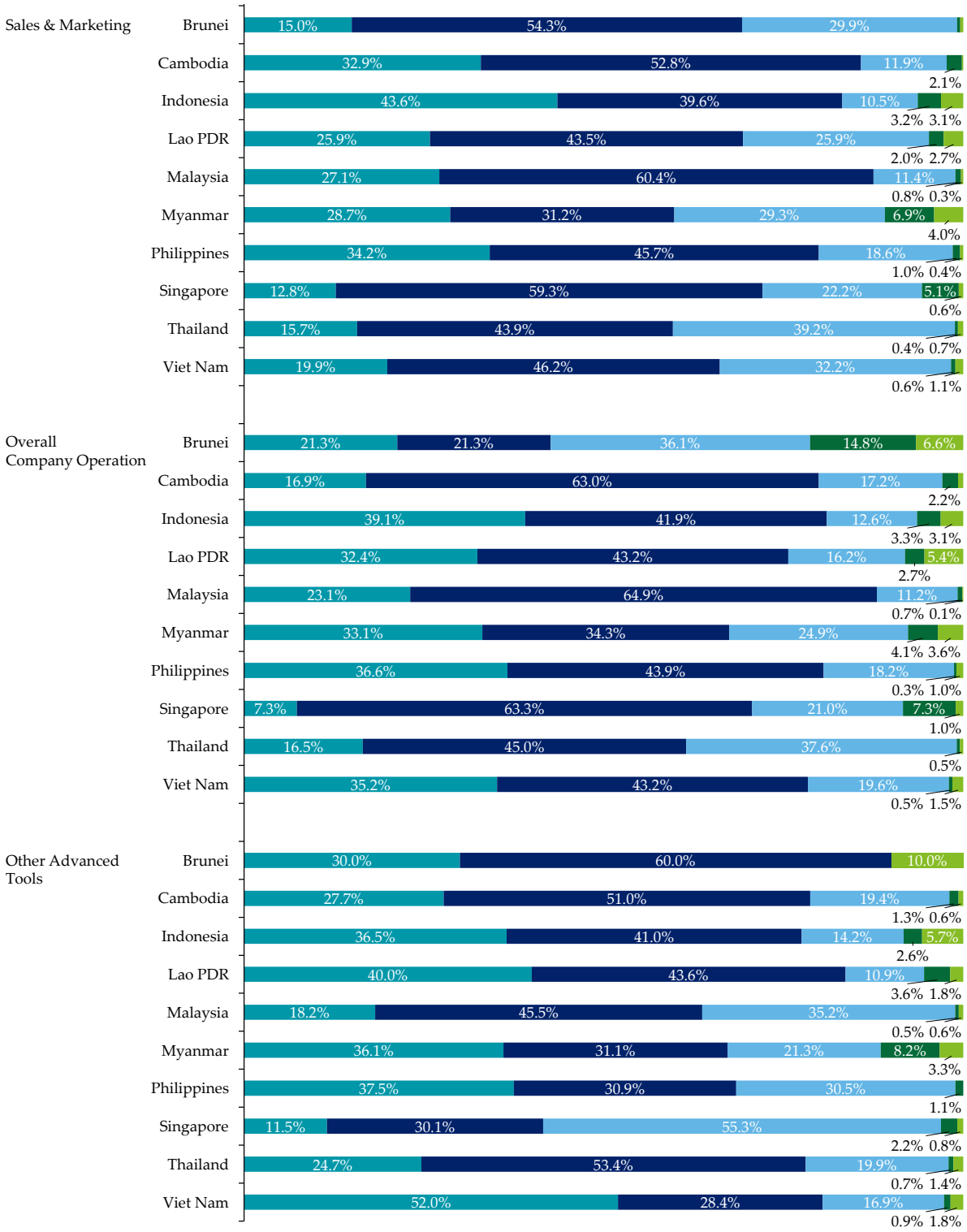


Figure 4.15. *Continued*



Notes: The percentage of each bar is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding bar by country. (Q25. How successful has the implementation of the corresponding digital tools been in meeting implementation objectives and generating benefits? If you have experienced multiple cases of implementation, please answer based on your average experience. [SINGLE CHOICE: choose one option])
Source: Authors.

Table 4.32 presents the breakdown of important consideration factors regarding the tools selected without an implementation plan within the next 3 years. Amongst the answer options, 'if digital tools conform to the business practices of the country' ranked the highest for four digital tool categories: procurement, logistics, sales & marketing, and overall company operation.

Table 4.32. Breakdown of Important Consideration Factors Regarding the Tools Selected as Without an Implementation Plan Within the Next 3 Years

Category	Consideration factors	Intra-company mgmt.	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
Price	If digital tools have subscription or reasonable profit-sharing models	223 (30.9%)	656 (54.3%)	637 (40.0%)	730 (45.3%)	918 (38.1%)	1,944 (43.2%)
	If digital tools have price package options that can be customised to meet companies' needs	355 (49.2%)	590 (48.9%)	890 (55.8%)	814 (50.5%)	1,398 (58.1%)	3,171 (70.5%)
Function or features	If digital tools are available in the local language	222 (30.7%)	367 (30.4%)	467 (29.3%)	455 (28.2%)	711 (29.5%)	1,757 (39.1%)
	If digital tools conform to the business practices of the country	399 (55.3%)	879 (72.8%)	1,120 (70.3%)	1,125 (69.8%)	1,664 (69.1%)	2,955 (65.7%)
Service	If digital tools have a support programme or team to help diagnose the business issues and provide solution recommendation	332 (46.0%)	623 (51.6%)	883 (55.4%)	820 (50.9%)	1,315 (54.6%)	2,975 (66.2%)
	If digital tools have a support programme or team in-country	111 (15.4%)	243 (20.1%)	267 (16.8%)	265 (16.4%)	455 (18.9%)	1,578 (35.1%)

Category	Consideration factors	Intra-company mgmt.	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
	If digital tools have a support programme or team provided in the local language	165 (22.9%)	391 (32.4%)	472 (29.6%)	526 (32.7%)	832 (34.6%)	1,699 (37.8%)
Others		10 (1.4%)	15 (1.2%)	17 (1.1%)	21 (1.3%)	15 (0.6%)	45 (1.0%)

Mgmt. = management.

Notes: The percentage of each cell is calculated by dividing the total number of responses to each row answer option by the total number of respondents that selected 'no plan to implement within the next 3 years' to any of the tools in the tool categories in the corresponding column in Q23. (Q26. Please answer the following question regarding the tools selected as 'without implementation plan within the next 3 years' in Q23: Which factor(s) do you consider important when adopting digital tools? [MULTIPLE CHOICE: choose all options that apply])

Source: Authors.

Table 4.33 shows the same data as Table 4.32 by country. Overall, most countries cited 'if digital tools conform to the country's business practices' as one of the most desired factors.

Table 4.33. Breakdown of Important Consideration Factors Regarding the Tools Selected as Without an Implementation Plan Within the Next 3 Years by Country

Country	Category	Consideration Factors	Intra-company mgmt.	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
Brunei	Price	If digital tools have subscription or reasonable profit-sharing models	2 (4.7%)	73 (57.9%)	59 (40.1%)	76 (52.1%)	85 (45.9%)	102 (44.2%)
		If digital tools have price package options that can be customised to meet companies' needs	9 (20.9%)	47 (37.3%)	66 (44.9%)	59 (40.4%)	89 (48.1%)	153 (66.2%)
	Function or features	If digital tools are available in the local language	1 (2.3%)	20 (15.9%)	26 (17.7%)	22 (15.1%)	30 (16.2%)	64 (27.7%)
		If digital tools conform to the business practices of the country	38 (88.4%)	119 (94.4%)	138 (93.9%)	135 (92.5%)	158 (85.4%)	176 (76.2%)
	Service	If digital tools have a support programme or team to help diagnose the business issues and provide solution recommendation	5 (11.6%)	43 (34.1%)	57 (38.8%)	47 (32.2%)	67 (36.2%)	135 (58.4%)

Country	Category	Consideration Factors	Intra-company mgmt.	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
		If digital tools have a support programme or team in-country	5 (11.6%)	25 (19.8%)	28 (19.0%)	27 (18.5%)	36 (19.5%)	82 (35.5%)
		If digital tools have a support programme or team provided in the local language	0 (0.0%)	46 (36.5%)	38 (25.9%)	41 (28.1%)	50 (27.0%)	45 (19.5%)
	Others		0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.9%)
Cambodia	Price	If digital tools have subscription or reasonable profit-sharing models	14 (31.1%)	13 (44.8%)	18 (19.6%)	17 (29.3%)	54 (38.0%)	296 (56.3%)
		If digital tools have price package options that can be customised to meet companies' needs	32 (71.1%)	15 (51.7%)	77 (83.7%)	48 (82.8%)	102 (71.8%)	464 (88.2%)
	Function or features	If digital tools are available in the local language	16 (35.6%)	12 (41.4%)	31 (33.7%)	34 (58.6%)	63 (44.4%)	288 (54.8%)
		If digital tools conform to the business practices of the country	26 (57.8%)	17 (58.6%)	63 (68.5%)	42 (72.4%)	106 (74.6%)	393 (74.7%)
	Service	If digital tools have a support programme or	41 (91.1%)	24 (82.8%)	85 (92.4%)	52 (89.7%)	134 (94.4%)	379 (72.1%)

Country	Category	Consideration Factors	Intra-company mgmt.	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
		team to help diagnose the business issues and provide solution recommendation						
		If digital tools have a support programme or team in-country	6 (13.3%)	6 (20.7%)	17 (18.5%)	12 (20.7%)	25 (17.6%)	290 (55.1%)
		If digital tools have a support programme or team provided in the local language	8 (17.8%)	6 (20.7%)	12 (13.0%)	20 (34.5%)	40 (28.2%)	264 (50.2%)
	Others		0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.2%)
Indonesia	Price	If digital tools have subscription or reasonable profit-sharing models	63 (54.3%)	50 (38.2%)	47 (48.5%)	71 (43.6%)	88 (47.3%)	175 (42.8%)
		If digital tools have price package options that can be customised to meet companies' needs	60 (51.7%)	85 (64.9%)	55 (56.7%)	102 (62.6%)	114 (61.3%)	276 (67.5%)
	Function or features	If digital tools are available in the local language	53 (45.7%)	43 (32.8%)	35 (36.1%)	53 (32.5%)	63 (33.9%)	148 (36.2%)

Country	Category	Consideration Factors	Intra-company mgmt.	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
		If digital tools conform to the business practices of the country	34 (29.3%)	57 (43.5%)	31 (32.0%)	70 (42.9%)	69 (37.1%)	189 (46.2%)
	Service	If digital tools have a support programme or team to help diagnose the business issues and provide solution recommendation	61 (52.6%)	58 (44.3%)	43 (44.3%)	79 (48.5%)	77 (41.4%)	226 (55.3%)
		If digital tools have a support programme or team in-country	30 (25.9%)	34 (26.0%)	21 (21.6%)	49 (30.1%)	63 (33.9%)	143 (35.0%)
		If digital tools have a support programme or team provided in the local language	25 (21.6%)	21 (16.0%)	17 (17.5%)	28 (17.2%)	39 (21.0%)	94 (23.0%)
	Others		6 (5.2%)	8 (6.1%)	4 (4.1%)	9 (5.5%)	9 (4.8%)	21 (5.1%)
Lao PDR	Price	If digital tools have subscription or reasonable profit-sharing models	15 (22.1%)	19 (30.2%)	21 (24.1%)	27 (29.0%)	35 (28.2%)	36 (23.8%)
		If digital tools have price package options that can be customised to meet companies' needs	30 (44.1%)	17 (27.0%)	34 (39.1%)	32 (34.4%)	54 (43.5%)	83 (55.0%)

Country	Category	Consideration Factors	Intra-company mgmt.	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
	Function or features	If digital tools are available in the local language	10 (14.7%)	15 (23.8%)	20 (23.0%)	19 (20.4%)	30 (24.2%)	42 (27.8%)
		If digital tools conform to the business practices of the country	58 (85.3%)	48 (76.2%)	67 (77.0%)	78 (83.9%)	94 (75.8%)	109 (72.2%)
	Services	If digital tools have a support programme or team to help diagnose the business issues and provide solution recommendation	21 (30.9%)	16 (25.4%)	35 (40.2%)	34 (36.6%)	54 (43.5%)	79 (52.3%)
		If digital tools have a support programme or team in-country	18 (26.5%)	17 (27.0%)	19 (21.8%)	21 (22.6%)	29 (23.4%)	33 (21.9%)
		If digital tools have a support programme or team provided in the local language	30 (44.1%)	28 (44.4%)	39 (44.8%)	44 (47.3%)	66 (53.2%)	78 (51.7%)
	Others		0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (1.1%)	0 (0.0%)	2 (1.3%)
Malaysia	Price	If digital tools have subscription or reasonable profit-sharing models	12 (22.2%)	152 (74.5%)	171 (60.2%)	116 (52.7%)	171 (55.0%)	363 (62.8%)

Country	Category	Consideration Factors	Intra-company mgmt.	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
		If digital tools have price package options that can be customised to meet companies' needs	48 (88.9%)	148 (72.5%)	216 (76.1%)	169 (76.8%)	254 (81.7%)	454 (78.5%)
	Function or features	If digital tools are available in the local language	13 (24.1%)	110 (53.9%)	148 (52.1%)	83 (37.7%)	147 (47.3%)	322 (55.7%)
		If digital tools conform to the business practices of the country	43 (79.6%)	156 (76.5%)	206 (72.5%)	162 (73.6%)	239 (76.8%)	394 (68.2%)
	Service	If digital tools have a support programme or team to help diagnose the business issues and provide solution recommendation	50 (92.6%)	180 (88.2%)	251 (88.4%)	175 (79.5%)	265 (85.2%)	516 (89.3%)
		If digital tools have a support programme or team in-country	6 (11.1%)	60 (29.4%)	65 (22.9%)	28 (12.7%)	75 (24.1%)	240 (41.5%)
		If digital tools have a support programme or team provided in the local language	13 (24.1%)	56 (27.5%)	101 (35.6%)	58 (26.4%)	121 (38.9%)	291 (50.3%)
	Others		0 (0.0%)	1 (0.5%)	3 (1.1%)	4 (1.8%)	1 (0.3%)	6 (1.0%)

Country	Category	Consideration Factors	Intra-company mgmt.	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
Myanmar	Price	If digital tools have subscription or reasonable profit-sharing models	60 (60.6%)	22 (52.4%)	54 (57.4%)	55 (61.1%)	76 (57.6%)	203 (66.6%)
		If digital tools have price package options that can be customised to meet companies' needs	77 (77.8%)	22 (52.4%)	61 (64.9%)	58 (64.4%)	99 (75.0%)	244 (80.0%)
	Function or features	If digital tools are available in the local language	39 (39.4%)	18 (42.9%)	42 (44.7%)	47 (52.2%)	73 (55.3%)	169 (55.4%)
		If digital tools conform to the business practices of the country	31 (31.3%)	20 (47.6%)	30 (31.9%)	32 (35.6%)	61 (46.2%)	152 (49.8%)
	Service	If digital tools have a support programme or team to help diagnose the business issues and provide solution recommendation	27 (27.3%)	12 (28.6%)	26 (27.7%)	29 (32.2%)	51 (38.6%)	157 (51.5%)
		If digital tools have a support programme or team in-country	18 (18.2%)	8 (19.0%)	16 (17.0%)	15 (16.7%)	28 (21.2%)	119 (39.0%)
		If digital tools have a support programme or	24 (24.2%)	20 (47.6%)	27 (28.7%)	36 (40.0%)	43 (32.6%)	113 (37.0%)

Country	Category	Consideration Factors	Intra-company mgmt.	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
		team provided in the local language						
	Others		1 (1.0%)	2 (4.8%)	1 (1.1%)	2 (2.2%)	2 (1.5%)	2 (0.7%)
Philippines	Price	If digital tools have subscription or reasonable profit-sharing models	8 (16.7%)	8 (22.9%)	11 (27.5%)	14 (28.6%)	16 (23.5%)	289 (57.2%)
		If digital tools have price package options that can be customised to meet companies' needs	11 (22.9%)	10 (28.6%)	13 (32.5%)	13 (26.5%)	19 (27.9%)	387 (76.6%)
	Function or features	If digital tools are available in the local language	10 (20.8%)	11 (31.4%)	8 (20.0%)	13 (26.5%)	10 (14.7%)	220 (43.6%)
		If digital tools conform to the business practices of the country	12 (25.0%)	5 (14.3%)	12 (30.0%)	9 (18.4%)	11 (16.2%)	340 (67.3%)
	Service	If digital tools have a support programme or team to help diagnose the business issues and provide solution recommendation	39 (81.3%)	25 (71.4%)	31 (77.5%)	38 (77.6%)	58 (85.3%)	299 (59.2%)

Country	Category	Consideration Factors	Intra-company mgmt.	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
		If digital tools have a support programme or team in-country	6 (12.5%)	11 (31.4%)	10 (25.0%)	10 (20.4%)	11 (16.2%)	267 (52.9%)
		If digital tools have a support programme or team provided in the local language	8 (16.7%)	5 (14.3%)	4 (10.0%)	7 (14.3%)	5 (7.4%)	224 (44.4%)
	Others		1 (2.1%)	1 (2.9%)	2 (5.0%)	0 (0.0%)	0 (0.0%)	4 (0.8%)
Singapore	Price	If digital tools have subscription or reasonable profit-sharing models	7 (25.9%)	30 (46.9%)	19 (19.4%)	27 (28.4%)	40 (24.5%)	94 (24.3%)
		If digital tools have price package options that can be customised to meet companies' needs	9 (33.3%)	17 (26.6%)	31 (31.6%)	27 (28.4%)	84 (51.5%)	191 (49.4%)
	Function or features	If digital tools are available in the local language	4 (14.8%)	10 (15.6%)	7 (7.1%)	12 (12.6%)	20 (12.3%)	93 (24.0%)
		If digital tools conform to the business practices of the country	15 (55.6%)	46 (71.9%)	66 (67.3%)	59 (62.1%)	107 (65.6%)	201 (51.9%)
	Service	If digital tools have a support programme or	14 (51.9%)	23 (35.9%)	36 (36.7%)	37 (38.9%)	86 (52.8%)	262 (67.7%)

Country	Category	Consideration Factors	Intra-company mgmt.	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
		team to help diagnose the business issues and provide solution recommendation						
		If digital tools have a support programme or team in-country	1 (3.7%)	5 (7.8%)	7 (7.1%)	9 (9.5%)	30 (18.4%)	88 (22.7%)
		If digital tools have a support programme or team provided in the local language	1 (3.7%)	27 (42.2%)	31 (31.6%)	41 (43.2%)	46 (28.2%)	99 (25.6%)
	Others		1 (3.7%)	0 (0.0%)	1 (1.0%)	0 (0.0%)	1 (0.6%)	1 (0.3%)
Thailand	Price	If digital tools have subscription or reasonable profit-sharing models	18 (31.6%)	224 (73.4%)	175 (57.4%)	256 (69.9%)	237 (48.3%)	245 (37.0%)
		If digital tools have price package options that can be customised to meet companies' needs	39 (68.4%)	170 (55.7%)	218 (71.5%)	231 (63.1%)	355 (72.3%)	537 (81.1%)
	Function or features	If digital tools are available in the local language	16 (28.1%)	54 (17.7%)	51 (16.7%)	66 (18.0%)	82 (16.7%)	157 (23.7%)

Country	Category	Consideration Factors	Intra-company mgmt.	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
		If digital tools conform to the business practices of the country	39 (68.4%)	264 (86.6%)	263 (86.2%)	307 (83.9%)	381 (77.6%)	458 (69.2%)
	Service	If digital tools have a support programme or team to help diagnose the business issues and provide solution recommendation	39 (68.4%)	185 (60.7%)	229 (75.1%)	241 (65.8%)	322 (65.6%)	567 (85.6%)
		If digital tools have a support programme or team in-country	4 (7.0%)	53 (17.4%)	48 (15.7%)	57 (15.6%)	65 (13.2%)	143 (21.6%)
		If digital tools have a support programme or team provided in the local language	15 (26.3%)	106 (34.8%)	94 (30.8%)	133 (36.3%)	184 (37.5%)	209 (31.6%)
	Others		0 (0.0%)	1 (0.3%)	2 (0.7%)	2 (0.5%)	0 (0.0%)	1 (0.2%)
Viet Nam	Price	If digital tools have subscription or reasonable profit-sharing models	24 (14.5%)	65 (31.3%)	62 (17.7%)	71 (21.5%)	116 (19.1%)	141 (19.0%)
		If digital tools have price package options that can be customised to meet companies' needs	40 (24.2%)	59 (28.4%)	119 (34.0%)	75 (22.7%)	228 (37.6%)	382 (51.5%)

Country	Category	Consideration Factors	Intra-company mgmt.	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
	Function or features	If digital tools are available in the local language	60 (36.4%)	74 (35.6%)	99 (28.3%)	106 (32.0%)	193 (31.8%)	254 (34.2%)
		If digital tools conform to the business practices of the country	103 (62.4%)	147 (70.7%)	244 (69.7%)	231 (69.8%)	438 (72.3%)	543 (73.2%)
	Service	If digital tools have a support programme or team to help diagnose the business issues and provide solution recommendation	35 (21.2%)	57 (27.4%)	90 (25.7%)	88 (26.6%)	201 (33.2%)	355 (47.8%)
		If digital tools have a support programme or team in-country	17 (10.3%)	24 (11.5%)	36 (10.3%)	37 (11.2%)	93 (15.3%)	173 (23.3%)
		If digital tools have a support programme or team provided in the local language	41 (24.8%)	76 (36.5%)	109 (31.1%)	118 (35.6%)	238 (39.3%)	282 (38.0%)
	Others		1 (0.6%)	2 (1.0%)	4 (1.1%)	3 (0.9%)	2 (0.3%)	5 (0.7%)

Mgmt. = management.

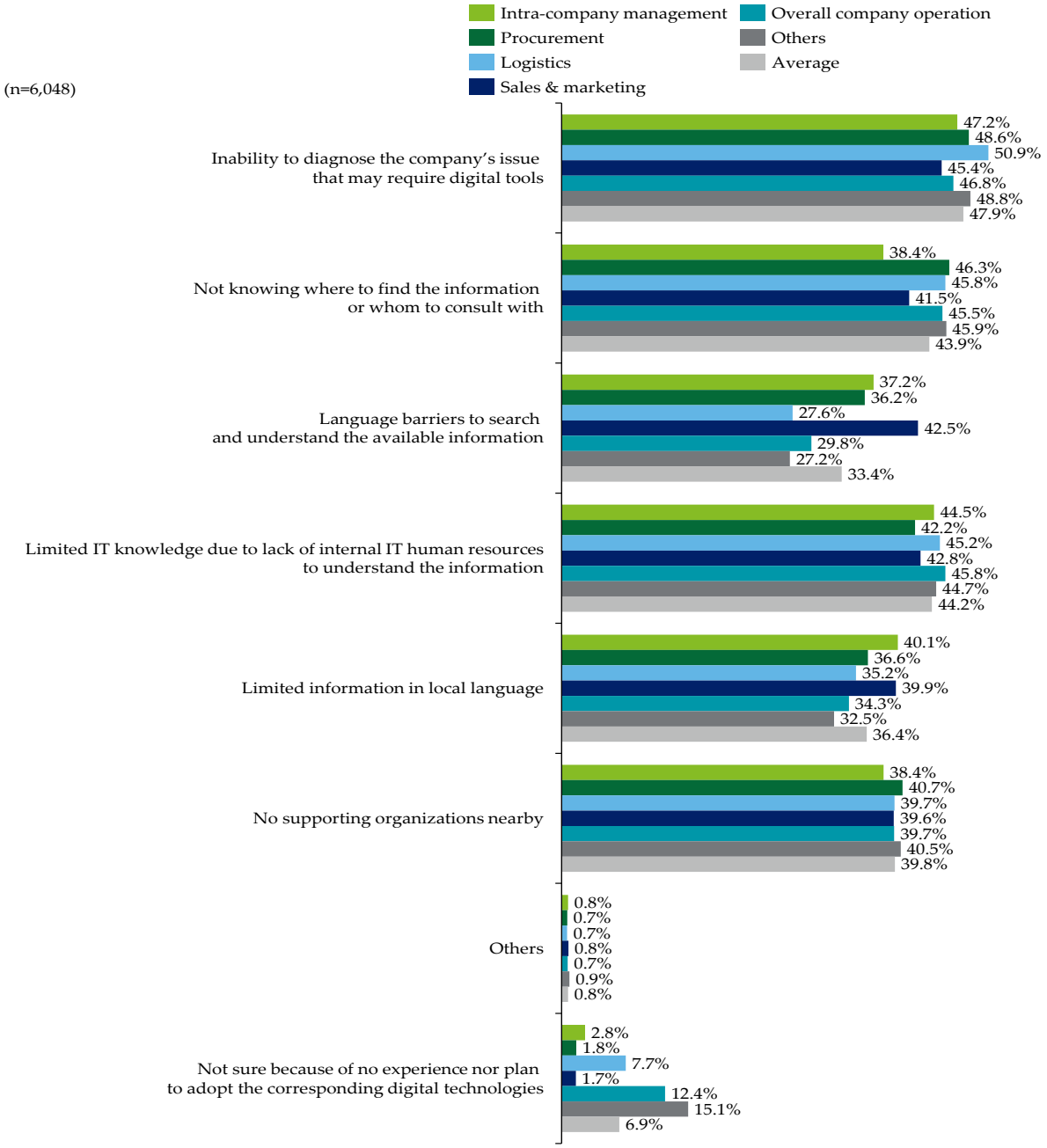
Notes: The percentage of each row is calculated by dividing the total number of responses of the corresponding row by the total respondents that selected 'without implementation plan within the next 3 years' to each corresponding answer option in Q23 by country. (Q26. Please answer the following question regarding the tools selected as 'without implementation plan within the next 3 years' in Q23: Which factor(s) do you consider important when adopting digital tools? [MULTIPLE CHOICE: choose all options that apply])

Source: Authors.

- Difficulties and Concerns

Figure 4.16 shows the causes of difficulties in the information gathering phase. On average, 47.9% of respondents have difficulties diagnosing company issues that may require digital tools (the highest amongst the answer options).

Figure 4.16. Breakdown of the Causes of Difficulties in the Information Gathering Phase



IT = information technology.

Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding answer option by the total questionnaire respondents. (Q27. What are the causes of difficulties in the information gathering phase? [MULTIPLE CHOICE: choose all options that apply])

Source: Authors.

Table 4.34 provides the same data as Figure 4.16 by country. Regarding 'inability to diagnose the company's issue that may require digital tools', Viet Nam had the highest average share amongst the countries (55.8%).

Table 4.34. Breakdown of the Causes of Difficulties in the Information Gathering Phase by Country

Country	Tool Category	A	B	C	D	E	F	G	H
Brunei	Intra-company management	128 (53.8%)	118 (49.6%)	61 (25.6%)	80 (33.6%)	79 (33.2%)	119 (50.0%)	0 (0.0%)	0 (0.0%)
	Procurement	118 (49.6%)	133 (55.9%)	52 (21.8%)	82 (34.5%)	73 (30.7%)	125 (52.5%)	0 (0.0%)	2 (0.8%)
	Logistics	122 (51.3%)	131 (55.0%)	30 (12.6%)	93 (39.1%)	58 (24.4%)	95 (39.9%)	0 (0.0%)	51 (21.4%)
	Sales & marketing	121 (50.8%)	120 (50.4%)	58 (24.4%)	76 (31.9%)	92 (38.7%)	127 (53.4%)	1 (0.4%)	1 (0.4%)
	Overall company operation	121 (50.8%)	135 (56.7%)	31 (13.0%)	92 (38.7%)	59 (24.8%)	83 (34.9%)	0 (0.0%)	66 (27.7%)
	Others	118 (49.6%)	148 (62.2%)	31 (13.0%)	95 (39.9%)	63 (26.5%)	88 (37.0%)	4 (1.7%)	65 (27.3%)
	Average	121 (51.0%)	131 (55.0%)	44 (18.4%)	86 (36.3%)	71 (29.7%)	106 (44.6%)	1 (0.4%)	31 (13.0%)
Cambodia	Intra-company management	483 (85.2%)	399 (70.4%)	243 (42.9%)	257 (45.3%)	232 (40.9%)	286 (50.4%)	1 (0.2%)	3 (0.5%)
	Procurement	476 (84.0%)	419 (73.9%)	273 (48.1%)	288 (50.8%)	223 (39.3%)	320 (56.4%)	0 (0.0%)	3 (0.5%)
	Logistics	453 (79.9%)	417 (73.5%)	275 (48.5%)	293 (51.7%)	252 (44.4%)	321 (56.6%)	0 (0.0%)	4 (0.7%)
	Sales & marketing	479 (84.5%)	409 (72.1%)	255 (45.0%)	306 (54.0%)	244 (43.0%)	320 (56.4%)	1 (0.2%)	1 (0.2%)
	Overall company operation	457 (80.6%)	427 (75.3%)	261 (46.0%)	287 (50.6%)	247 (43.6%)	320 (56.4%)	0 (0.0%)	3 (0.5%)
	Others	449 (79.2%)	416 (73.4%)	277 (48.9%)	299 (52.7%)	230 (40.6%)	332 (58.6%)	0 (0.0%)	7 (1.2%)

Country	Tool Category	A	B	C	D	E	F	G	H
	Average	466 (82.2%)	415 (73.1%)	264 (46.6%)	288 (50.9%)	238 (42.0%)	317 (55.8%)	0 (0.1%)	4 (0.6%)
Indonesia	Intra-company management	437 (48.9%)	211 (23.6%)	244 (27.3%)	348 (39.0%)	411 (46.0%)	287 (32.1%)	28 (3.1%)	26 (2.9%)
	Procurement	409 (45.8%)	259 (29.0%)	268 (30.0%)	300 (33.6%)	359 (40.2%)	294 (32.9%)	23 (2.6%)	39 (4.4%)
	Logistics	388 (43.4%)	266 (29.8%)	256 (28.7%)	308 (34.5%)	342 (38.3%)	297 (33.3%)	21 (2.4%)	40 (4.5%)
	Sales & marketing	374 (41.9%)	279 (31.2%)	285 (31.9%)	298 (33.4%)	353 (39.5%)	291 (32.6%)	26 (2.9%)	49 (5.5%)
	Overall company operation	385 (43.1%)	278 (31.1%)	270 (30.2%)	313 (35.1%)	345 (38.6%)	277 (31.0%)	25 (2.8%)	63 (7.1%)
	Others	360 (40.3%)	284 (31.8%)	296 (33.1%)	321 (35.9%)	328 (36.7%)	275 (30.8%)	34 (3.8%)	63 (7.1%)
	Average	392 (43.9%)	263 (29.4%)	270 (30.2%)	315 (35.2%)	356 (39.9%)	287 (32.1%)	26 (2.9%)	47 (5.2%)
Lao PDR	Intra-company management	43 (26.9%)	47 (29.4%)	62 (38.8%)	71 (44.4%)	49 (30.6%)	65 (40.6%)	1 (0.6%)	0 (0.0%)
	Procurement	48 (30.0%)	54 (33.8%)	57 (35.6%)	67 (41.9%)	35 (21.9%)	72 (45.0%)	1 (0.6%)	4 (2.5%)
	Logistics	45 (28.1%)	58 (36.3%)	26 (16.3%)	67 (41.9%)	35 (21.9%)	50 (31.3%)	1 (0.6%)	43 (26.9%)
	Sales & marketing	54 (33.8%)	55 (34.4%)	70 (43.8%)	64 (40.0%)	52 (32.5%)	60 (37.5%)	1 (0.6%)	2 (1.3%)
	Overall company operation	51 (31.9%)	53 (33.1%)	27 (16.9%)	72 (45.0%)	30 (18.8%)	52 (32.5%)	1 (0.6%)	55 (34.4%)
	Others	44 (27.5%)	55 (34.4%)	31 (19.4%)	70 (43.8%)	37 (23.1%)	41 (25.6%)	1 (0.6%)	60 (37.5%)
	Average	48 (29.7%)	54 (33.5%)	46 (28.4%)	69 (42.8%)	40 (24.8%)	57 (35.4%)	1 (0.6%)	27 (17.1%)
Malaysia	Intra-company management	460 (49.5%)	490 (52.7%)	236 (25.4%)	577 (62.0%)	398 (42.8%)	532 (57.2%)	1 (0.1%)	5 (0.5%)

Country	Tool Category	A	B	C	D	E	F	G	H
	Procurement	585 (62.9%)	648 (69.7%)	172 (18.5%)	497 (53.4%)	429 (46.1%)	526 (56.6%)	1 (0.1%)	8 (0.9%)
	Logistics	598 (64.3%)	631 (67.8%)	161 (17.3%)	511 (54.9%)	442 (47.5%)	520 (55.9%)	2 (0.2%)	8 (0.9%)
	Sales & marketing	420 (45.2%)	471 (50.6%)	264 (28.4%)	555 (59.7%)	380 (40.9%)	534 (57.4%)	5 (0.5%)	6 (0.6%)
	Overall company operation	593 (63.8%)	622 (66.9%)	197 (21.2%)	532 (57.2%)	449 (48.3%)	517 (55.6%)	4 (0.4%)	10 (1.1%)
	Others	583 (62.7%)	631 (67.8%)	141 (15.2%)	544 (58.5%)	413 (44.4%)	533 (57.3%)	4 (0.4%)	20 (2.2%)
	Average	540 (58.0%)	582 (62.6%)	195 (21.0%)	536 (57.6%)	419 (45.0%)	527 (56.7%)	3 (0.3%)	10 (1.0%)
		232 (64.4%)	195 (54.2%)	186 (51.7%)	172 (47.8%)	153 (42.5%)	98 (27.2%)	5 (1.4%)	6 (1.7%)
Myanmar	Intra-company management	212 (58.9%)	191 (53.1%)	175 (48.6%)	167 (46.4%)	127 (35.3%)	107 (29.7%)	4 (1.1%)	21 (5.8%)
	Procurement	202 (56.1%)	179 (49.7%)	151 (41.9%)	163 (45.3%)	116 (32.2%)	106 (29.4%)	7 (1.9%)	35 (9.7%)
	Logistics	209 (58.1%)	191 (53.1%)	194 (53.9%)	178 (49.4%)	136 (37.8%)	101 (28.1%)	4 (1.1%)	17 (4.7%)
	Sales & Marketing	190 (52.8%)	168 (46.7%)	165 (45.8%)	178 (49.4%)	125 (34.7%)	109 (30.3%)	4 (1.1%)	49 (13.6%)
	Overall company operation	167 (46.4%)	159 (44.2%)	163 (45.3%)	112 (31.1%)	115 (31.9%)	7 (1.9%)	55 (15.3%)	49 (13.6%)
	Others	208 (57.7%)	182 (50.5%)	172 (47.7%)	170 (47.3%)	128 (35.6%)	106 (29.4%)	5 (1.4%)	31 (8.5%)
	Average	466 (67.1%)	399 (57.4%)	285 (41.0%)	300 (43.2%)	373 (53.7%)	280 (40.3%)	3 (0.4%)	23 (3.3%)
Philippines	Intra-company management	486 (69.9%)	416 (59.9%)	316 (45.5%)	296 (42.6%)	355 (51.1%)	276 (39.7%)	2 (0.3%)	8 (1.2%)
	Procurement	510 (73.4%)	428 (61.6%)	289 (41.6%)	291 (41.9%)	361 (51.9%)	264 (38.0%)	2 (0.3%)	14 (2.0%)

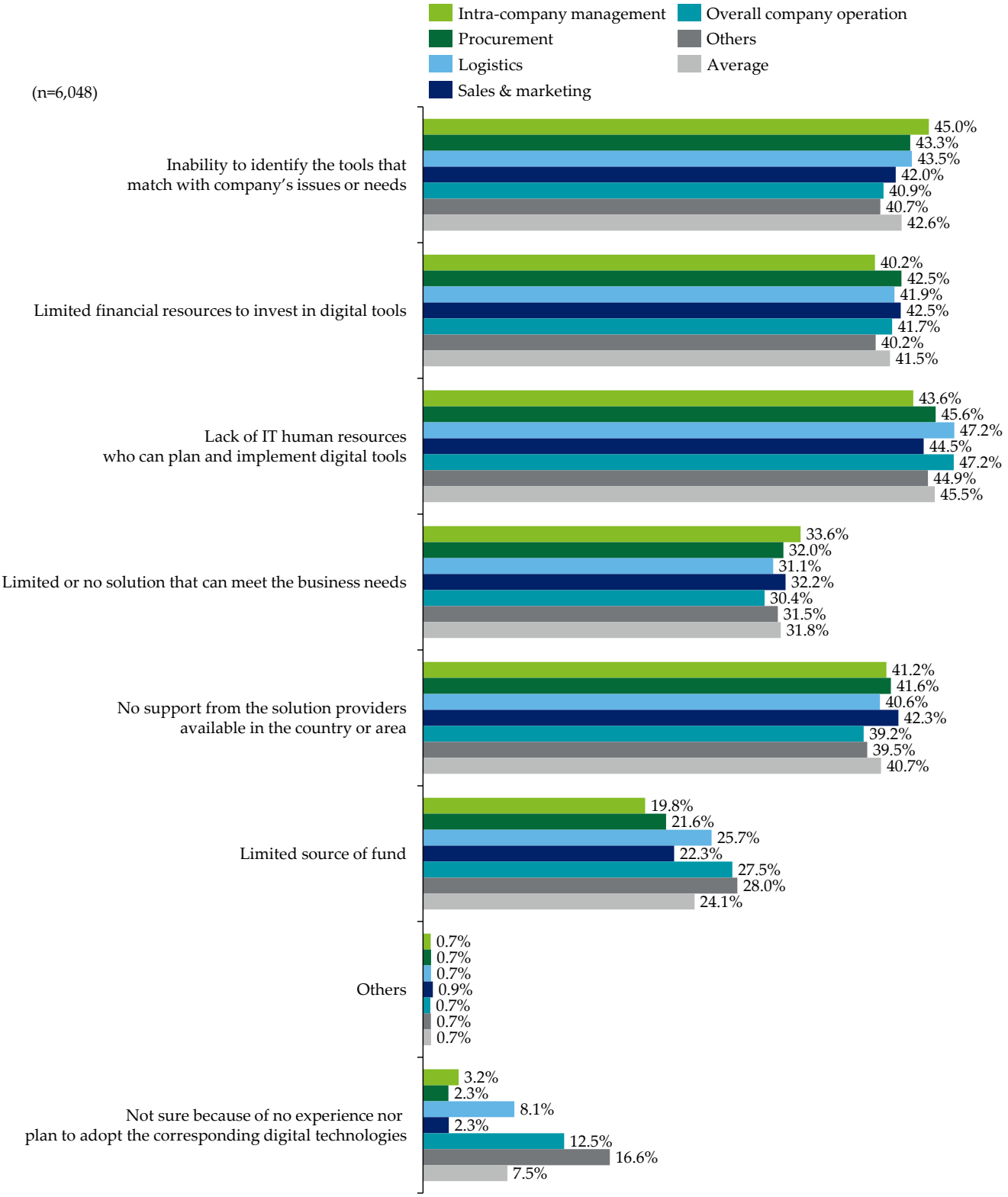
Country	Tool Category	A	B	C	D	E	F	G	H
	Logistics	477 (68.6%)	428 (61.6%)	308 (44.3%)	293 (42.2%)	357 (51.4%)	286 (41.2%)	4 (0.6%)	11 (1.6%)
	Sales & marketing	451 (64.9%)	407 (58.6%)	298 (42.9%)	272 (39.1%)	343 (49.4%)	280 (40.3%)	3 (0.4%)	44 (6.3%)
	Overall company operation	474 (68.2%)	382 (55.0%)	276 (39.7%)	235 (33.8%)	323 (46.5%)	278 (40.0%)	2 (0.3%)	66 (9.5%)
	Others	477 (68.7%)	410 (59.0%)	295 (42.5%)	281 (40.5%)	352 (50.6%)	277 (39.9%)	3 (0.4%)	28 (4.0%)
	Average	134 (20.8%)	136 (21.1%)	202 (31.3%)	208 (32.2%)	89 (13.8%)	132 (20.5%)	1 (0.2%)	100 (15.5%)
Singapore	Intra-company management	113 (17.5%)	230 (35.7%)	263 (40.8%)	178 (27.6%)	61 (9.5%)	157 (24.3%)	2 (0.3%)	6 (0.9%)
	Procurement	259 (40.2%)	232 (36.0%)	91 (14.1%)	209 (32.4%)	91 (14.1%)	128 (19.8%)	1 (0.2%)	38 (5.9%)
	Logistics	123 (19.1%)	192 (29.8%)	317 (49.1%)	179 (27.8%)	117 (18.1%)	150 (23.3%)	1 (0.2%)	5 (0.8%)
	Sales & marketing	94 (14.6%)	197 (30.5%)	245 (38.0%)	219 (34.0%)	82 (12.7%)	123 (19.1%)	1 (0.2%)	64 (9.9%)
	Overall company operation	223 (34.6%)	114 (17.7%)	166 (25.7%)	161 (25.0%)	72 (11.2%)	123 (19.1%)	2 (0.3%)	144 (22.3%)
	Others	158 (24.4%)	184 (28.4%)	214 (33.2%)	192 (29.8%)	85 (13.2%)	136 (21.0%)	1 (0.2%)	60 (9.2%)
	Average	267 (38.1%)	198 (28.2%)	272 (38.8%)	352 (50.2%)	345 (49.2%)	302 (43.1%)	5 (0.7%)	2 (0.3%)
Thailand	Intra-company management	277 (39.5%)	280 (39.9%)	187 (26.7%)	361 (51.5%)	283 (40.4%)	354 (50.5%)	4 (0.6%)	3 (0.4%)
	Procurement	294 (41.9%)	219 (31.2%)	129 (18.4%)	478 (68.2%)	224 (32.0%)	390 (55.6%)	3 (0.4%)	22 (3.1%)
	Logistics	283 (40.4%)	212 (30.2%)	312 (44.5%)	325 (46.4%)	364 (51.9%)	307 (43.8%)	3 (0.4%)	3 (0.4%)
	Sales & marketing	272 (38.8%)	257 (36.7%)	136 (19.4%)	493 (70.3%)	221 (31.5%)	414 (59.1%)	4 (0.6%)	52 (7.4%)

Country	Tool Category	A	B	C	D	E	F	G	H
	Overall company operation	268 (38.2%)	354 (50.5%)	121 (17.3%)	505 (72.0%)	192 (27.4%)	437 (62.3%)	1 (0.1%)	70 (10.0%)
	Others	277 (39.5%)	253 (36.1%)	193 (27.5%)	419 (59.8%)	272 (38.7%)	367 (52.4%)	3 (0.5%)	25 (3.6%)
	Average	207 (24.1%)	130 (15.1%)	461 (53.7%)	324 (37.7%)	298 (34.7%)	224 (26.1%)	2 (0.2%)	5 (0.6%)
Viet Nam	Intra-company management	216 (25.1%)	169 (19.7%)	426 (49.6%)	315 (36.7%)	267 (31.1%)	231 (26.9%)	4 (0.5%)	13 (1.5%)
	Procurement	210 (24.4%)	210 (24.4%)	260 (30.3%)	318 (37.0%)	205 (23.9%)	232 (27.0%)	3 (0.3%)	208 (24.2%)
	Logistics	204 (23.7%)	153 (17.8%)	510 (59.4%)	317 (36.9%)	318 (37.0%)	222 (25.8%)	4 (0.5%)	8 (0.9%)
	Sales & marketing	215 (25.0%)	206 (24.0%)	173 (20.1%)	313 (36.4%)	173 (20.1%)	225 (26.2%)	3 (0.3%)	341 (39.7%)
	Overall company operation	230 (26.8%)	226 (26.3%)	150 (17.5%)	311 (36.2%)	197 (22.9%)	226 (26.3%)	2 (0.2%)	364 (42.4%)
	Others	214 (24.9%)	182 (21.2%)	330 (38.4%)	316 (36.8%)	243 (28.3%)	227 (26.4%)	3 (0.3%)	157 (18.2%)
	Average	128 (53.8%)	118 (49.6%)	61 (25.6%)	80 (33.6%)	79 (33.2%)	119 (50.0%)	0 (0.0%)	0 (0.0%)

A = inability to diagnose the company's issue that may require digital tools, B = not knowing where to find the information or whom to consult with, C = language barriers to search and understand the available information, D = limited IT knowledge due to a lack of internal IT human resources to understand the information, E = limited information in local language, F = no supporting organisations nearby, G = others, H = not sure because of no experience or plan to adopt the corresponding digital technologies, IT = information technology.
Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding row country. (Q27. What are the causes of difficulties in information gathering phase? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Figure 4.17 provides a breakdown of the causes of difficulties in the adoption phase. On average, 45.5% of respondents have difficulties due to the lack of information technology (IT) human resources who can plan and implement digital tools (the highest amongst the answer options). This is followed by the inability to identify tools that match a company's issues or needs (42.6%).

Figure 4.17. Breakdown of the Causes of Difficulties in the Adoption Phase



IT = information technology.

Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total questionnaire respondents. (Q28. What are the causes of difficulties in information adoption phase? [MULTIPLE CHOICE: choose all options that apply])

Source: Authors.

Table 4.35 provides the same data as Figure 4.17 by country. Regarding 'language barriers to search and understand the available information', Malaysia had the highest average score amongst the countries (68.7%).

Table 4.35. Breakdown of the Causes of Difficulties in the Adoption Phase by Country

Country	Tool Category	A	B	C	D	E	F	G	H
Brunei	Intra-company management	127 (53.4%)	86 (36.1%)	61 (25.6%)	104 (43.7%)	108 (45.4%)	6 (2.5%)	0 (0.0%)	0 (0.0%)
	Procurement	119 (50.0%)	89 (37.4%)	58 (24.4%)	91 (38.2%)	122 (51.3%)	14 (5.9%)	0 (0.0%)	2 (0.8%)
	Logistics	119 (50.0%)	77 (32.4%)	94 (39.5%)	93 (39.1%)	96 (40.3%)	48 (20.2%)	0 (0.0%)	51 (21.4%)
	Sales & marketing	116 (48.7%)	87 (36.6%)	51 (21.4%)	96 (40.3%)	123 (51.7%)	7 (2.9%)	0 (0.0%)	1 (0.4%)
	Overall company operation	118 (49.6%)	67 (28.2%)	88 (37.0%)	86 (36.1%)	84 (35.3%)	50 (21.0%)	0 (0.0%)	67 (28.2%)
	Others	114 (47.9%)	81 (34.0%)	87 (36.6%)	115 (48.3%)	83 (34.9%)	50 (21.0%)	0 (0.0%)	65 (27.3%)
	Average	119 (49.9%)	81 (34.1%)	73 (30.7%)	98 (41.0%)	103 (43.1%)	29 (12.3%)	0 (0.0%)	31 (13.0%)
Cambodia	Intra-company management	480 (84.7%)	363 (64.0%)	211 (37.2%)	205 (36.2%)	353 (62.3%)	202 (35.6%)	1 (0.2%)	3 (0.5%)
	Procurement	464 (81.8%)	385 (67.9%)	251 (44.3%)	230 (40.6%)	353 (62.3%)	221 (39.0%)	0 (0.0%)	3 (0.5%)
	Logistics	452 (79.7%)	379 (66.8%)	270 (47.6%)	232 (40.9%)	352 (62.1%)	238 (42.0%)	0 (0.0%)	4 (0.7%)
	Sales & marketing	456 (80.4%)	401 (70.7%)	245 (43.2%)	231 (40.7%)	357 (63.0%)	249 (43.9%)	0 (0.0%)	2 (0.4%)

Country	Tool Category	A	B	C	D	E	F	G	H
	Overall company operation	449 (79.2 %)	385 (67.9 %)	260 (45.9 %)	226 (39.9 %)	362 (63.8 %)	249 (43.9 %)	0 (0.0%)	2 (0.4%)
	Others	449 (79.2 %)	384 (67.7 %)	270 (47.6 %)	221 (39.0 %)	349 (61.6 %)	241 (42.5 %)	0 (0.0%)	10 (1.8%)
	Average	458 (80.8 %)	383 (67.5 %)	251 (44.3 %)	224 (39.5 %)	354 (62.5 %)	233 (41.2 %)	0 (0.0%)	4 (0.7%)
Indonesia	Intra-company management	378 (42.3 %)	398 (44.6 %)	321 (35.9 %)	329 (36.8 %)	291 (32.6 %)	221 (24.7 %)	22 (2.5%)	31 (3.5%)
	Procurement	367 (41.1 %)	401 (44.9 %)	311 (34.8 %)	304 (34.0 %)	281 (31.5 %)	224 (25.1 %)	20 (2.2%)	45 (5.0%)
	Logistics	373 (41.8 %)	382 (42.8 %)	340 (38.1 %)	320 (35.8 %)	274 (30.7 %)	209 (23.4 %)	22 (2.5%)	40 (4.5%)
	Sales & marketing	354 (39.6 %)	382 (42.8 %)	338 (37.8 %)	286 (32.0 %)	295 (33.0 %)	233 (26.1 %)	24 (2.7%)	43 (4.8%)
	Overall company operation	347 (38.9 %)	398 (44.6 %)	337 (37.7 %)	293 (32.8 %)	288 (32.3 %)	233 (26.1 %)	25 (2.8%)	45 (5.0%)
	Others	352 (39.4 %)	407 (45.6 %)	330 (37.0 %)	281 (31.5 %)	298 (33.4 %)	227 (25.4 %)	27 (3.0%)	59 (6.6%)
	Average	362 (40.5 %)	395 (44.2 %)	330 (36.9 %)	302 (33.8 %)	288 (32.2 %)	225 (25.1 %)	23 (2.6%)	44 (4.9%)
Lao PDR	Intra-company management	54 (33.8 %)	75 (46.9 %)	67 (41.9 %)	37 (23.1 %)	72 (45.0 %)	22 (13.8 %)	1 (0.6%)	5 (3.1%)
	Procurement	37 (23.1 %)	95 (59.4 %)	69 (43.1 %)	30 (18.8 %)	64 (40.0 %)	20 (12.5 %)	2 (1.3%)	12 (7.5%)
	Logistics	48 (30.0 %)	56 (35.0 %)	69 (43.1 %)	24 (15.0 %)	53 (33.1 %)	31 (19.4 %)	1 (0.6%)	50 (31.3 %)

Country	Tool Category	A	B	C	D	E	F	G	H
	Sales & marketing	46 (28.8 %)	80 (50.0 %)	68 (42.5 %)	28 (17.5 %)	78 (48.8 %)	31 (19.4 %)	1 (0.6%)	10 (6.3%)
	Overall company operation	46 (28.8 %)	43 (26.9 %)	63 (39.4 %)	32 (20.0 %)	49 (30.6 %)	31 (19.4 %)	1 (0.6%)	65 (40.6 %)
	Others	38 (23.8 %)	51 (31.9 %)	51 (31.9 %)	43 (26.9 %)	45 (28.1 %)	36 (22.5 %)	1 (0.6%)	74 (46.3 %)
	Average	45 (28.0 %)	67 (41.7 %)	65 (40.3 %)	32 (20.2 %)	60 (37.6 %)	29 (17.8 %)	1 (0.7%)	36 (22.5 %)
Malaysia	Intra-company management	384 (41.3 %)	170 (18.3 %)	643 (69.1 %)	301 (32.4 %)	517 (55.6 %)	130 (14.0 %)	0 (0.0%)	5 (0.5%)
	Procurement	364 (39.1 %)	179 (19.2 %)	635 (68.3 %)	280 (30.1 %)	518 (55.7 %)	139 (14.9 %)	1 (0.1%)	6 (0.6%)
	Logistics	361 (38.8 %)	162 (17.4 %)	639 (68.7 %)	274 (29.5 %)	540 (58.1 %)	144 (15.5 %)	3 (0.3%)	11 (1.2%)
	Sales & marketing	311 (33.4 %)	167 (18.0 %)	625 (67.2 %)	293 (31.5 %)	511 (54.9 %)	102 (11.0 %)	0 (0.0%)	11 (1.2%)
	Overall company operation	357 (38.4 %)	173 (18.6 %)	662 (71.2 %)	301 (32.4 %)	526 (56.6 %)	176 (18.9 %)	1 (0.1%)	11 (1.2%)
	Others	358 (38.5 %)	193 (20.8 %)	628 (67.5 %)	310 (33.3 %)	526 (56.6 %)	176 (18.9 %)	2 (0.2%)	25 (2.7%)
	Average	356 (38.3 %)	174 (18.7 %)	639 (68.7 %)	293 (31.5 %)	523 (56.2 %)	145 (15.5 %)	1 (0.1%)	12 (1.2%)
Myanmar	Intra-company management	202 (56.1 %)	168 (46.7 %)	169 (46.9 %)	104 (28.9 %)	102 (28.3 %)	93 (25.8 %)	3 (0.8%)	14 (3.9%)
	Procurement	161 (44.7 %)	175 (48.6 %)	167 (46.4 %)	89 (24.7 %)	109 (30.3 %)	101 (28.1 %)	4 (1.1%)	28 (7.8%)

Country	Tool Category	A	B	C	D	E	F	G	H
	Logistics	172 (47.8 %)	152 (42.2 %)	165 (45.8 %)	90 (25.0 %)	110 (30.6 %)	105 (29.2 %)	7 (1.9%)	43 (11.9 %)
	Sales & marketing	183 (50.8 %)	147 (40.8 %)	164 (45.6 %)	91 (25.3 %)	109 (30.3 %)	113 (31.4 %)	4 (1.1%)	29 (8.1%)
	Overall company operation	151 (41.9 %)	157 (43.6 %)	166 (46.1 %)	84 (23.3 %)	104 (28.9 %)	113 (31.4 %)	4 (1.1%)	54 (15.0 %)
	Others	160 (44.4 %)	144 (40.0 %)	143 (39.7 %)	91 (25.3 %)	113 (31.4 %)	106 (29.4 %)	7 (1.9%)	72 (20.0 %)
	Average	172 (47.6 %)	157 (43.7 %)	162 (45.1 %)	92 (25.4 %)	108 (30.0 %)	105 (29.2 %)	5 (1.3%)	40 (11.1 %)
Philippines	Intra-company management	488 (70.2 %)	403 (58.0 %)	273 (39.3 %)	359 (51.7 %)	340 (48.9 %)	212 (30.5 %)	2 (0.3%)	21 (3.0%)
	Procurement	523 (75.3 %)	414 (59.6 %)	303 (43.6 %)	351 (50.5 %)	332 (47.8 %)	216 (31.1 %)	2 (0.3%)	6 (0.9%)
	Logistics	498 (71.7 %)	436 (62.7 %)	279 (40.1 %)	348 (50.1 %)	336 (48.3 %)	228 (32.8 %)	3 (0.4%)	13 (1.9%)
	Sales & marketing	507 (72.9 %)	402 (57.8 %)	289 (41.6 %)	365 (52.5 %)	346 (49.8 %)	223 (32.1 %)	5 (0.7%)	8 (1.2%)
	Overall company operation	457 (65.8 %)	428 (61.6 %)	267 (38.4 %)	347 (49.9 %)	353 (50.8 %)	209 (30.1 %)	3 (0.4%)	41 (5.9%)
	Others	459 (66.0 %)	401 (57.7 %)	235 (33.8 %)	282 (40.6 %)	346 (49.8 %)	230 (33.1 %)	2 (0.3%)	72 (10.4 %)
	Average	489 (70.3 %)	414 (59.6 %)	274 (39.5 %)	342 (49.2 %)	342 (49.2 %)	220 (31.6 %)	3 (0.4%)	27 (3.9%)
Singapore	Intra-company management	149 (23.1 %)	209 (32.4 %)	239 (37.1 %)	134 (20.8 %)	138 (21.4 %)	66 (10.2 %)	0 (0.0%)	102 (15.8 %)

Country	Tool Category	A	B	C	D	E	F	G	H
	Procurement	143 (22.2 %)	225 (34.9 %)	302 (46.8 %)	115 (17.8 %)	164 (25.4 %)	62 (9.6%)	1 (0.2%)	3 (0.5%)
	Logistics	155 (24.0 %)	294 (45.6 %)	241 (37.4 %)	93 (14.4 %)	175 (27.1 %)	85 (13.2 %)	1 (0.2%)	41 (6.4%)
	Sales & marketing	141 (21.9 %)	257 (39.8 %)	301 (46.7 %)	101 (15.7 %)	160 (24.8 %)	54 (8.4%)	1 (0.2%)	6 (0.9%)
	Overall company operation	136 (21.1 %)	308 (47.8 %)	260 (40.3 %)	86 (13.3 %)	117 (18.1 %)	98 (15.2 %)	1 (0.2%)	66 (10.2 %)
	Others	117 (18.1 %)	201 (31.2 %)	275 (42.6 %)	89 (13.8 %)	135 (20.9 %)	97 (15.0 %)	1 (0.2%)	145 (22.5 %)
	Average	140 (21.7 %)	249 (38.6 %)	270 (41.8 %)	103 (16.0 %)	148 (23.0 %)	77 (11.9 %)	1 (0.1%)	61 (9.4%)
Thailand	Intra-company management	267 (38.1 %)	121 (17.3 %)	332 (47.4 %)	261 (37.2 %)	241 (34.4 %)	85 (12.1 %)	12 (1.7%)	4 (0.6%)
	Procurement	265 (37.8 %)	152 (21.7 %)	340 (48.5 %)	272 (38.8 %)	244 (34.8 %)	111 (15.8 %)	12 (1.7%)	9 (1.3%)
	Logistics	265 (37.8 %)	241 (34.4 %)	451 (64.3 %)	259 (36.9 %)	252 (35.9 %)	244 (34.8 %)	4 (0.6%)	25 (3.6%)
	Sales & marketing	250 (35.7 %)	168 (24.0 %)	298 (42.5 %)	261 (37.2 %)	244 (34.8 %)	142 (20.3 %)	15 (2.1%)	10 (1.4%)
	Overall company operation	242 (34.5 %)	286 (40.8 %)	443 (63.2 %)	258 (36.8 %)	287 (40.9 %)	263 (37.5 %)	3 (0.4%)	56 (8.0%)
	Others	231 (33.0 %)	297 (42.4 %)	436 (62.2 %)	319 (45.5 %)	291 (41.5 %)	290 (41.4 %)	1 (0.1%)	83 (11.8 %)
	Average	253 (36.1 %)	211 (30.1 %)	383 (54.7 %)	272 (38.8 %)	260 (37.1 %)	189 (27.0 %)	8 (1.1%)	31 (4.4%)

Country	Tool Category	A	B	C	D	E	F	G	H
Viet Nam	Intra-company management	191 (22.2%)	437 (50.9%)	320 (37.3%)	196 (22.8%)	330 (38.4%)	158 (18.4%)	1 (0.1%)	7 (0.8%)
	Procurement	177 (20.6%)	458 (53.3%)	321 (37.4%)	176 (20.5%)	329 (38.3%)	199 (23.2%)	2 (0.2%)	23 (2.7%)
	Logistics	186 (21.7%)	356 (41.4%)	309 (36.0%)	150 (17.5%)	269 (31.3%)	220 (25.6%)	3 (0.3%)	214 (24.9%)
	Sales & marketing	178 (20.7%)	478 (55.6%)	313 (36.4%)	198 (23.1%)	333 (38.8%)	197 (22.9%)	3 (0.3%)	19 (2.2%)
	Overall company operation	173 (20.1%)	278 (32.4%)	308 (35.9%)	124 (14.4%)	199 (23.2%)	242 (28.2%)	2 (0.2%)	352 (41.0%)
	Others	181 (21.1%)	275 (32.0%)	260 (30.3%)	157 (18.3%)	203 (23.6%)	238 (27.7%)	2 (0.2%)	400 (46.6%)
	Average	181 (21.1%)	380 (44.3%)	305 (35.5%)	167 (19.4%)	277 (32.3%)	209 (24.3%)	2 (0.3%)	169 (19.7%)

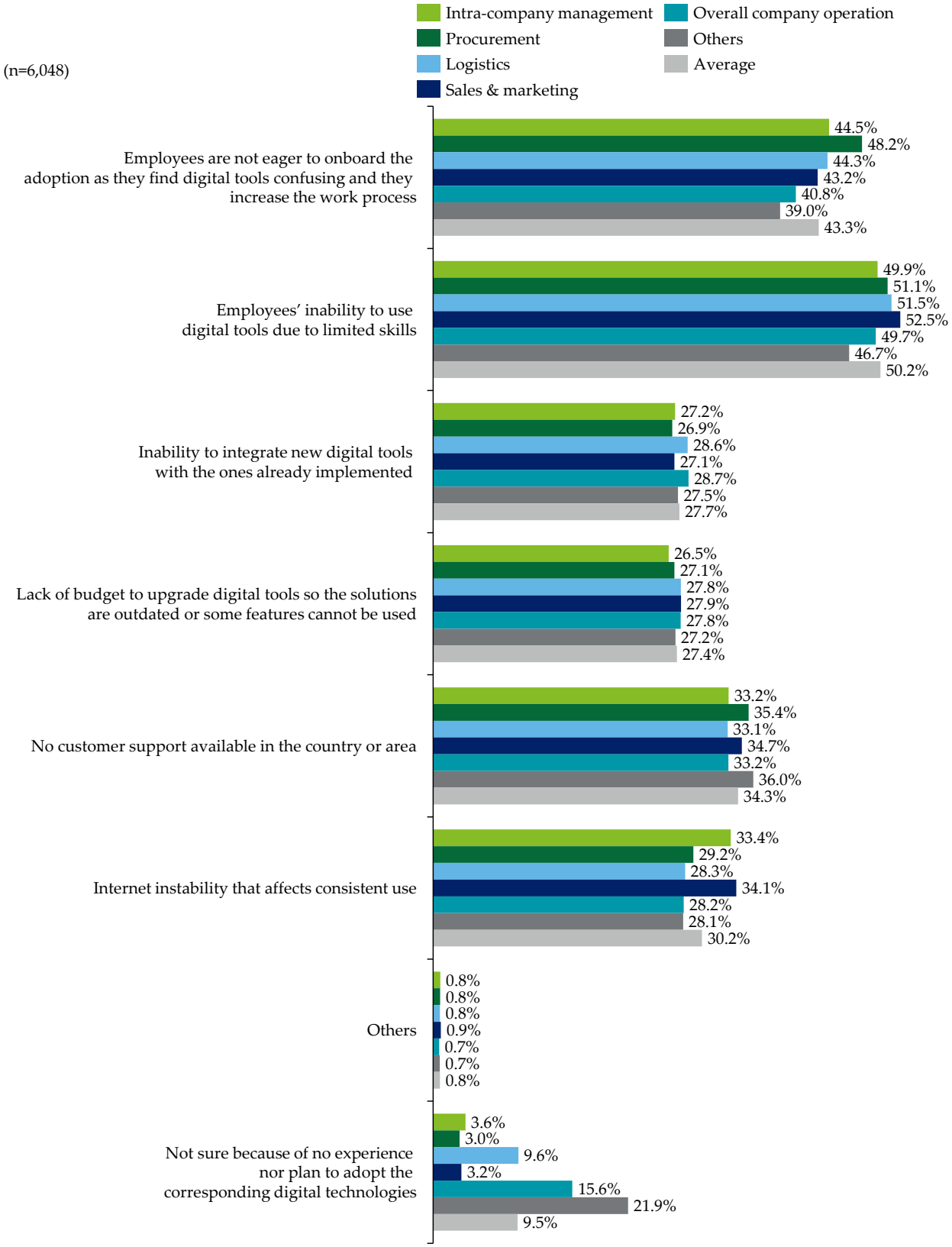
A = inability to identify the tools that match with company's issues or needs, B = limited financial resources to invest in digital tools, C = lack of IT human resources who can plan and implement digital tools, D = limited or no solution that can meet the business needs, E = no support from the solution providers available in the country or area, F = limited source of fund, G = others, H = not sure because of no experience nor plan to adopt the corresponding digital technologies, IT = information technology.

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding row country. (Q28. What are the causes of difficulties in adoption phase? [MULTIPLE CHOICE: choose all options that apply])

Source: Authors.

Figure 4.18 provides a breakdown of the causes of difficulties in the post-adoption phase. On average, 50.2% of respondents have difficulties because of employees' inability to use digital tools due to limited skills (the highest amongst the answer options). This is followed by employees' inability to use digital tools due to limited skills (43.3%).

Figure 4.18. Breakdown of the Causes of Difficulties in the Post-Adoption Phase



Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total questionnaire respondents. (Q29. What are the causes of difficulties in post adoption phase? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 4.36 provides the same data as Figure 4.18 by country. Regarding 'employees' inability to use digital tools due to limited skills', Cambodia had the highest average score amongst the countries (72.1%), followed by Malaysia (65.6%) and the Philippines (62.6%).

Table 4.36. Breakdown of the Causes of Difficulties in the Post-Adoption Phase by Country

Country	Tool category	A	B	C	D	E	F	G	H
Brunei	Intra-company management	110 (46.2 %)	82 (34.5 %)	56 (23.5 %)	54 (22.7 %)	81 (34.0 %)	20 (8.4%)	0 (0.0%)	2 (0.8%)
	Procurement	114 (47.9 %)	84 (35.3 %)	56 (23.5 %)	54 (22.7 %)	88 (37.0 %)	4 (1.7%)	1 (0.4%)	7 (2.9%)
	Logistics	76 (31.9 %)	110 (46.2 %)	59 (24.8 %)	46 (19.3 %)	75 (31.5 %)	1 (0.4%)	0 (0.0%)	64 (26.9 %)
	Sales & marketing	94 (39.5 %)	79 (33.2 %)	57 (23.9 %)	58 (24.4 %)	89 (37.4 %)	40 (16.8 %)	0 (0.0%)	9 (3.8%)
	Overall company operation	71 (29.8 %)	100 (42.0 %)	63 (26.5 %)	33 (13.9 %)	69 (29.0 %)	6 (2.5%)	0 (0.0%)	92 (38.7 %)
	Others	62 (26.1 %)	89 (37.4 %)	65 (27.3 %)	40 (16.8 %)	86 (36.1 %)	9 (3.8%)	0 (0.0%)	105 (44.1 %)
	Average	88 (46.2 %)	91 (34.5 %)	59 (23.5 %)	48 (22.7 %)	81 (34.0 %)	13 (8.4%)	0 (0.0%)	47 (0.8%)
Cambodia	Intra-company management	445 (78.5 %)	409 (72.1 %)	258 (45.5 %)	201 (35.4 %)	313 (55.2 %)	186 (32.8 %)	0 (0.0%)	1 (0.2%)
	Procurement	462 (81.5 %)	433 (76.4 %)	219 (38.6 %)	227 (40.0 %)	333 (58.7 %)	198 (34.9 %)	0 (0.0%)	5 (0.9%)

Country	Tool category	A	B	C	D	E	F	G	H
	Logistics	447 (78.8 %)	439 (77.4 %)	224 (39.5 %)	247 (43.6 %)	331 (58.4 %)	197 (34.7 %)	2 (0.4%)	5 (0.9%)
	Sales & marketing	453 (79.9 %)	429 (75.7 %)	235 (41.4 %)	246 (43.4 %)	333 (58.7 %)	221 (39.0 %)	0 (0.0%)	2 (0.4%)
	Overall company operation	436 (76.9 %)	438 (77.2 %)	218 (38.4 %)	259 (45.7 %)	305 (53.8 %)	195 (34.4 %)	0 (0.0%)	2 (0.4%)
	Others	454 (80.1 %)	438 (77.2 %)	223 (39.3 %)	260 (45.9 %)	333 (58.7 %)	214 (37.7 %)	0 (0.0%)	11 (1.9%)
	Average	450 (78.5 %)	431 (72.1 %)	230 (45.5 %)	240 (35.4 %)	325 (55.2 %)	202 (32.8 %)	0 (0.0%)	4 (0.2%)
Indonesia	Intra-company management	318 (35.6 %)	362 (40.5 %)	250 (28.0 %)	232 (26.0 %)	308 (34.5 %)	343 (38.4 %)	22 (2.5%)	36 (4.0%)
	Procurement	324 (36.3 %)	367 (41.1 %)	243 (27.2 %)	213 (23.9 %)	315 (35.3 %)	335 (37.5 %)	22 (2.5%)	48 (5.4%)
	Logistics	312 (34.9 %)	357 (40.0 %)	257 (28.8 %)	226 (25.3 %)	311 (34.8 %)	319 (35.7 %)	24 (2.7%)	47 (5.3%)
	Sales & Marketing	309 (34.6 %)	362 (40.5 %)	253 (28.3 %)	236 (26.4 %)	315 (35.3 %)	315 (35.3 %)	23 (2.6%)	54 (6.0%)
	Overall Company Operation	319 (35.7 %)	354 (39.6 %)	258 (28.9 %)	218 (24.4 %)	327 (36.6 %)	336 (37.6 %)	26 (2.9%)	50 (5.6%)
	Others	313 (35.1 %)	368 (41.2 %)	253 (28.3 %)	240 (26.9 %)	309 (34.6 %)	343 (38.4 %)	29 (3.2%)	58 (6.5%)
	Average	316 (35.6 %)	362 (40.5 %)	252 (28.0 %)	228 (26.0 %)	314 (34.5 %)	332 (38.4 %)	24 (2.5%)	49 (4.0%)

Country	Tool category	A	B	C	D	E	F	G	H
Lao PDR	Intra-company management	47 (29.4%)	63 (39.4%)	35 (21.9%)	49 (30.6%)	56 (35.0%)	33 (20.6%)	1 (0.6%)	5 (3.1%)
	Procurement	49 (30.6%)	68 (42.5%)	36 (22.5%)	55 (34.4%)	60 (37.5%)	19 (11.9%)	1 (0.6%)	11 (6.9%)
	Logistics	45 (28.1%)	63 (39.4%)	34 (21.3%)	36 (22.5%)	44 (27.5%)	12 (7.5%)	1 (0.6%)	54 (33.8%)
	Sales & marketing	54 (33.8%)	76 (47.5%)	21 (13.1%)	54 (33.8%)	63 (39.4%)	30 (18.8%)	1 (0.6%)	11 (6.9%)
	Overall company operation	42 (26.3%)	54 (33.8%)	27 (16.9%)	32 (20.0%)	44 (27.5%)	19 (11.9%)	1 (0.6%)	75 (46.9%)
	Others	43 (26.9%)	46 (28.8%)	28 (17.5%)	24 (15.0%)	34 (21.3%)	16 (10.0%)	1 (0.6%)	88 (55.0%)
	Average	47 (29.4%)	62 (39.4%)	30 (21.9%)	42 (30.6%)	50 (35.0%)	22 (20.6%)	1 (0.6%)	41 (3.1%)
Malaysia	Intra-company management	458 (49.2%)	610 (65.6%)	251 (27.0%)	177 (19.0%)	188 (20.2%)	503 (54.1%)	2 (0.2%)	5 (0.5%)
	Procurement	516 (55.5%)	619 (66.6%)	179 (19.2%)	225 (24.2%)	211 (22.7%)	503 (54.1%)	1 (0.1%)	16 (1.7%)
	Logistics	497 (53.4%)	614 (66.0%)	205 (22.0%)	270 (29.0%)	227 (24.4%)	482 (51.8%)	1 (0.1%)	24 (2.6%)
	Sales & marketing	426 (45.8%)	604 (64.9%)	190 (20.4%)	206 (22.2%)	192 (20.6%)	512 (55.1%)	2 (0.2%)	14 (1.5%)
	Overall company operation	498 (53.5%)	618 (66.5%)	220 (23.7%)	287 (30.9%)	215 (23.1%)	488 (52.5%)	0 (0.0%)	32 (3.4%)

Country	Tool category	A	B	C	D	E	F	G	H
	Others	474 (51.0 %)	623 (67.0 %)	187 (20.1 %)	258 (27.7 %)	258 (27.7 %)	483 (51.9 %)	2 (0.2%)	114 (12.3 %)
	Average	478 (49.2 %)	615 (65.6 %)	205 (27.0 %)	237 (19.0 %)	215 (20.2 %)	495 (54.1 %)	1 (0.2%)	34 (0.5%)
Myanmar	Intra-company management	107 (29.7 %)	215 (59.7 %)	90 (25.0 %)	107 (29.7 %)	69 (19.2 %)	115 (31.9 %)	3 (0.8%)	25 (6.9%)
	Procurement	106 (29.4 %)	200 (55.6 %)	90 (25.0 %)	107 (29.7 %)	87 (24.2 %)	101 (28.1 %)	4 (1.1%)	40 (11.1 %)
	Logistics	92 (25.6 %)	172 (47.8 %)	99 (27.5 %)	109 (30.3 %)	72 (20.0 %)	100 (27.8 %)	7 (1.9%)	70 (19.4 %)
	Sales & marketing	108 (30.0 %)	205 (56.9 %)	96 (26.7 %)	113 (31.4 %)	74 (20.6 %)	116 (32.2 %)	5 (1.4%)	49 (13.6 %)
	Overall company operation	87 (24.2 %)	172 (47.8 %)	89 (24.7 %)	109 (30.3 %)	84 (23.3 %)	103 (28.6 %)	5 (1.4%)	86 (23.9 %)
	Others	86 (23.9 %)	145 (40.3 %)	94 (26.1 %)	96 (26.7 %)	83 (23.1 %)	102 (28.3 %)	6 (1.7%)	115 (31.9 %)
	Average	98 (29.7 %)	185 (59.7 %)	93 (25.0 %)	107 (29.7 %)	78 (19.2 %)	106 (31.9 %)	5 (0.8%)	64 (6.9%)
Philippines	Intra-company management	526 (75.7 %)	435 (62.6 %)	228 (32.8 %)	226 (32.5 %)	346 (49.8 %)	272 (39.1 %)	2 (0.3%)	23 (3.3%)
	Procurement	531 (76.4 %)	450 (64.7 %)	240 (34.5 %)	214 (30.8 %)	362 (52.1 %)	257 (37.0 %)	2 (0.3%)	5 (0.7%)
	Logistics	507 (72.9 %)	445 (64.0 %)	277 (39.9 %)	227 (32.7 %)	329 (47.3 %)	285 (41.0 %)	2 (0.3%)	13 (1.9%)

Country	Tool category	A	B	C	D	E	F	G	H
	Sales & marketing	511 (73.5 %)	453 (65.2 %)	235 (33.8 %)	238 (34.2 %)	329 (47.3 %)	279 (40.1 %)	3 (0.4%)	10 (1.4%)
	Overall company operation	469 (67.5 %)	395 (56.8 %)	270 (38.8 %)	247 (35.5 %)	336 (48.3 %)	272 (39.1 %)	3 (0.4%)	44 (6.3%)
	Others	450 (64.7 %)	371 (53.4 %)	252 (36.3 %)	233 (33.5 %)	331 (47.6 %)	274 (39.4 %)	2 (0.3%)	71 (10.2 %)
	Average	499 (75.7 %)	425 (62.6 %)	250 (32.8 %)	231 (32.5 %)	339 (49.8 %)	273 (39.1 %)	2 (0.3%)	28 (3.3%)
Singapore	Intra-company management	206 (31.9 %)	216 (33.5 %)	167 (25.9 %)	75 (11.6 %)	96 (14.9 %)	125 (19.4 %)	1 (0.2%)	106 (16.4 %)
	Procurement	264 (40.9 %)	231 (35.8 %)	223 (34.6 %)	91 (14.1 %)	104 (16.1 %)	76 (11.8 %)	1 (0.2%)	3 (0.5%)
	Logistics	241 (37.4 %)	247 (38.3 %)	218 (33.8 %)	84 (13.0 %)	86 (13.3 %)	77 (11.9 %)	1 (0.2%)	40 (6.2%)
	Sales & marketing	147 (22.8 %)	331 (51.3 %)	211 (32.7 %)	90 (14.0 %)	115 (17.8 %)	89 (13.8 %)	1 (0.2%)	7 (1.1%)
	Overall company operation	132 (20.5 %)	259 (40.2 %)	269 (41.7 %)	102 (15.8 %)	102 (15.8 %)	55 (8.5%)	1 (0.2%)	68 (10.5 %)
	Others	87 (13.5 %)	164 (25.4 %)	236 (36.6 %)	112 (17.4 %)	162 (25.1 %)	48 (7.4%)	1 (0.2%)	161 (25.0 %)
	Average	180 (31.9 %)	241 (33.5 %)	221 (25.9 %)	92 (11.6 %)	111 (14.9 %)	78 (19.4 %)	1 (0.2%)	64 (16.4 %)
Thailand	Intra-company management	273 (38.9 %)	248 (35.4 %)	138 (19.7 %)	190 (27.1 %)	248 (35.4 %)	196 (28.0 %)	14 (2.0%)	6 (0.9%)

Country	Tool category	A	B	C	D	E	F	G	H
	Procurement	346 (49.4 %)	269 (38.4 %)	148 (21.1 %)	163 (23.3 %)	252 (35.9 %)	103 (14.7 %)	13 (1.9%)	11 (1.6%)
	Logistics	280 (39.9 %)	341 (48.6 %)	138 (19.7 %)	231 (33.0 %)	277 (39.5 %)	76 (10.8 %)	6 (0.9%)	34 (4.9%)
	Sales & marketing	308 (43.9 %)	266 (37.9 %)	141 (20.1 %)	148 (21.1 %)	253 (36.1 %)	228 (32.5 %)	15 (2.1%)	10 (1.4%)
	Overall company operation	255 (36.4 %)	354 (50.5 %)	165 (23.5 %)	244 (34.8 %)	340 (48.5 %)	82 (11.7 %)	3 (0.4%)	80 (11.4 %)
	Others	245 (35.0 %)	364 (51.9 %)	186 (26.5 %)	234 (33.4 %)	389 (55.5 %)	73 (10.4 %)	2 (0.3%)	118 (16.8 %)
	Average	285 (38.9 %)	307 (35.4 %)	153 (19.7 %)	202 (27.1 %)	293 (35.4 %)	126 (28.0 %)	9 (2.0%)	43 (0.9%)
Viet Nam	Intra-company management	201 (23.4 %)	380 (44.2 %)	172 (20.0 %)	290 (33.8 %)	303 (35.3 %)	229 (26.7 %)	4 (0.5%)	11 (1.3%)
	Procurement	202 (23.5 %)	367 (42.7 %)	191 (22.2 %)	291 (33.9 %)	332 (38.6 %)	172 (20.0 %)	3 (0.3%)	34 (4.0%)
	Logistics	182 (21.2 %)	327 (38.1 %)	219 (25.5 %)	207 (24.1 %)	249 (29.0 %)	163 (19.0 %)	3 (0.3%)	229 (26.7 %)
	Sales & marketing	203 (23.6 %)	369 (43.0 %)	201 (23.4 %)	296 (34.5 %)	335 (39.0 %)	230 (26.8 %)	3 (0.3%)	27 (3.1%)
	Overall company operation	156 (18.2 %)	264 (30.7 %)	156 (18.2 %)	151 (17.6 %)	184 (21.4 %)	147 (17.1 %)	3 (0.3%)	417 (48.5 %)
	Others	143 (16.6 %)	218 (25.4 %)	140 (16.3 %)	150 (17.5 %)	190 (22.1 %)	137 (15.9 %)	2 (0.2%)	484 (56.3 %)

Country	Tool category	A	B	C	D	E	F	G	H
	Average	181 (23.4 %)	321 (44.2 %)	180 (20.0 %)	231 (33.8 %)	266 (35.3 %)	180 (26.7 %)	3 (0.5%)	200 (1.3%)

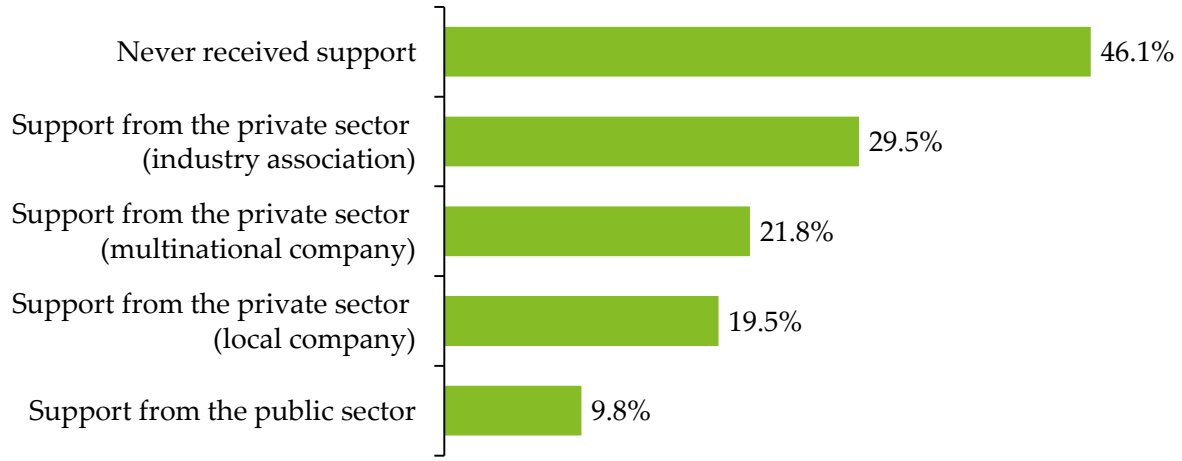
A = employees are not eager to onboard the adoption as they find digital tools confusing and they increase the work process, B = employees' inability to use digital tools due to limited skills, C = inability to integrate new digital tools with the ones already implemented, D = lack of budget to upgrade digital tools so the solutions are outdated or some features cannot be used, E = no customer support available in the country or area, F = internet instability that affects consistent use, G = others, H = not sure because of no experience nor plan to adopt the corresponding digital technologies.
Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding row country. (Q29. What are the causes of difficulties in post adoption phase? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

- Need for Support

Figure 4.19 provides the breakdown of respondents' support for digital tool adoption. Some 46.1% have never received support, followed by support from the private sector through industry associations at 29.5%.

Figure 4.19. Breakdown of Received Support in Digital Tool Adoption

(n=6,048)



Notes: Support from the public sector includes the government or public institutions. Support from the private sector (industry associations) includes private manufacturing industry associations that manufacturing companies can belong to. The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total questionnaire respondents. (Q30. Which support have you ever received in digital tool adoption? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 4.37 provides the same data as Figure 4.19 by country. Malaysia has the highest number of respondents that have never received support (79.5%), while Singapore has the lowest number (22.3%). Regarding support from the private sector through industry associations, Singapore has the highest share (48.8%) while Malaysia has the lowest share (5.6%).

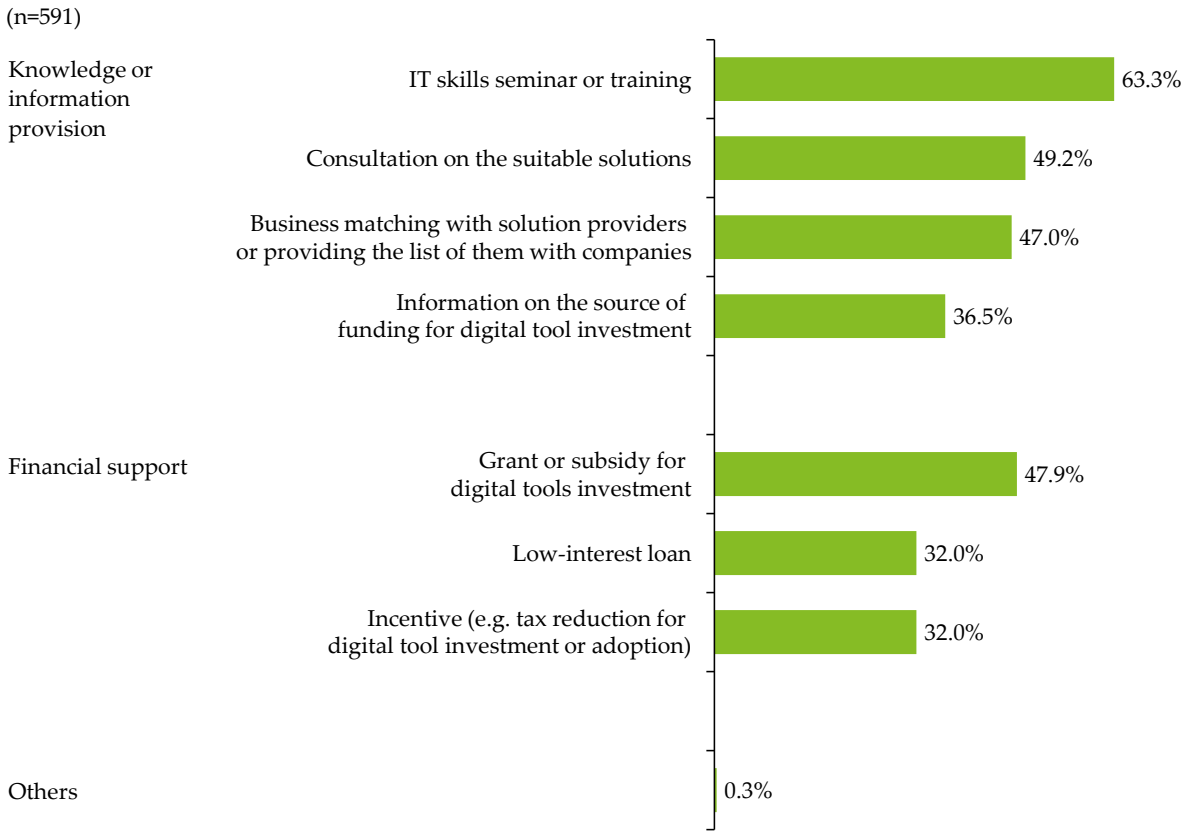
Table 4.37. Breakdown of Support Received for Digital Tool Adoption by Country

Country	Never received support	Support from private sector (industry association)	Support from private sector (multinational company)	Support from private sector (local company)	Support from the public sector
Brunei	126 (52.9%)	75 (31.5%)	82 (34.5%)	42 (17.6%)	8 (3.4%)
Cambodia	146 (25.7%)	187 (33.0%)	25 (4.4%)	280 (49.4%)	33 (5.8%)
Indonesia	413 (46.2%)	277 (31.0%)	178 (19.9%)	141 (15.8%)	222 (24.9%)
Lao PDR	80 (50.0%)	58 (36.3%)	56 (35.0%)	10 (6.3%)	12 (7.5%)
Malaysia	739 (79.5%)	52 (5.6%)	65 (7.0%)	99 (10.6%)	52 (5.6%)
Myanmar	199 (55.3%)	40 (11.1%)	63 (17.5%)	122 (33.9%)	20 (5.6%)
Philippines	127 (18.3%)	300 (43.2%)	142 (20.4%)	280 (40.3%)	70 (10.1%)
Singapore	144 (22.3%)	315 (48.8%)	307 (47.6%)	51 (7.9%)	59 (9.1%)
Thailand	494 (70.5%)	100 (14.3%)	97 (13.8%)	60 (8.6%)	27 (3.9%)
Viet Nam	318 (37.0%)	383 (44.6%)	302 (35.2%)	96 (11.2%)	88 (10.2%)
Total	**2,786 (46.1%)**	**1,787 (29.5%)**	**1,317 (21.8%)**	**1,181 (19.5%)**	**591 (9.8%)**

Notes: Support from the public sector includes the government or public institutions. Support from the private sector (industry associations) includes private manufacturing industry associations that manufacturing companies can belong to. The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding row country. (Q30. Which support have you ever received in digital tool adoption? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Figure 4.20 provides a breakdown of the support received from the public sector. For knowledge or information provision, 63.3% of respondents selected IT skills seminars or training as the most common support received. For financial support, 47.9% of respondents selected grants or subsidies for investment in digital tools.

Figure 4.20. Breakdown of the Support Received from the Public Sector



IT = information technology.

Notes: Support from the public sector includes government or public institution. The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total respondents that selected 'support from the public sector (government or public institution)' in Q30. (Q31. If you selected 'support from the public sector (government or public institution)' in Q30, what support have you received? [MULTIPLE CHOICE: choose all options that apply])

Source: Authors.

Table 4.38 provides the same data as Figure 4.20 by country. Brunei had the highest share (87.5%), citing IT skills seminars or training as the most common support received in knowledge or information provision, while the Philippines had the lowest share (50.7%). Indonesia had the highest share (65.6%), citing grants or subsidies for investment in digital tools as the most common support received in financial support, while Myanmar had the lowest share (26.3%).

Table 4.38. Breakdown of the Received Support from Public Sector by Country

Country	IT Skills Seminar or Training	Consultation on the Suitable Solutions	Business Matching with Solution Providers or Providing the List of Them with Companies	Information on the Source of Funding for Digital Tool Investment	Grant or Subsidy for Digital Tools Investment	Low-Interest Loan	Incentive	Others
Brunei (n=8)	7 (87.5%)	4 (50.0%)	1 (12.5%)	2 (25.0%)	3 (37.5%)	1 (12.5%)	3 (37.5%)	0 (0.0%)
Cambodia (n=33)	23 (69.7%)	21 (63.6%)	19 (57.6%)	15 (45.5%)	19 (57.6%)	9 (27.3%)	20 (60.6%)	0 (0.0%)
Indonesia (n=222)	136 (61.3%)	113 (50.9%)	115 (51.8%)	80 (36.0%)	124 (55.9%)	102 (45.9%)	75 (33.8%)	5 (2.3%)
Lao PDR (n=12)	7 (58.3%)	6 (50.0%)	6 (50.0%)	4 (33.3%)	4 (33.3%)	4 (33.3%)	4 (33.3%)	1 (8.3%)
Malaysia (n=52)	40 (76.9%)	30 (57.7%)	30 (57.7%)	26 (50.0%)	28 (53.8%)	8 (15.4%)	25 (48.1%)	1 (1.9%)
Myanmar (n=20)	12 (60.0%)	9 (45.0%)	3 (15.0%)	10 (50.0%)	5 (25.0%)	8 (40.0%)	2 (10.0%)	2 (10.0%)
Philippines (n=70)	40 (57.1%)	38 (54.3%)	36 (51.4%)	23 (32.9%)	38 (54.3%)	19 (27.1%)	19 (27.1%)	2 (2.9%)
Singapore (n=59)	35 (59.3%)	33 (55.9%)	28 (47.5%)	16 (27.1%)	21 (35.6%)	9 (15.3%)	5 (8.5%)	0 (0.0%)
Thailand (n=27)	19 (70.4%)	14 (51.9%)	10 (37.0%)	8 (29.6%)	13 (48.1%)	6 (22.2%)	4 (14.8%)	0 (0.0%)
Viet Nam (n=88)	55 (62.5%)	23 (26.1%)	30 (34.1%)	32 (36.4%)	28 (31.8%)	23 (26.1%)	32 (36.4%)	0 (0.0%)

Country	IT Skills Seminar or Training	Consultation on the Suitable Solutions	Business Matching with Solution Providers or Providing the List of Them with Companies	Information on the Source of Funding for Digital Tool Investment	Grant or Subsidy for Digital Tools Investment	Low-Interest Loan	Incentive	Others
Total (n=591)	374 (63.3%)	291 (49.2%)	278 (47.0%)	216 (36.5%)	283 (47.9%)	189 (32.0%)	189 (32.0%)	0 (0.0%)

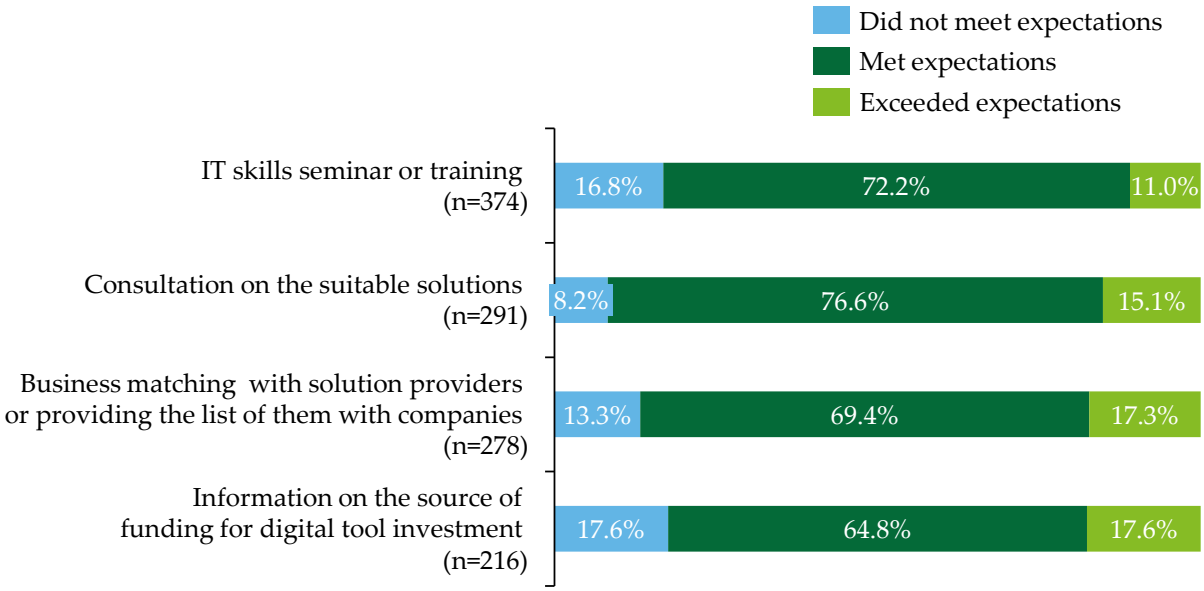
IT = information technology.

Notes: Support from the public sector includes government or public institutions. Incentive includes tax reductions for digital tool investment or adoption. The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding row by country that selected 'support from the public sector (government or public institution)' in Q30. (Q31. If you selected 'support from the public sector (government or public institution)' in Q30, what support have you received? [MULTIPLE CHOICE: choose all options that apply])

Source: Authors.

Figure 4.21 provides a breakdown of the satisfaction level for the support received in knowledge or information provision from the public sector. The support with the highest percentage of 'met expectations and exceeded expectations' is 'consultation on the suitable solutions'.

Figure 4.21. Breakdown of the Satisfaction Level for the Support Received in Knowledge or Information Provision from the Public Sector



IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding bar by the total respondents that selected 'support from the public sector (government or public institution)' in Q30. (Q32. Did the support you received as answered in Q31 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 4.22 provides the same data as Figure 4.21 by country. About 90% of companies in eight countries reported 'consultation on the suitable solutions' meeting expectations, compared with 58% in Myanmar.

Figure 4.22. Breakdown of the Satisfaction Level for the Support Received in Knowledge or Information Provision from the Public Sector by Country

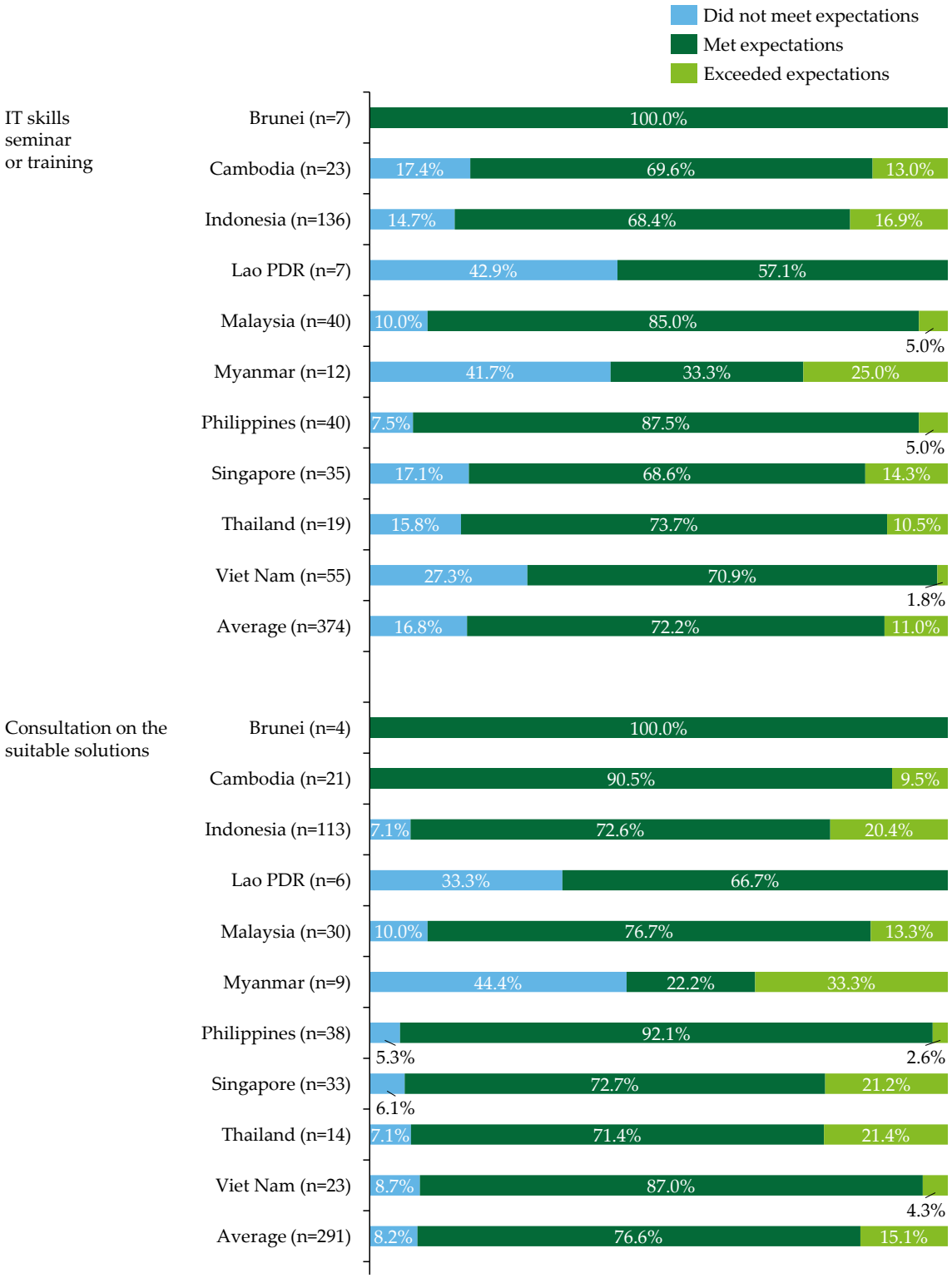
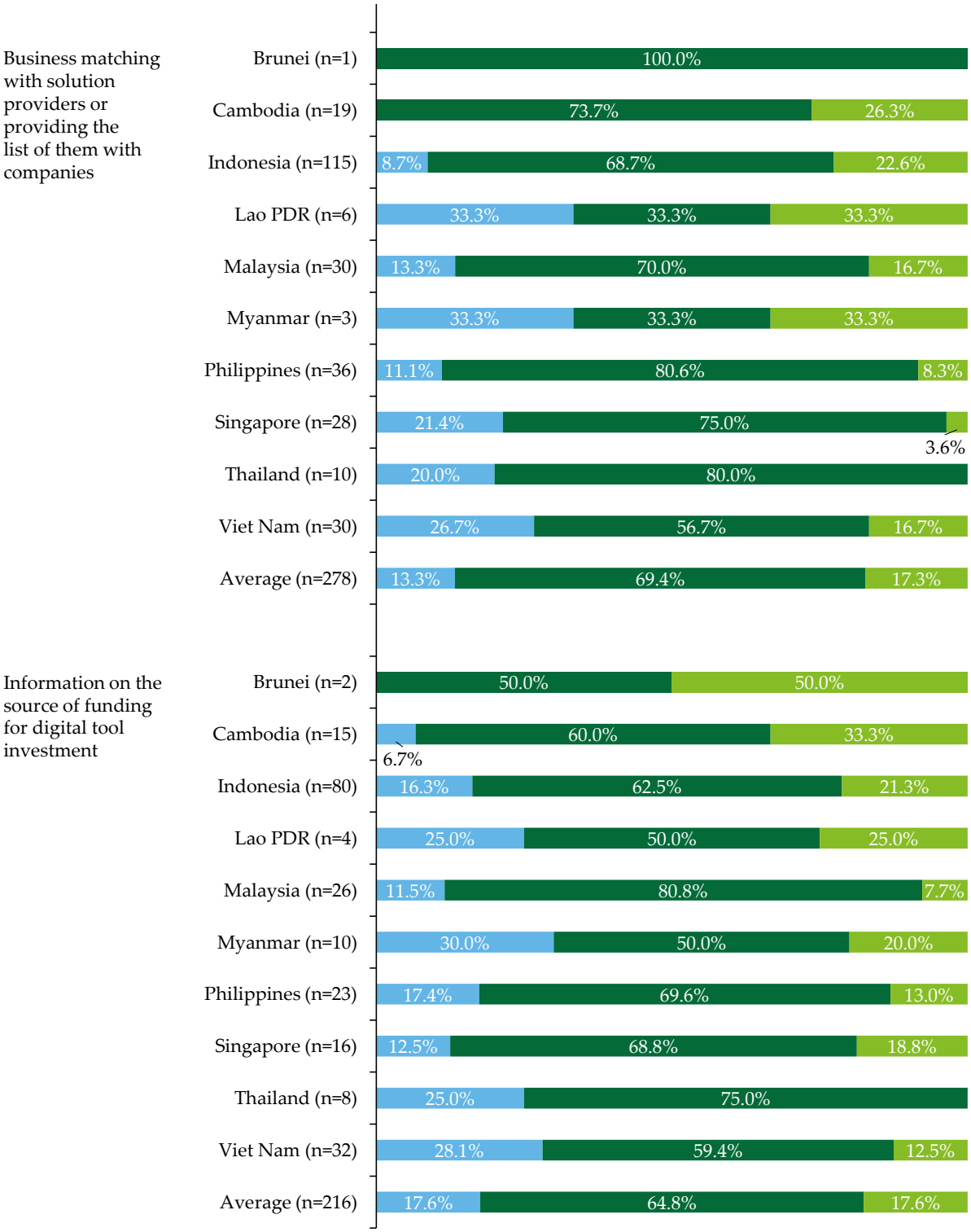


Figure 4.22. *Continued*



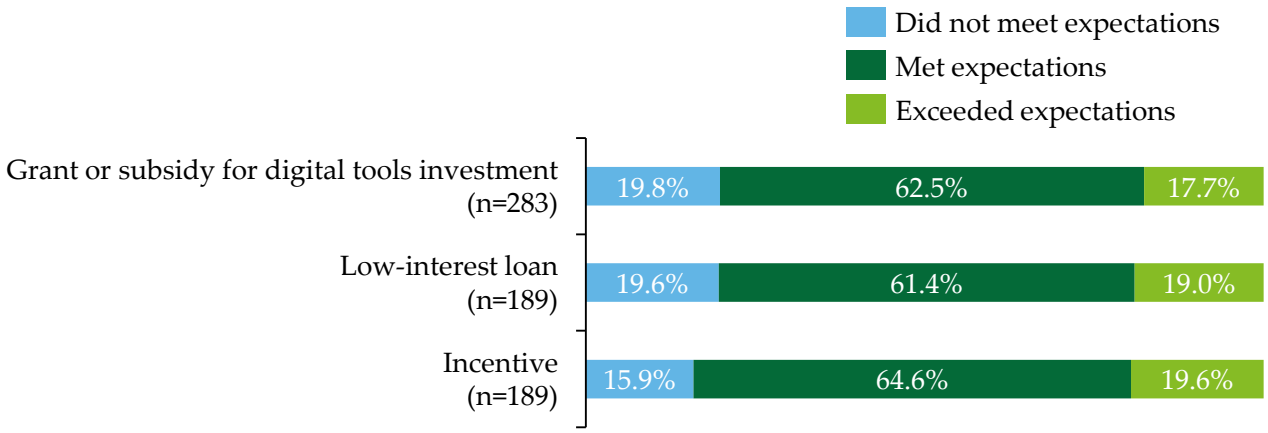
IT = information technology.

Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding option by the total respondents in the corresponding bar country selecting 'support from the public sector (government or public institution)' in Q30. (Q32. Did the support you received as answered in Q31 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option])

Source: Authors.

Figure 4.23 provides a breakdown of the satisfaction level for the support received in terms of financial support from the public sector. The total score of met expectations and exceeded expectations in all answer options achieved around or more than 80%.

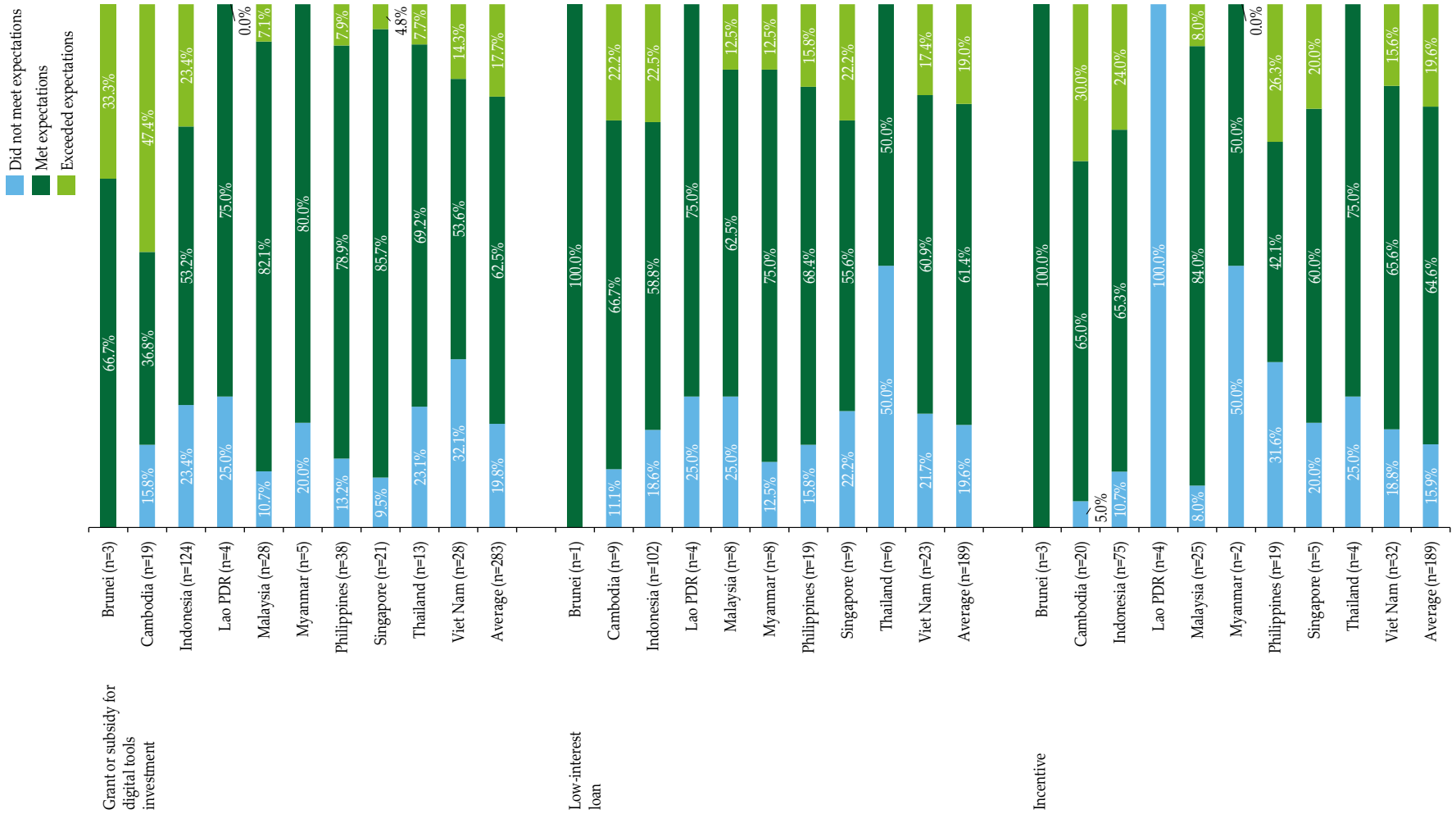
Figure 4.23. Breakdown of the Satisfaction Level for the Support Received in Terms of Public Sector Financial Support



Notes: Incentive includes tax reductions for digital tool investment or adoption. The percentage of the bar is calculated by dividing the total number of responses of the corresponding bar by the total number of respondents that selected 'support from the public sector (government or public institution)' in Q30. (Q32. Did the support you received as answered in Q31 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 4.24 provides the same data as Figure 4.23 by country. More than 70% of respondents in all countries selected met or exceeded expectations in terms of grants or subsidies for investment in digital tools. More than 80% of respondents in all countries, excluding Thailand at 50%, met or exceeded expectations for low-interest loans. More than 70% of respondents in eight countries, except Myanmar and the Lao PDR, met or exceeded expectations for incentives. The limited sample size for some countries should be noted, as shown in Figure 4.24.

Figure 4.24. Breakdown of the Satisfaction Level for the Financial Support Received from the Public Sector by Country

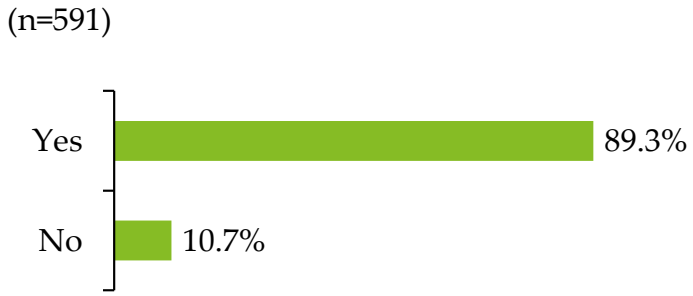


Notes: Incentive includes tax reductions for digital tool investment or adoption. The percentage of the bar is calculated by dividing the total number of responses of the corresponding bar by the total respondents of the corresponding bar country selecting 'support from the public sector (government or public institution)' in Q30. (Q32. Did the support you received as answered in Q31 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option])

Source: Authors.

Figure 4.25 provides a breakdown of the respondents' ability to adopt digital tools as a result of public sector support. Some 89.3% of respondents could adopt the tools based on the support provided.

Figure 4.25. Breakdown of the Respondents' Ability to Adopt Digital Tools After Receiving Public Sector Support



Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total respondents that selected 'support from the public sector (government or public institution)' in Q30. (Q33. Were you able to adopt the tools as a result of the support? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 4.39 shows the same data as Figure 4.25 by country. All the respondents (100%) in Brunei, Singapore, and Thailand reported the ability to adopt digital tools based on the support provided, while Viet Nam had the lowest rate (75.0%).

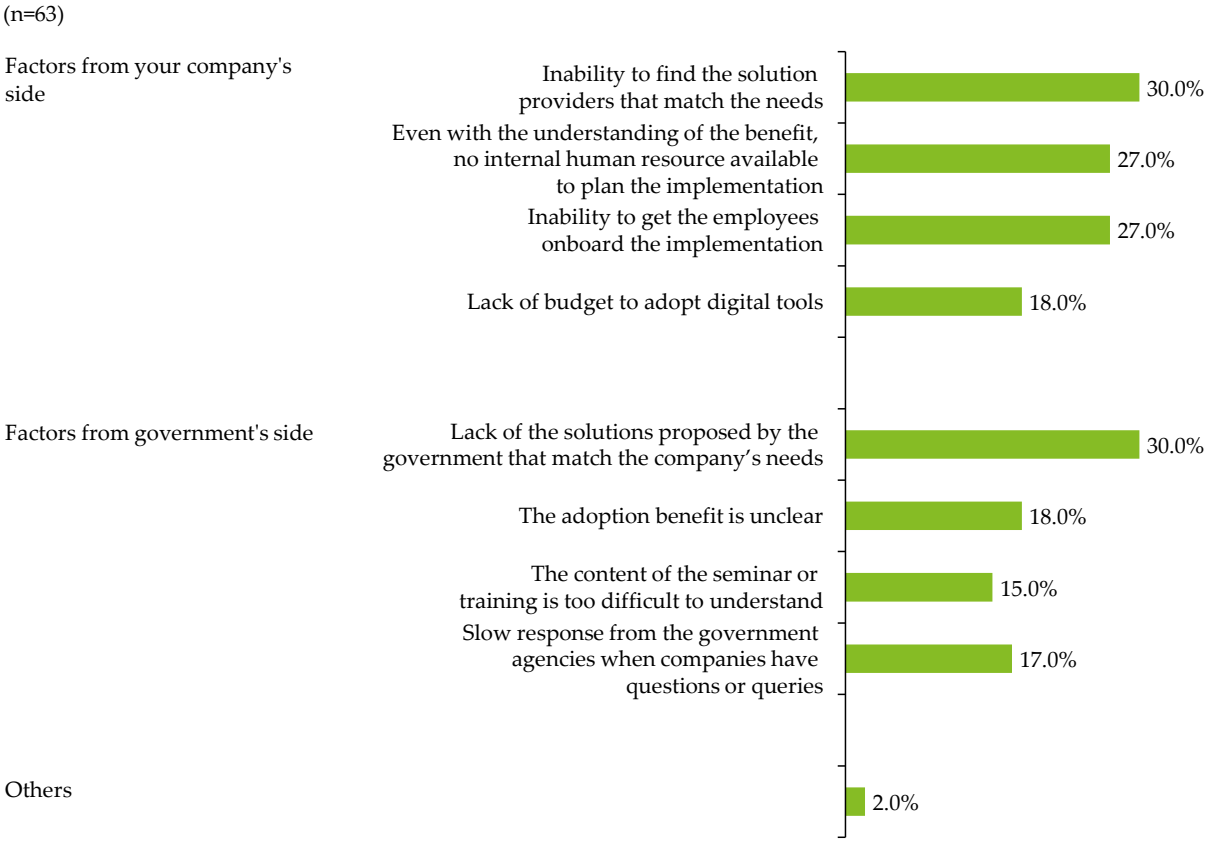
Table 4.39. Breakdown of the Respondents' Ability to Adopt Digital Tools After Receiving Public Sector Support by Country

Country	Yes	No
Brunei (n=8)	8 (100.0%)	0 (0.0%)
Cambodia (n=33)	32 (97.0%)	1 (3.0%)
Indonesia (n=222)	192 (86.5%)	30 (13.5%)
Lao PDR (n=12)	11 (91.7%)	1 (8.3%)
Malaysia (n=52)	49 (94.2%)	3 (5.8%)
Myanmar (n=20)	19 (95.0%)	1 (5.0%)
Philippines (n=70)	65 (92.9%)	5 (7.1%)
Singapore (n=59)	59 (100.0%)	0 (0.0%)
Thailand (n=27)	27 (100.0%)	0 (0.0%)
Viet Nam (n=88)	66 (75.0%)	22 (25.0%)
Total (n=591)	**528 (89.3%)**	**63 (10.7%)**

Notes: The percentage for each row is calculated by dividing the total number of responses of the corresponding row by the total number of respondents of the corresponding row country selecting 'support from the public sector (government or public institution)' in Q30. (Q33. Were you able to adopt the tools as a result of the support? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 4.26 provides a breakdown of the reasons why respondents could not proceed to implementation after receiving public sector support. Based on factors from the company side, 30.0% of respondents selected 'inability to find the solution providers that match the needs'. Based on factors from the government side, 30.0% selected 'lack of the solutions proposed by the government that match the company's needs'.

Figure 4.26. Breakdown of the Reasons Why Respondents Could Not Proceed to Implementation After Receiving Public Sector Support



Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total respondents of the corresponding row selecting 'no' in Q33. (Q34. What do you think are the reasons why you could not proceed to implementation after receiving the support? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 4.40 shows the same data as Figure 4.26 by country. The limited number of samples should be noted. For the response to 'inability to find the solution providers that match the needs', the Lao PDR and Malaysia scored 100%.

Table 4.40. Breakdown of the Reasons Why Respondents Could Not Proceed to Implementation After Receiving Public Sector Support by Country

Country	A	B	C	D	E	F	G	H	I
Brunei (n=0)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Cambodia (n=1)	0 (0.0%)	1 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Indonesia (n=30)	13 (43.3%)	17 (56.7%)	15 (50.0%)	7 (23.3%)	6 (20.0%)	12 (40.0%)	15 (50.0%)	8 (26.7%)	0 (0.0%)
Lao PDR (n=1)	1 (100.0%)	0 (0.0%)	1 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	0 (0.0%)	0 (0.0%)
Malaysia (n=3)	1 (33.3%)	0 (0.0%)	3 (100.0%)	3 (100.0%)	2 (66.7%)	0 (0.0%)	1 (33.3%)	1 (33.3%)	0 (0.0%)
Myanmar (n=1)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	0 (0.0%)
Philippines (n=5)	2 (40.0%)	4 (80.0%)	1 (20.0%)	3 (60.0%)	2 (40.0%)	1 (20.0%)	2 (40.0%)	3 (60.0%)	0 (0.0%)
Singapore (n=0)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Thailand (n=0)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)

Country	A	B	C	D	E	F	G	H	I
Viet Nam (n=22)	10 (45.5%)	5 (22.7%)	10 (45.5%)	5 (22.7%)	7 (31.8%)	2 (9.1%)	11 (50.0%)	4 (18.2%)	0 (0.0%)
Total (n=66)	**27 (42.9%)**	**27 (42.9%)**	**30 (47.6%)**	**18 (28.6%)**	**18 (28.6%)**	**15 (23.8%)**	**30 (47.6%)**	**17 (27.0%)**	**0 (0.0%)**

A = even with the understanding of the benefit, no internal human resource available to plan the implementation; B = inability to get the employees onboard the implementation; C = inability to find the solution providers that match the needs; D = lack of budget to adopt digital tools; E = the adoption benefit is unclear; F = the content of the seminar or training is too difficult to understand; G = lack of the solutions proposed by the government that match the company's needs; H = slow response from the government agencies when companies have questions or queries; I = others.
Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option by the total respondents of the corresponding row country selecting 'no' in Q33. (Q34. What do you think are the reasons why you could not proceed to implementation after receiving the support? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Figure 4.27 provides a breakdown of the support received from the private sector. For knowledge or information provision, 65.9% of respondents selected 'consultation on the suitable solutions' as the most common support received. For financial support, 35.1% of respondents selected 'grant or subsidy for digital tools investment'.

Figure 4.27. Breakdown of Support Received from the Private Sector

IT = information technology.
Notes: Support from the private sector includes industry associations, multinational companies, and local companies. The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total respondents that selected 'yes' in Q33. (Q35. If you selected 'support from private sector' in Q30, what support have you received? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 4.41 provides the same data as Figure 4.27 by country. Regarding 'consultation on the suitable solutions' – the most common support received in knowledge or information provision – Brunei received the highest support rate at 96.3%, while Singapore received the lowest support rate at 46.9%. For grants or subsidies for digital tool investment as the most common support received in financial support, Cambodia received the highest support rate at 64.3%, while Brunei received the lowest support rate at 6.5%.

Table 4.41. Breakdown of Support Received from the Private Sector by Country

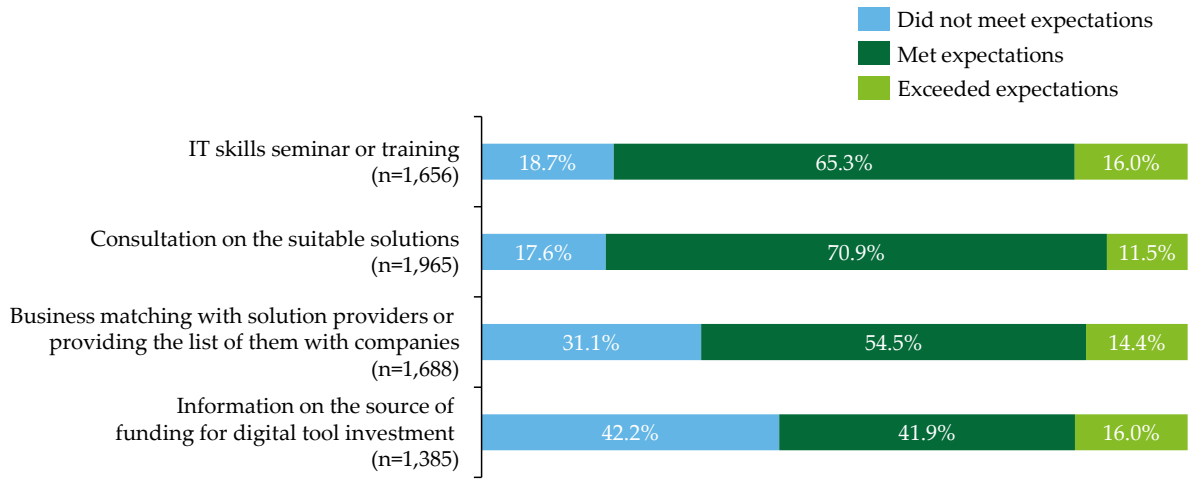
Country	IT skills seminar or training	Consultation on the suitable solutions	Business matching with solution providers or providing the list of them with companies	Information on the source of funding for digital tool investment	Grant or subsidy for digital tools investment	Low-interest loan	Discounts or any relevant financial assistance programme for adopting digital tools	Others
Brunei (n=108)	36 (33.3%)	104 (96.3%)	101 (93.5%)	82 (75.9%)	7 (6.5%)	6 (5.6%)	27 (25.0%)	0 (0.0%)
Cambodia (n=412)	307 (74.5%)	309 (75.0%)	219 (53.2%)	185 (44.9%)	265 (64.3%)	159 (38.6%)	275 (66.7%)	0 (0.0%)
Indonesia (n=408)	230 (56.4%)	193 (47.3%)	196 (48.0%)	156 (38.2%)	197 (48.3%)	185 (45.3%)	138 (33.8%)	11 (2.7%)
Lao PDR (n=73)	19 (26.0%)	61 (83.6%)	59 (80.8%)	52 (71.2%)	10 (13.7%)	6 (8.2%)	10 (13.7%)	0 (0.0%)
Malaysia (n=168)	125 (74.4%)	124 (73.8%)	106 (63.1%)	64 (38.1%)	63 (37.5%)	31 (18.5%)	55 (32.7%)	0 (0.0%)
Myanmar (n=153)	104 (68.0%)	112 (73.2%)	96 (62.7%)	85 (55.6%)	53 (34.6%)	31 (20.3%)	76 (49.7%)	3 (2.0%)
Philippines (n=520)	418 (80.4%)	307 (59.0%)	279 (53.7%)	231 (44.4%)	320 (61.5%)	234 (45.0%)	267 (51.3%)	1 (0.2%)

Country	IT skills seminar or training	Consultation on the suitable solutions	Business matching with solution providers or providing the list of them with companies	Information on the source of funding for digital tool investment	Grant or subsidy for digital tools investment	Low-interest loan	Discounts or any relevant financial assistance programme for adopting digital tools	Others
Singapore (n=458)	202 (44.1%)	215 (46.9%)	156 (34.1%)	78 (17.0%)	42 (9.2%)	85 (18.6%)	33 (7.2%)	0 (0.0%)
Thailand (n=196)	117 (59.7%)	140 (71.4%)	85 (43.4%)	75 (38.3%)	40 (20.4%)	31 15.8%)	27 (13.8%)	0 (0.0%)
Viet Nam (n=485)	98 (20.2%)	400 (82.5%)	391 (80.6%)	377 (77.7%)	48 (9.9%)	42 (8.7%)	60 (12.4%)	1 (0.2%)
Total (n=2,981)	**1,656 (55.6%)**	**1,965 (65.9%)**	**1,688 (56.6%)**	**1,385 (46.5%)**	**1,045 (35.1%)**	**810 (27.2%)**	**968 (32.5%)**	**16 (0.5%)**

Notes: Support from the private sector includes industry associations, multinational companies, and local companies. The percentage of each row is calculated by dividing the total number of responses for each answer option by the total respondents in the corresponding row country selecting 'yes' in Q33. (Q35. If you selected 'support from private sector' in Q30, what support have you received? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Figure 4.28 provides a breakdown of the satisfaction level regarding the support received in knowledge or information provision from the private sector. The type of support with the highest share that met or exceeded expectations is 'consultation on the suitable solutions'. 'Information on the source of funding for digital tool investment' has the lowest share that met or exceeded expectations.

Figure 4.28. Breakdown of the Satisfaction Level for the Support Received in Knowledge or Information Provision from the Private Sector



Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding bar by the total respondents selecting 'support from the private sector' in Q30. (Q36. Did the support you received as answered in Q35 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 4.29 provides the same data as Figure 4.28 by country. Around 70% of respondents in all countries reported that 'consultation on the suitable solutions' met expectations, excluding the Lao PDR at around 50%.

Figure 4.29. Breakdown of the Satisfaction Level for the Support Received in Knowledge or Information Provision from the Private Sector by Country

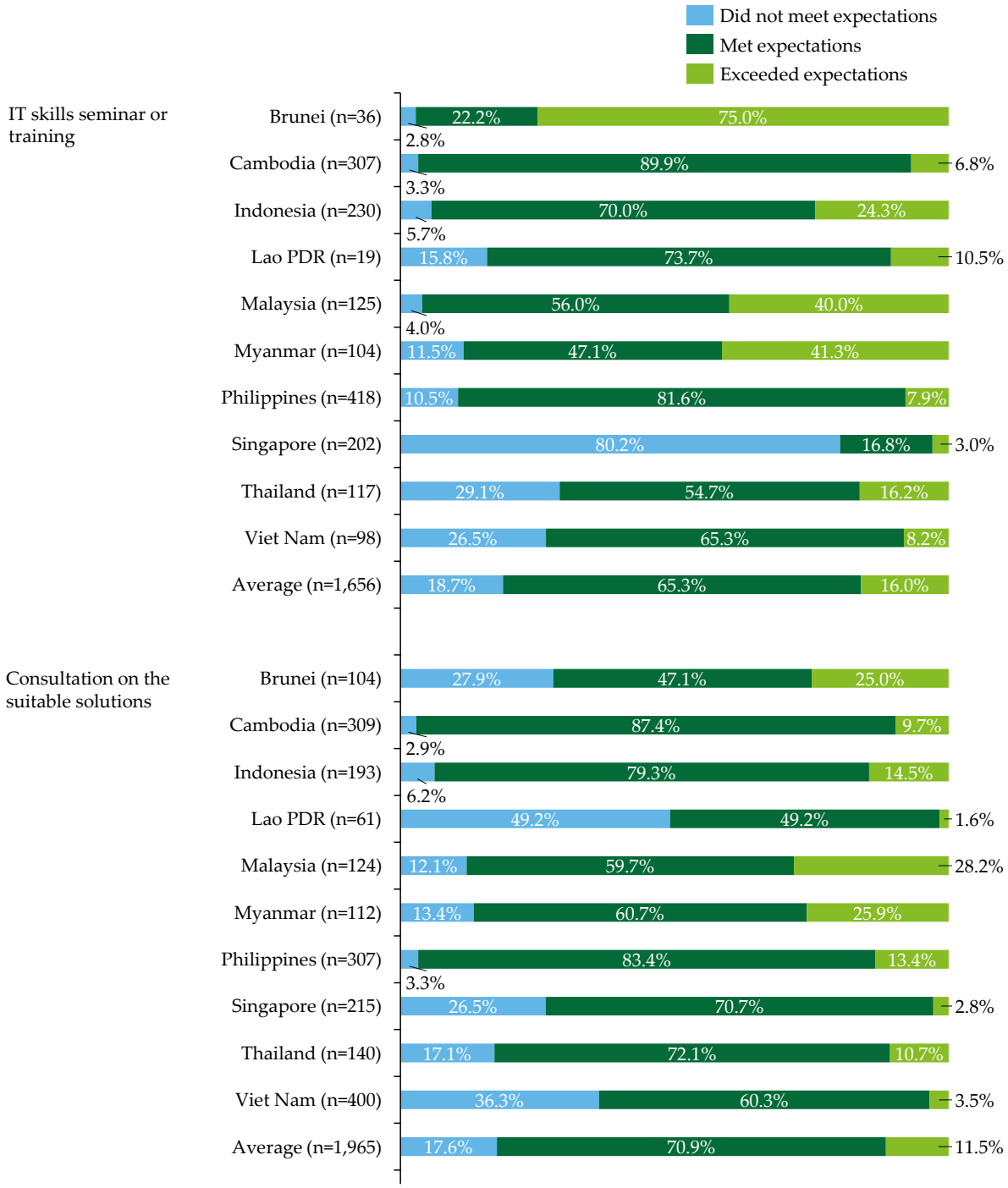
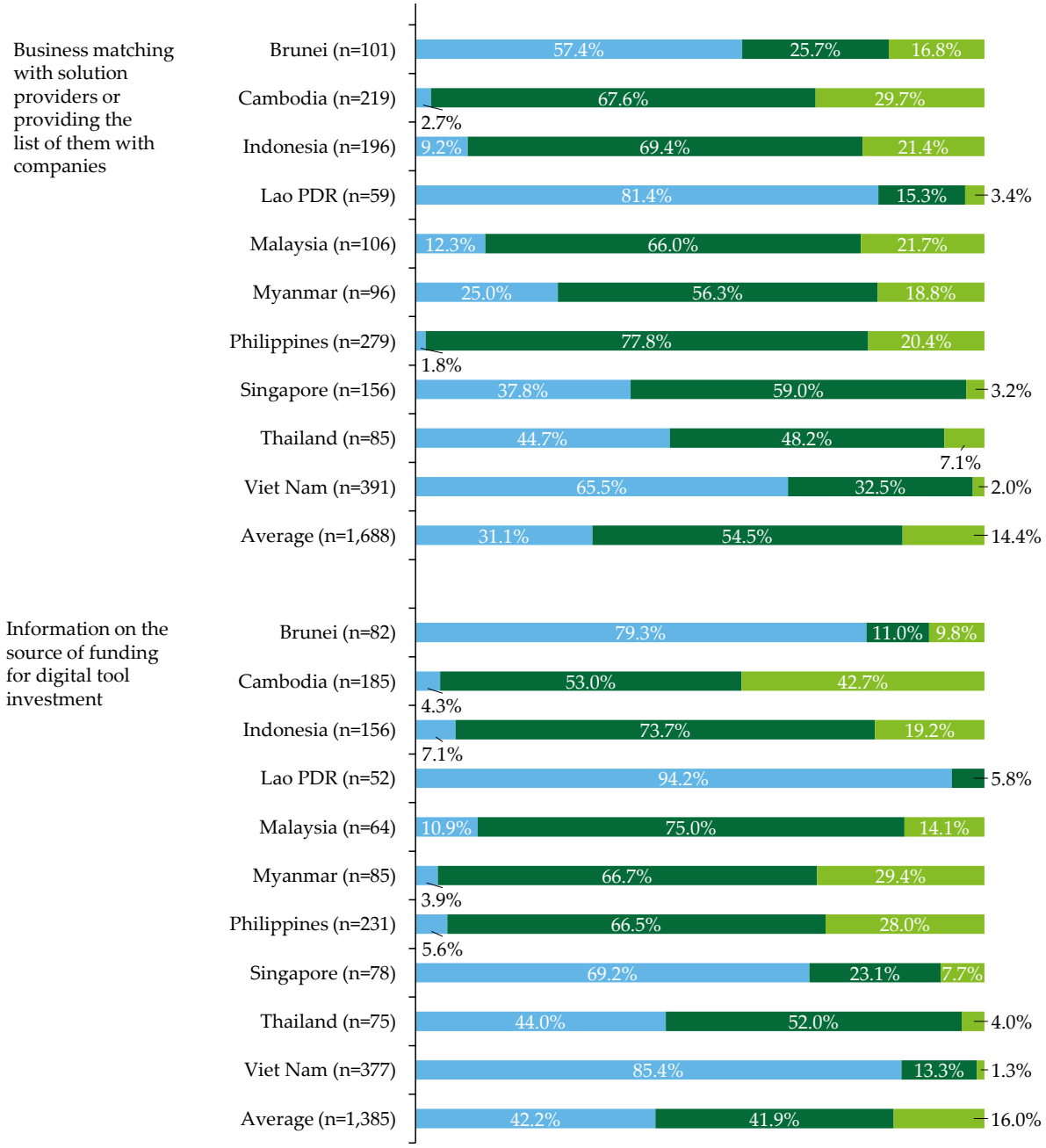


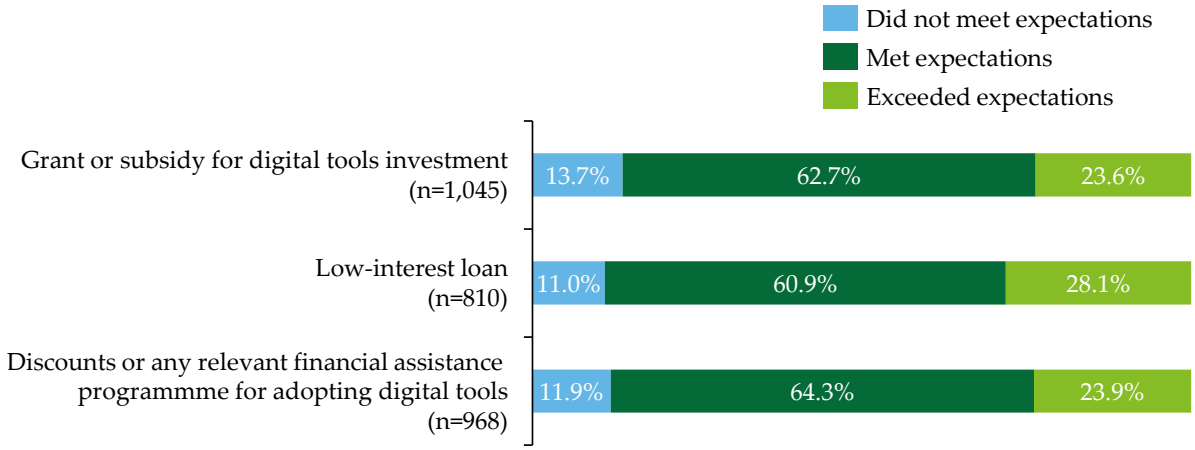
Figure 4.29. *Continued*



IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total respondents in the corresponding bar country selecting 'support from the private sector' in Q30. (Q36. Did the support you received as answered in Q35 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 4.30 provides a breakdown of the satisfaction level for the financial support received from the private sector. In terms of the total score of met and exceeded expectations, all answer options achieved around or more than 85%.

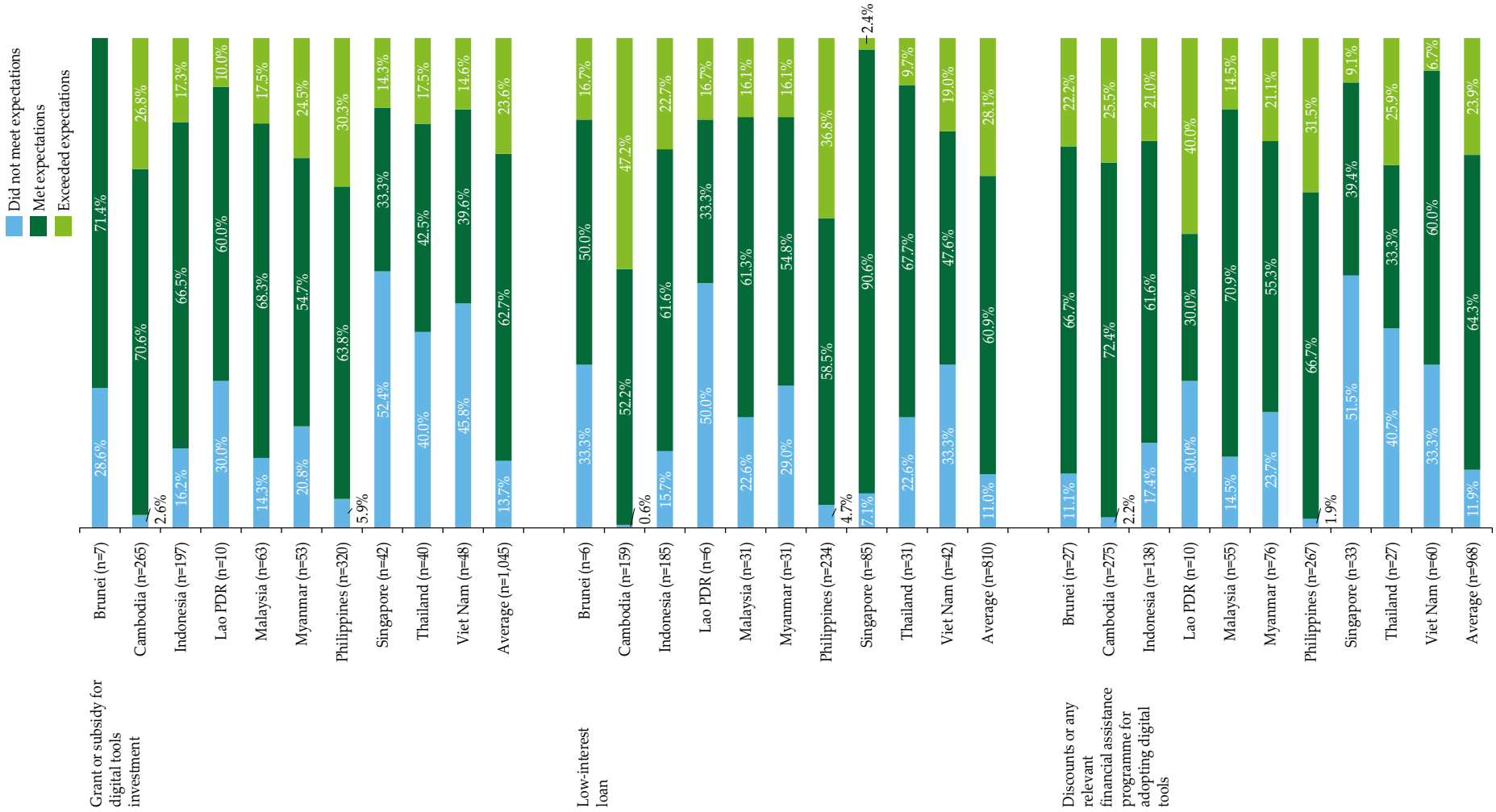
Figure 4.30. Breakdown of the Satisfaction Level for the Financial Support Received from the Private Sector



Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding bar by the total respondents that selected 'support from the private sector' in Q30. (Q36. Did the support you received as answered in Q35 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 4.31 provides the same data as Figure 4.30 by country. Seven countries reported that more than 70% met or exceeded expectations in terms of grants or subsidies for digital tool investment, apart from Singapore, Thailand, and Viet Nam. For low-interest loans, nine countries reached around or more than 70%, excluding the Lao PDR (50%). Seven countries achieved around or more than 70% for incentives, besides Singapore and Thailand. The limited sample size for some countries should be noted, as shown in the figure.

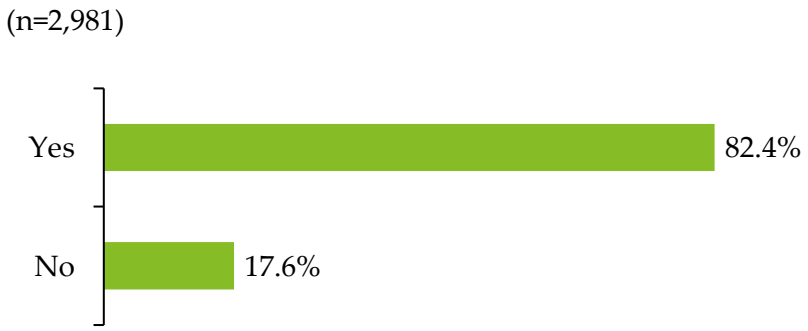
Figure 4.31. Breakdown of the Expectation Level for the Financial Support Received from the Private Sector by Country



Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total respondents in the corresponding row country selecting 'support from the private sector' in Q30. (Q36. Did the support you received as answered in Q35 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 4.32 provides a breakdown of the respondents' ability to adopt digital tools as a result of private sector support. Some 82.4% of respondents could adopt the tools based on the provided support.

Figure 4.32. Breakdown of the Respondents' Ability to Adopt Digital Tools After Receiving Private Sector Support



Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding bar by the total respondents selecting 'support from the private sector' in Q30. (Q37. Were you able to adopt the tools as a result of the support? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 4.42 shows the same data as Figure 4.32 by country. More than 90% of respondents in Cambodia, the Philippines, and Malaysia reported being able to adopt digital tools after receiving private sector support, compared with 53.4% in Viet Nam.

Table 4.42. Breakdown of the Respondents' Ability to Adopt Digital Tools After Receiving Private Sector Support by Country

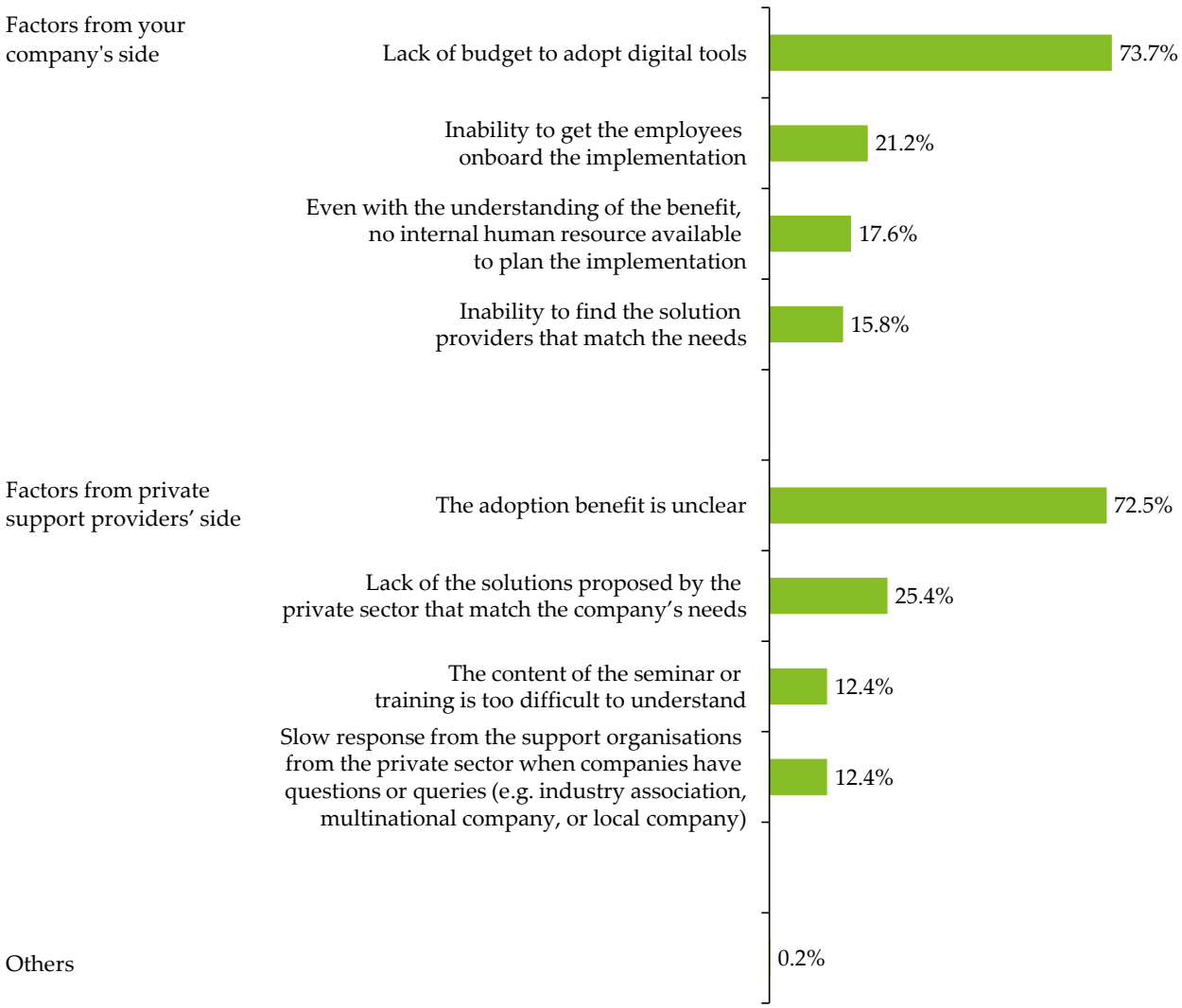
Country	Yes	No
Brunei	68 (63.0%)	40 (37.0%)
Cambodia	406 (98.5%)	6 (1.5%)
Indonesia	342 (83.8%)	66 (16.2%)
Lao PDR	41 (56.2%)	32 (43.8%)
Malaysia	156 (92.9%)	12 (7.1%)
Myanmar	136 (88.9%)	17 (11.1%)
Philippines	501 (96.3%)	19 (3.7%)
Singapore	376 (82.1%)	82 (17.9%)
Thailand	172 (87.8%)	24 (12.2%)
Viet Nam	259 (53.4%)	226 (46.6%)
Total	**2,457 (82.4%)**	**524 (17.6%)**

Notes: The percentage for each row is calculated by dividing the total number of responses of the corresponding row by the total respondents of corresponding column country selecting 'support from the private sector' in Q30. (Q37. Were you able to adopt the tools as a result of the support? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 4.33 provides a breakdown of the reasons why respondents could not proceed to implementation after receiving private sector support. Based on factors from the respondents' company's side, 73.7% of respondents selected 'lack of budget to adopt digital tools'. Based on factors from the private support providers' side, 72.5% of respondents selected 'the adoption benefit is unclear'.

Figure 4.33. Breakdown of Why Respondents Could Not Proceed to Implementation After Receiving Private Sector Support

(n=524)



Notes: Support from the private sector includes industry associations, multinational companies, and local companies. The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total respondents of the corresponding row selecting 'no' in Q37. (Q38. What do you think are the reasons why you could not proceed to implementation after receiving the support? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 4.43 shows the same data as Figure 3.33 by country. The limited number of samples should be noted, but more than 90% of respondents in Brunei, the Lao PDR, and Viet Nam cited the 'lack of budget to adopt digital tools' as a reason for not proceeding to implementation. Around or more than 90% of respondents in Brunei, the Lao PDR, and Viet Nam cited the reason as 'the adoption benefit is unclear'.

Table 4.43. Breakdown of Why Respondents Could Not Proceed to Implementation After Receiving Private Sector Support by Country

Country	A	B	C	D	E	F	G	H	I
Brunei (n=40)	1 (2.5%)	0 (0.0%)	5 (12.5 %)	39 (97.5 %)	39 (97.5 %)	3 (7.5%)	5 (12.5 %)	0 (0.0%)	0 (0.0%)
Cambodia (n=6)	4 (66.7 %)	3 (50.0 %)	1 (16.7 %)	2 (33.3 %)	4 (66.7 %)	1 (16.7 %)	4 (66.7 %)	2 (33.3 %)	0 (0.0%)
Indonesia (n=66)	39 (59.1 %)	39 (59.1 %)	17 (25.8 %)	14 (21.2 %)	7 (10.6 %)	19 (28.8 %)	32 (48.5 %)	23 (34.8 %)	1 (1.5%)
Lao PDR (n=32)	1 (3.1%)	0 (0.0%)	0 (0.0%)	31 (96.9 %)	29 (90.6 %)	2 (6.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Malaysia (n=12)	5 (41.7 %)	2 (16.7 %)	7 (58.3 %)	9 (75.0 %)	8 (66.7 %)	0 (0.0%)	6 (50.0 %)	6 (50.0 %)	0 (0.0%)
Myanmar (n=17)	11 (64.7 %)	8 (47.1 %)	7 (41.2 %)	14 (82.4 %)	12 (70.6 %)	9 (52.9 %)	10 (58.8 %)	9 (52.9 %)	0 (0.0%)
Philippines (n=19)	6 (31.6 %)	10 (52.6 %)	4 (21.1 %)	4 (21.1 %)	7 (36.8 %)	6 (31.6 %)	6 (31.6 %)	5 (26.3 %)	0 (0.0%)
Singapore (n=82)	7 (8.5%)	33 (40.2 %)	13 (15.9 %)	40 (48.8 %)	54 (65.9 %)	1 (1.2%)	27 (32.9 %)	4 (4.9%)	0 (0.0%)
Thailand (n=24)	5 (20.8 %)	1 (4.2%)	5 (20.8 %)	17 (70.8 %)	17 (70.8 %)	1 (4.2%)	7 (29.2 %)	4 (16.7 %)	0 (0.0%)

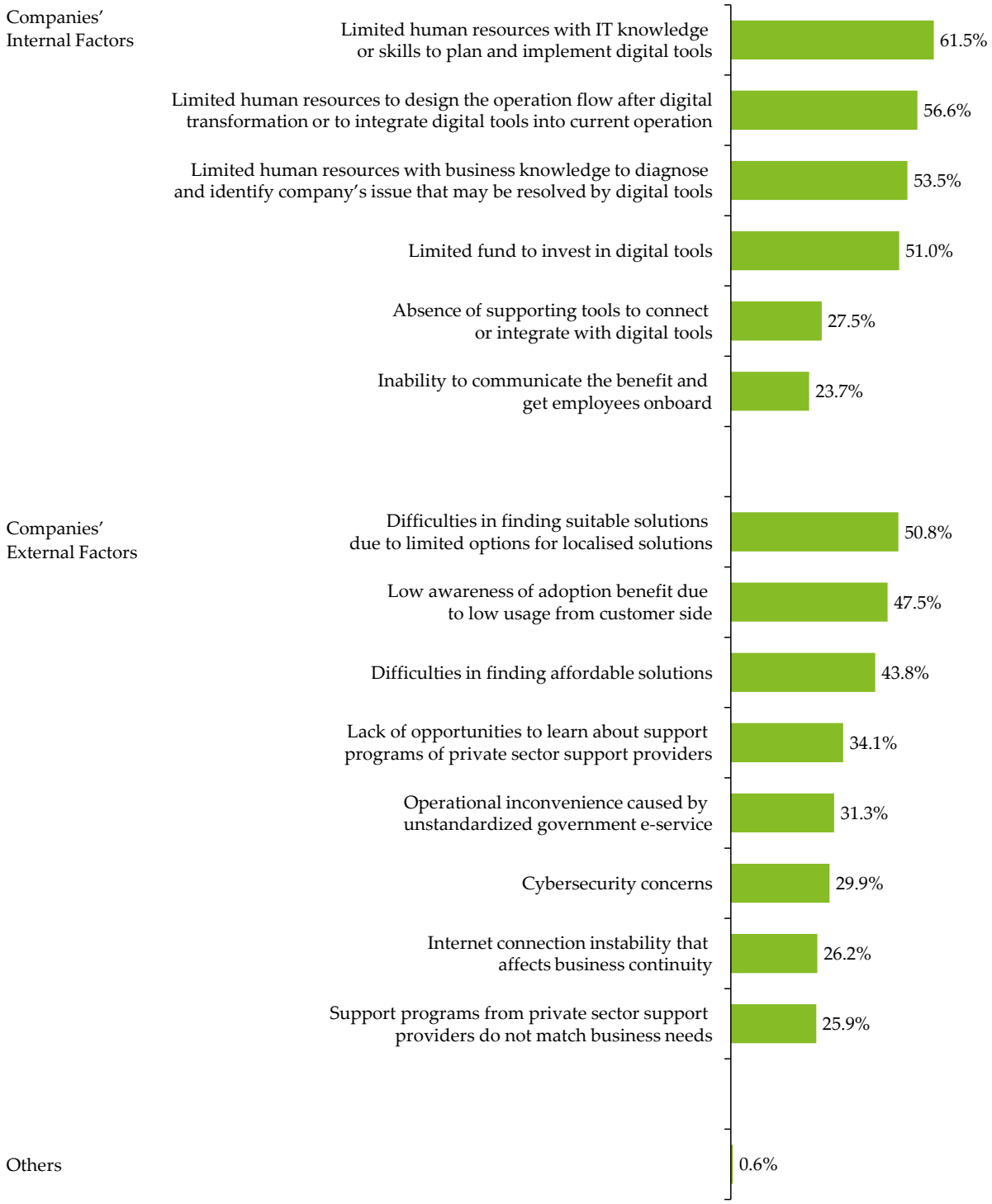
Country	A	B	C	D	E	F	G	H	I
Viet Nam (n=226)	13 (5.8%)	15 (6.6%)	24 (10.6 %)	216 (95.6 %)	203 (89.8 %)	23 (10.2 %)	36 (15.9 %)	12 (5.3%)	0 (0.0%)
Total (n=524)	**92 (17.6 %)**	**111 (21.2 %)**	**83 (15.8 %)**	**386 (73.7 %)**	**380 (72.5 %)**	**65 (12.4 %)**	**133 (25.4 %)**	**65 (12.4 %)**	**1 (0.2%)**

A = even with the understanding of the benefit, no internal human resource available to plan the implementation; B = inability to get the employees onboard the implementation; C = inability to find the solution providers that match the needs; D = lack of budget to adopt digital tools; E = the adoption benefit is unclear; F = the content of the seminar or training is too difficult to understand; G = lack of the solutions proposed by the government that match the company's needs; H = slow response from the government agencies when companies have questions or queries; I = others.
Notes: Support from the private sector includes industry associations, multinational companies, and local companies. The percentage of each row is calculated by dividing the total number of responses for each answer option by the total respondents in the corresponding column country selecting 'no' in Q37. (Q38. What do you think are the reasons why you could not proceed to implementation after receiving the support? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Figure 4.34 provides a breakdown of issues that governments should emphasise to encourage digital adoption based on feedback from ASEAN companies. Based on the companies' internal factors, 61.5% of respondents selected 'limited human resources with IT knowledge or skills to plan and implement digital tools'. Based on companies' external factors, 50.8% of respondents selected 'difficulties in finding suitable solutions due to limited options for localised solutions'.

Figure 4.34. Breakdown of Issues that Governments Should Emphasise to Encourage Digital Adoption

(n=6,048)



IT = information technology.

Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total questionnaire respondents. (Q39. Which issues of ASEAN companies do you think the government should emphasise in order to encourage digital adoption? [MULTIPLE CHOICE: choose all options that apply])

Source: Authors.

Table 4.44 shows the same data as Figure 4.34 by country. For the 'limited human resources with IT knowledge or skills to plan and implement digital tools' as the most common companies' internal factor, Cambodia showed the highest share at 77.8%, followed by Malaysia at 76.1%. For the 'difficulties in finding suitable solutions due to limited options for localised solutions' as the most common companies' external factor, Brunei showed the highest share at 73.9%.

Table 4.44. Breakdown of Issues that Government should Emphasise to Encourage Digital Adoption by Country

Country	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Brunei (n=238)	14 (5.9%)	77 (32.4%)	81 (34.0%)	81 (34.0%)	134 (56.3%)	126 (52.9%)	177 (74.4%)	45 (18.9%)	113 (47.5%)	176 (73.9%)	63 (26.5%)	75 (31.5%)	53 (22.3%)	119 (50.0%)	0 (0.0%)
Cambodia (n=567)	178 (31.4%)	256 (45.1%)	277 (48.9%)	312 (55.0%)	393 (69.3%)	441 (77.8%)	328 (57.8%)	191 (33.7%)	309 (54.5%)	307 (54.1%)	129 (22.8%)	263 (46.4%)	210 (37.0%)	227 (40.0%)	0 (0.0%)
Indonesia (n=893)	247 (27.7%)	213 (23.9%)	386 (43.2%)	257 (28.8%)	463 (51.8%)	487 (54.5%)	316 (35.4%)	190 (21.3%)	300 (33.6%)	307 (34.4%)	291 (32.6%)	248 (27.8%)	193 (21.6%)	196 (21.9%)	28 (3.1%)
Lao PDR (n=160)	25 (15.6%)	31 (19.4%)	72 (45.0%)	69 (43.1%)	63 (39.4%)	61 (38.1%)	99 (61.9%)	31 (19.4%)	102 (63.8%)	68 (42.5%)	46 (28.8%)	63 (39.4%)	32 (20.0%)	50 (31.3%)	1 (0.6%)
Malaysia (n=930)	531 (51.1%)	260 (25.0%)	146 (14.1%)	159 (15.3%)	535 (51.5%)	534 (51.4%)	390 (37.5%)	246 (23.7%)	130 (12.5%)	200 (19.2%)	109 (10.5%)	48 (4.6%)	156 (15.0%)	73 (7.0%)	0 (0.0%)
Myanmar (n=360)	88 (24.4%)	179 (49.7%)	227 (63.1%)	232 (64.4%)	267 (74.2%)	274 (76.1%)	200 (55.6%)	114 (31.7%)	157 (43.6%)	243 (67.5%)	66 (18.3%)	75 (20.8%)	209 (58.1%)	210 (58.3%)	4 (1.1%)
Philippines (n=695)	230 (33.1%)	237 (34.1%)	339 (48.8%)	223 (32.1%)	494 (71.1%)	487 (70.1%)	401 (57.7%)	288 (41.4%)	364 (52.4%)	289 (41.6%)	201 (28.9%)	328 (47.2%)	163 (23.5%)	115 (16.5%)	2 (0.3%)

Singapore (n=645)	85 (13.2 %)	95 (14.7 %)	293 (45.4 %)	111 (17.2 %)	428 (66.4 %)	160 (24.8 %)	278 (43.1 %)	114 (17.7 %)	372 (57.7 %)	175 (27.1 %)	150 (23.3 %)	212 (32.9 %)	62 (9.6%)	126 (19.5 %)	0 (0.0%)
Thailand (n=701)	66 (9.4%)	127 (18.1 %)	357 (50.9 %)	339 (48.4 %)	379 (54.1 %)	319 (45.5 %)	374 (53.4 %)	77 (11.0 %)	253 (36.1 %)	436 (62.2 %)	121 (17.3 %)	129 (18.4 %)	63 (9.0%)	360 (51.4 %)	1 (0.1%)
Viet Nam (n=859)	121 (14.1 %)	189 (22.0 %)	363 (42.3 %)	299 (34.8 %)	386 (44.9 %)	249 (29.0 %)	514 (59.8 %)	125 (14.6 %)	504 (58.7 %)	493 (57.4 %)	225 (26.2 %)	312 (36.3 %)	115 (13.4 %)	284 (33.1 %)	0 (0.0%)
Total (n=6,048)	**1,585 (26.2 %)**	**1,664 (27.5 %)**	**3,085 (51.0 %)**	**2,647 (43.8 %)**	**3,719 (61.5 %)**	**3,237 (53.5 %)**	**3,421 (56.6 %)**	**1,436 (23.7 %)**	**2,874 (47.5 %)**	**3,071 (50.8 %)**	**1,808 (29.9 %)**	**1,895 (31.3 %)**	**1,565 (25.9 %)**	**2,060 (34.1 %)**	**38 (0.6%)**

IT = information technology.

A = internet connection instability that affects business continuity, B = absence of supporting tools to connect or integrate with digital tools, C = limited fund to invest in digital tools, D = difficulties in finding affordable solutions, E = limited human resources with IT knowledge or skills to plan and implement digital tools, F = limited human resources with business knowledge to diagnose and identify company's issue that may be resolved by digital tools, G = limited human resources to design the operation flow after digital transformation or to integrate digital tools into current operation, H = inability to communicate the benefit and get employees onboard, I = low awareness of adoption benefit due to low usage from customer side, J = difficulties in finding suitable solutions due to limited options for localised solutions, K = cybersecurity concerns, L = operational inconvenience caused by unstandardised government e-service, M = support programmes from private sector support providers do not match business needs, N = lack of opportunities to learn about support programmes of private sector support providers, O = others.

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option by the total respondents in the corresponding column country of the questionnaire. (Q39. Which issues of ASEAN companies do you think the government should emphasise in order to encourage digital adoption? [MULTIPLE CHOICE: choose all options that apply])

Source: Authors.

3. Conclusion

This chapter has reported the results of the web survey conducted in all AMS. In terms of digital tool implementation, the most implemented tool category was intra-company management tools, including email and/or chat applications, mobile devices, computers, and Office suites. Those tools scored almost 100% amongst the surveyed companies. E-payment tools for procurement and sales & marketing, and social network services, scored around 90%, following intra-company management tools. Other advanced tools scored lower than other tools, but some of them, such as 3D printing and internet-of-things devices, are implemented by about 35% of respondents – the highest in the other advanced tools category. The surveyed companies' major objective in implementing the tools was to increase profitability through a sales increase, followed by making management decisions in a timely manner based on the data collected. The survey observed that more than 90% of companies stated that these objectives were achieved by implementing the tools. Companies without any implementation plan within the next 3 years cite whether digital tools conform to the business practices of the countries where the businesses are located as the most important factor.

Regarding the difficulties and concerns in each phase of adoption, the lack of business and digital skills was observed as a major challenge for the surveyed companies. For example, in the information gathering phase, almost half of the respondents reported difficulties due to the inability to diagnose company issues that might require digital tools as the highest amongst the answer options. In adopting digital tools, the major difficulty was the lack of IT human resources to plan and implement such tools, followed by the inability to identify tools that match company issues or needs. After the adoption of the tools, the respondents reported difficulties caused by lack of IT human resources who can plan and implement digital tools, followed by employees' inability to use digital tools due to limited skills.

The survey observed the need for support to enable companies to go digital. Asking the respondents about any kind of support that they have received in the past, 46.1% answered that they have never received support, followed by support from the private sector through industry associations at 29.5%. Amongst the support received by the respondents, support from the public sector scored the least, at less than 10%. Amongst the respondents who have received any public sector support, IT skills seminars or training was the most common support, and almost half of them have received grants or subsidies for digital tool investment. Such support is generally considered to have met recipients' expectations, especially financial support. In terms of support from the public sector, more than 80% of those contributing to the successful implementation amongst the respondents were able to adopt the tools. Meanwhile, for respondents who have not succeeded in adopting the tools, the top reason was the inability to find solution providers that match their needs or the lack of solutions proposed by the government that match company needs. In terms of private

sector support, 'consultation on the suitable solutions' was the most common type of support for knowledge or information provision, while 'grant or subsidy for digital tools investment' was the most common type of financial support, and such support was generally reported to have met expectations. Like public sector support, most recipients succeeded in adopting the tools. However, for those who could not proceed with the adoption, the major reasons were a lack of budget to adopt digital tools, followed by unclear adoption benefits.

Regarding issues that governments should emphasise to encourage digital adoption, for companies' internal factors, 'limited human resources with IT knowledge or skills to plan and implement digital tools' was selected the most. For companies' external factors, 'difficulties in finding suitable solutions due to limited options for localised solutions' scored the highest amongst the answer options.

Chapter 5
Phone Survey Result

1. Introduction

This chapter presents the results of a phone survey conducted in Indonesia, Malaysia, and Viet Nam. The survey was designed to be closer to a field survey than a web survey to collect responses from companies without an online environment that the web survey may not cover. The survey aimed to gather information about various aspects of businesses in these countries, including industry breakdown, company size, and location types. The respondents were categorised based on their industry, company size, and whether their business operated in urban or rural areas. The findings provide valuable insights into the business landscape, digital divide, and international engagement within the surveyed countries.

2. Questionnaire Result (Phone Survey)

This section provides the phone survey results. The phone survey covers three countries in this study: Indonesia, Malaysia, and Viet Nam.

▪ Respondents Overview

This section provides an overview of the respondents' attributes, broken down by industry, company size, and location type.

Table 5.1 provides a breakdown of the survey respondents by industry, categorising them according to the industry in which they operate.

Table 5.1. Breakdown of Respondents by Industry

Country	Agriculture, Forestry, Fishing	Services	Manufacturing (light mfg. 1 – consumer goods or consumables)	Manufacturing (light mfg. 2 – others)	Manufacturing (heavy mfg.)
Indonesia	205 (20.1%)	204 (20.0%)	203 (19.9%)	204 (20.0%)	202 (19.8%)
Malaysia	197 (19.0%)	224 (21.6%)	208 (20.0%)	209 (20.1%)	201 (19.3%)
Viet Nam	211 (20.2%)	201 (19.3%)	221 (21.2%)	205 (19.7%)	204 (19.6%)
Total	**613 (19.8%)**	**629 (20.3%)**	**632 (20.4%)**	**618 (19.9%)**	**607 (19.6%)**

Mfg. = manufacturing.
Notes: The sub-industries under each industry are available in the Appendix. Amongst the sub-industries, 'construction' is included in 'services' and 'mining' is included in 'manufacturing (heavy mfg.)'. The percentage of each row is calculated by dividing the total number of responses for each answer option in columns by the total number of respondents in the corresponding row country. (Q4-1. Which industry is your company's main business? (If multiple options exist, please select the business with the largest percentage of sales.) [SINGLE CHOICE: choose one option], Q4-2. Please select the detail of your company's main business. [SINGLE CHOICE: choose one option])
Source: Authors.

Table 5.2 shows the survey respondents by company size, categorising them into small and micro-groups.

Table 5.2. Breakdown of Respondents by Company Size

Country	Small	Micro
Indonesia	884 (86.8%)	134 (13.2%)
Malaysia	929 (89.4%)	110 (10.6%)
Viet Nam	609 (58.4%)	433 (41.6%)
Total	**2,422 (78.2%)**	**677 (21.8%)**

Mfg. = manufacturing.
Notes: 'Micro' represents companies with 1–4 employees. 'Small' represents companies with 5–19 employees for services and manufacturing (heavy mfg.); and 5–49 for agriculture, forestry, fishing, manufacturing (light mfg. 1 – consumer goods or consumables); and manufacturing (light mfg. 2 – others). The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding column country. (Q5. How many regular employees does your company have? [SINGLE CHOICE: choose one option])
Source: Authors.

This survey also includes information on the municipality where the respondents are located to get a more precise picture of the digital divide. Table 5.3 reports whether the respondents are located in urban or rural areas.

Table 5.3. Breakdown of Respondents by Location Type

Country	Urban	Rural
Indonesia	513 (50.4%)	505 (49.6%)
Malaysia	376 (36.2%)	663 (63.8%)
Viet Nam	452 (43.4%)	590 (56.6%)
Total	**1,341 (43.3%)**	**1,758 (56.7%)**

Notes: 'Urban' is the sum of respondents who selected any cities in Q2-2. 'Rural' is the sum of respondents who selected 'others' in Q2-2. The shares are shown in parentheses. Singapore has no rural areas. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding column country. (Q2-1. Please provide your company's location. [SINGLE CHOICE: choose one option], Q2-2. Please select the name of the municipality in which your company is located. [SINGLE CHOICE: choose one option])
Source: Authors.

- Company Overview

Table 5.4 provides a breakdown of the survey respondents by the locations where they are operating their businesses, besides the countries in which they are located.

Table 5.4. Location where the Respondents are Operating the Business

If the Respondents are Operating Businesses Overseas	Number
Overseas operation	9 (0.03%)
No overseas operation	3,090 (99.7%)

Notes: Location shares are shown in parentheses. The percentage of 'overseas operation' is calculated by dividing the total number of responses answered by any of the answer options excluding the respondents who answered 'no overseas operation' by the total number of respondents. The percentage of 'no overseas operation' is calculated by dividing the total number of responses answered this answer option by the total number of respondents. (Q3. Besides the country where your company is located, which country does your business operate in? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 5.5 shows the country where the respondents are operating their businesses.

Table 5.5. Country where the Respondents are Operating their Businesses

Location	Number
Japan	3 (33.3%)
China	4 (44.4%)
Hong Kong	1 (11.1%)
Taiwan	3 (33.3%)
Republic of Korea	0 (0.0%)
Brunei	0 (0.0%)
Cambodia	0 (0.0%)
Indonesia	0 (0.0%)
Lao PDR	0 (0.0%)
Malaysia	6 (66.7%)
Myanmar	0 (0.0%)
Philippines	2 (22.2%)
Singapore	3 (33.3%)
Thailand	0 (0.0%)
Viet Nam	0 (0.0%)
India	0 (0.0%)
Other Asian countries	0 (0.0%)
United States	0 (0.0%)
Mexico	0 (0.0%)
Europe (member states of the European Union)	0 (0.0%)
Middle East	0 (0.0%)
Central and South America	0 (0.0%)
Others	5 (55.6%)

Notes: Location shares are shown in parentheses. The percentage of each country is calculated by dividing the number of respondents who answered each answer option by the number of respondents that operate overseas, excluding the respondents who answered 'no overseas operation'.
(Q3. Besides the country where your company is located, which country does your business operate in? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 5.6 provides a breakdown of the service industry by country.

Table 5.6. Breakdown of Service Industry by Country

Country	Construction	Finance, Insurance, Real Estate	Public Administration	Retail Trade	Services[a]	Transportation & Public Utilities	Wholesale Trade
Indonesia	0 (0.0%)	9 (4.4%)	0 (0.0%)	28 (13.7%)	86 (42.2%)	16 (7.8%)	65 (31.9%)
Malaysia	0 (0.0%)	24 (10.7%)	4 (1.8%)	20 (8.9%)	87 (38.8%)	22 (9.8%)	67 (29.9%)
Viet Nam	0 (0.0%)	25 (12.4%)	3 (1.5%)	15 (7.5%)	83 (41.3%)	15 (7.5%)	60 (29.9%)
Total	**0 (0.0%)**	**58 (9.2%)**	**7 (1.1%)**	**63 (10.0%)**	**256 (40.7%)**	**53 (8.4%)**	**192 (30.5%)**

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents from services in the corresponding row country. (Q4-2. Please select the detail of your company's main business [SINGLE CHOICE: choose one option])

[a] Hotels, amusement & recreation, automotive repair, health, legal, etc.

Source: Authors.

Table 5.7 provides a breakdown of manufacturing (light mfg. 1 – consumer goods or consumables) by country.

Table 5.7. Breakdown of Manufacturing (Light Mfg. 1 – Consumer Goods or Consumables) by Country

Country	Apparel and Other Finished Products Made from Fabrics and Similar Material	Food and Kindred Products	Textile Mill Products	Tobacco Products
Indonesia	39 (19.2%)	112 (55.2%)	44 (21.7%)	8 (3.9%)
Malaysia	19 (9.1%)	141 (67.8%)	37 (17.8%)	11 (5.3%)
Viet Nam	71 (32.1%)	113 (51.1%)	32 (14.5%)	5 (2.3%)
Total	**129 (20.4%)**	**366 (57.9%)**	**113 (17.9%)**	**24 (3.8%)**

Notes: No answers were obtained from 'miscellaneous manufacturing industries', 'transportation equipment', and 'wholesale trade'. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents from manufacturing (light mfg. 1 – consumer goods or consumables) in the corresponding row country. (Q4-2. Please select the detail of your company's main business [SINGLE CHOICE: choose one option])
Source: Authors.

Table 5.8 shows manufacturing (light manufacturing 2 – others) by country.

Table 5.8. Breakdown of Manufacturing (Light Mfg. 2 – Others) by Country

Country	Fabricated metal products, except machinery and transportation equipment	Furniture and fixtures	Leather and leather products	Lumber and wood products, except furniture	Misc. mfg. industries[a]	Paper and allied products	Printing, publishing, and allied industries	Rubber and misc. plastics products
Indonesia	38 (18.6%)	34 (16.7%)	7 (3.4%)	20 (9.8%)	18 (8.8%)	14 (6.9%)	51 (25.0%)	22 (10.8%)
Malaysia	57 (27.3%)	16 (7.7%)	3 (1.4%)	26 (12.4%)	21 (10.0%)	14 (6.7%)	31 (14.8%)	41 (19.6%)
Viet Nam	93 (45.4%)	12 (5.9%)	11 (5.4%)	31 (15.1%)	11 (5.4%)	13 (6.3%)	7 (3.4%)	27 (13.2%)
Total	**188 (30.4%)**	**62 (10.0%)**	**21 (3.4%)**	**77 (12.5%)**	**50 (8.1%)**	**41 (6.6%)**	**89 (14.4%)**	**90 (14.6%)**

Mfg. = manufacturing, Misc. = miscellaneous.
Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents from manufacturing (light mfg. 2 – others) in the corresponding row country. (Q4-2. Please select the detail of your company's main business [SINGLE CHOICE: choose one option])
[a] For example, jewellery, silverware, plated ware, musical instruments, dolls, toys, pens, and pencils.
Source: Authors.

Table 5.9 provides a breakdown of manufacturing (heavy manufacturing) by country.

Table 5.9. Breakdown of Manufacturing (Heavy Manufacturing) by Country

Country	Mining	Chemicals and Allied Products	Electronic and Other Electrical Equipment and Components, except Computer	Industrial and Commercial Machinery and Computer Equipment	Measuring, Analysing, and Controlling Instruments; Photographic, Medical, and Optical Goods; Watches and Clocks	Petroleum Refining and Related Industries	Primary Metal Industries	Stone, Clay, Glass, and Concrete Products	Transportation Equipment
Indonesia	0	43	15	43	9	41	23	14	14
	(0.0%)	(21.3%)	(7.4%)	(21.3%)	(4.5%)	(20.3%)	(11.4%)	(6.9%)	(6.9%)
Malaysia	0	40	27	55	9	7	26	19	18
	(0.0%)	(19.9%)	(13.4%)	(27.4%)	(4.5%)	(3.5%)	(12.9%)	(9.5%)	(9.0%)
Viet Nam	0	68	17	14	15	17	8	52	13
	(0.0%)	(33.3%)	(8.3%)	(6.9%)	(7.4%)	(8.3%)	(3.9%)	(25.5%)	(6.4%)
Total	**0**	**151**	**59**	**112**	**33**	**65**	**57**	**85**	**45**
	(0.0%)	**(24.9%)**	**(9.7%)**	**(18.5%)**	**(5.4%)**	**(10.7%)**	**(9.4%)**	**(14.0%)**	**(7.4%)**

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents from manufacturing (heavy manufacturing) in the corresponding row country. (Q4-2. Please select the detail of your company's main business [SINGLE CHOICE: choose one option])
Source: Authors.

Table 5.10 shows the percentages of regular employees involved in digital-related tasks.

Table 5.10. Breakdown of the Percentage of Regular Employees Involved in Digital-Related Tasks by Country

Country	None	Less than 5%	5%–9%	10%–19%	20%–29%	30%–39%	40%–49%	More than 50%
Indonesia	207 (20.3%)	117 (11.5%)	430 (42.2%)	247 (24.3%)	13 (1.3%)	1 (0.1%)	2 (0.2%)	1 (0.1%)
Malaysia	263 (25.3%)	436 (42.0%)	327 (31.5%)	12 (1.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.1%)
Viet Nam	497 (47.7%)	115 (11.0%)	299 (28.7%)	131 (12.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total	**967 (31.2%)**	**668 (21.6%)**	**1,056 (34.1%)**	**390 (12.6%)**	**13 (0.4%)**	**1 (0.0%)**	**2 (0.1%)**	**2 (0.1%)**

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding row country. (Q6. Of the regular employees you answered in Q5, what percentage are involved in digital-related tasks? (e.g. those in charge of consideration and planning, implementation of digitalisation within the company including in-house engineers) [SINGLE CHOICE: choose one option])
Source: Authors.

Table 5.11 shows company ownership.

Table 5.11. Breakdown of Company Ownership by Country

Country	Private Enterprise	State-owned Company
Indonesia	1,017 (99.9%)	1 (0.1%)
Malaysia	1,038 (99.9%)	1 (0.1%)
Viet Nam	1,042 (100.0%)	0 (0.0%)
Total	**3,097 (99.9%)**	**2 (0.1%)**

Notes: Private enterprise refers to enterprises where more than half of the shares are held by the private sector. State-owned company refers to companies where more than half of the shares are held by the public sector. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding row country. (Q7. What is your company's ownership type? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 5.12 shows the company headquarters status by country.

Table 5.12. Breakdown of Company Headquarters Status by Country

Country	Yes	No
Indonesia	1,018 (100.0%)	0 (0.0%)
Malaysia	1,039 (100.0%)	0 (0.0%)
Viet Nam	1,042 (100.0%)	0 (0.0%)
Total	**3,099 (100.0%)**	**0 (0.0%)**

Notes: No means the company is not the headquarters (e.g. a subsidiary). The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding row country. (Q8. Is your company the headquarters? (Q8. Is your company the headquarters? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 5.13 shows company management status by country.

Table 5.13. Company Management Status

Country	Managed by the Owner	Not Managed by the Owner
Indonesia	1,016 (99.8%)	2 (0.2%)
Malaysia	1,038 (99.9%)	1 (0.1%)
Viet Nam	1,041 (99.9%)	1 (0.1%)
Total	**3,095 (99.9%)**	**4 (0.1%)**

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding row country. (Q9. Is your company managed by the owner? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 5.14 shows company-affiliated status by country.

Table 5.14. Company Affiliated Status by Country

Country	Domestic Company	Foreign-affiliated Company
Indonesia	1,018 (100.0%)	0 (0.0%)
Malaysia	1,039 (100.0%)	0 (0.0%)
Viet Nam	1,042 (100.0%)	0 (0.0%)
Total	**3,099 (100.0%)**	**0 (0.0%)**

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding row country. (Q10-1. Please tell us whether your company is domestic or foreign-affiliated company [SINGLE CHOICE: choose one option])
Source: Authors.

Table 5.15 shows the company ownership of a separate base for sales, production, and procurement apart from the company site by country.

Table 5.15. Ownership of Separate Base for Sales, Production, and Procurement Apart from the Company site by Country

Country	Sales		Production		Procurement	
	Yes	No	Yes	No	Yes	No
Indonesia	20 (2.0%)	998 (98.0%)	3 (0.3%)	1,015 (99.7%)	48 (4.7%)	970 (95.3%)
Malaysia	6 (0.6%)	1,033 (99.4%)	3 (0.3%)	1,036 (99.7%)	3 (0.3%)	1,036 (99.7%)
Viet Nam	119 (11.4%)	923 (88.6%)	91 (8.7%)	951 (91.3%)	145 (13.9%)	897 (86.1%)
Total	**145 (4.7%)**	**2,954 (95.3%)**	**97 (3.1%)**	**3,002 (96.9%)**	**196 (6.3%)**	**2,903 (93.7%)**

Notes: The respondents chose 'yes' or 'no' for each of sales, production, and procurement. Therefore, adding 'yes' and 'no' for each base yields 100%. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding row country. (Q11. Does your company have a separate base for sales, production, and procurement apart from your company's site? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 5.16 shows the customer segments by country.

Table 5.16. Breakdown of Customer Segments by Country

Country	Consumer	Mfg. MSMEs	Mfg. large Companies	Non-mfg. MSMEs	Non-mfg. large Companies	Public Institutions
Indonesia	691 (67.9%)	378 (37.1%)	250 (24.6%)	585 (57.5%)	246 (24.2%)	8 (0.8%)
Malaysia	995 (95.8%)	410 (39.5%)	127 (12.2%)	454 (43.7%)	117 (11.3%)	0 (0.0%)
Viet Nam	672 (64.5%)	543 (52.1%)	250 (24.0%)	708 (67.9%)	132 (12.7%)	9 (0.9%)
Total	**2,358 (76.1%)**	**1,331 (42.9%)**	**627 (20.2%)**	**1,747 (56.4%)**	**495 (16.0%)**	**17 (0.5%)**

Mfg. = manufacturing; MSMEs = micro, small, and medium-sized enterprises.
Notes: Consumer includes individual or household consumers. Manufacturing MSMEs are companies that provide parts or components to a small-scale assembly company. Manufacturing large companies are companies that provide parts or components to a large-scale assembly company. Non-manufacturing MSMEs are companies that provide final goods to a small-scale wholesale or retail company. Non-manufacturing large companies are companies that provide final goods to a large-scale wholesale or retail company. Public institutions include central or local governments. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding row country. (Q12. Which segment is your customer? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 5.17 shows the presence of multinational companies as the direct customers (including joint venture companies where at least one owner is a foreign company) for companies by country.

Table 5.17. Breakdown of the Presence of Multinational Companies as the Direct Customers by Country

Country	Yes	No
Indonesia	317 (31.1%)	701 (68.9%)
Malaysia	303 (29.2%)	736 (70.8%)
Viet Nam	253 (24.3%)	789 (75.7%)
Total	**873 (28.2%)**	**2,226 (71.8%)**

Notes: 'Yes' means the company has direct customers from multinational companies, including joint venture companies where at least one owner is a foreign company. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding row country. (Q13-1. Does your company have direct customers that include multinational companies, including joint venture companies where at least one owner is a foreign company? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 5.18 shows where multinational companies are located as direct customers for businesses by country.

Table 5.18. Location of Multinational Companies as Direct Customers for Business by Country

Country	Domestic	Domestic & Overseas	Overseas
Indonesia	240 (75.7%)	35 (11.0%)	42 (13.2%)
Malaysia	271 (89.4%)	2 (0.7%)	30 (9.9%)
Viet Nam	226 (89.3%)	2 (0.8%)	25 (9.9%)
Total	**737 (84.4%)**	**39 (4.5%)**	**97 (11.1%)**

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents in the corresponding row country. (Q13-2. If you selected 'Yes' in Q13-1, please tell us where your direct customers are based. [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 5.19 shows the locations of multinational companies as direct customers located overseas for companies by country.

Table 5.19. Locations of Multinational Companies as Direct Customers Overseas

Overseas Direct Customers	Indonesia	Malaysia	Viet Nam	Total
Japan	6 (7.8%)	5 (15.6%)	0 (0.0%)	**11 (8.1%)**
China	28 (36.4%)	11 (34.4%)	3 (11.1%)	**42 (30.9%)**
Hong Kong	3 (3.9%)	3 (9.4%)	1 (3.7%)	**7 (5.1%)**
Taiwan	20 (26.0%)	3 (9.4%)	2 (7.4%)	**25 (18.4%)**
Republic of Korea	0 (0.0%)	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
Brunei	0 (0.0%)	4 (12.5%)	0 (0.0%)	**4 (2.9%)**
Cambodia	1 (1.3%)	0 (0.0%)	6 (22.2%)	**7 (5.1%)**
Indonesia	0 (0.0%)	4 (12.5%)	2 (7.4%)	**6 (4.4%)**
Lao PDR	0 (0.0%)	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
Malaysia	29 (37.7%)	0 (0.0%)	4 (14.8%)	**33 (24.3%)**
Myanmar	0 (0.0%)	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
Philippines	13 (16.9%)	6 (18.8%)	6 (22.2%)	**25 (18.4%)**
Singapore	0 (0.0%)	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
Thailand	12 (15.6%)	5 (15.6%)	7 (25.9%)	**24 (17.6%)**
Viet Nam	8 (10.4%)	0 (0.0%)	0 (0.0%)	**8 (5.9%)**

Overseas Direct Customers	Indonesia	Malaysia	Viet Nam	Total
India	1 (1.3%)	0 (0.0%)	0 (0.0%)	**1 (0.7%)**
Other Asian countries	0 (0.0%)	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
United States	1 (1.3%)	0 (0.0%)	0 (0.0%)	**1 (0.7%)**
Mexico	1 (1.3%)	0 (0.0%)	0 (0.0%)	**1 (0.7%)**
European Union	0 (0.0%)	1 (3.1%)	0 (0.0%)	**1 (0.7%)**
Middle East	0 (0.0%)	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
Central and South America	0 (0.0%)	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
Others	0 (0.0%)	0 (0.0%)	0 (0.0%)	**0 (0.0%)**

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents that selected 'overseas' in Q13-2 in the corresponding column country. (Q13-3. If you selected 'Overseas' in Q13-2, please specify the countries where your direct customers are based. [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 5.20 shows the availability of multinational companies as indirect customers by country.

Table 5.20. Breakdown of the Presence of Multinational Companies as Indirect Customers by Country

Country	Yes	No	Not sure
Indonesia	174 (17.1%)	734 (72.1%)	110 (10.8%)
Malaysia	256 (24.6%)	640 (61.6%)	143 (13.8%)
Viet Nam	163 (15.6%)	747 (71.7%)	132 (12.7%)
Total	**593 (19.1%)**	**2,121 (68.4%)**	**385 (12.4%)**

Notes: 'Yes' means the company has indirect customers from multinational companies, including the company acting as a secondary supplier to multinational companies. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents of the corresponding row country. (Q14. Does your company have indirect customers that include multinational companies (e.g. your company is a secondary supplier to multinational companies)? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 5.21 shows the availability of multinational companies as direct suppliers for companies by country.

Table 5.21. Breakdown of the Presence of Multinational Companies as Direct Suppliers for Companies in ASEAN by Country

Country	Yes	No
Indonesia	224 (22.0%)	794 (78.0%)
Malaysia	339 (32.6%)	700 (67.4%)
Viet Nam	236 (22.6%)	806 (77.4%)
Total	**799 (25.8%)**	**2,300 (74.2%)**

Notes: 'Yes' means the company has multinational companies as direct customers, including joint venture companies where at least one owner is a foreign company. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents of the corresponding row country. (Q15-1. Does your company have direct suppliers that include multinational companies, including joint venture companies where at least one owner is a foreign company? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 5.22 shows direct suppliers' locations for companies by country.

Table 5.22. Location of Multinational Companies as Direct Suppliers for Business by Country

Country	Domestic	Overseas
Indonesia	209 (93.3%)	31 (13.8%)
Malaysia	297 (87.6%)	47 (13.9%)
Viet Nam	210 (89.0%)	22 (9.3%)
Total	**716 (89.6%)**	**100 (12.5%)**

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents that selected 'yes' in Q15-1 in the corresponding row country. (Q15-2. If you selected 'Yes' in Q15-1, please tell us where your direct suppliers are based. [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 5.23 shows the locations of multinational companies as direct suppliers located overseas for companies by country.

Table 5.23. Locations of Multinational Companies as Direct Suppliers Overseas by Country

Direct Supplier Location	Indonesia	Malaysia	Viet Nam	Total
Japan	0 (0.0%)	1 (2.1%)	0 (0.0%)	**1 (1.0%)**
China	15 (48.4%)	3 (6.4%)	8 (36.4%)	**26 (26.0%)**
Hong Kong	1 (3.2%)	1 (2.1%)	0 (0.0%)	**2 (2.0%)**
Taiwan	4 (12.9%)	2 (4.3%)	1 (4.5%)	**7 (7.0%)**
Republic of Korea	0 (0.0%)	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
Brunei	0 (0.0%)	16 (34.0%)	0 (0.0%)	**16 (16.0%)**
Cambodia	0 (0.0%)	0 (0.0%)	8 (36.4%)	**8 (8.0%)**
Indonesia	0 (0.0%)	16 (34.0%)	0 (0.0%)	**16 (16.0%)**
Lao PDR	0 (0.0%)	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
Malaysia	4 (12.9%)	0 (0.0%)	7 (31.8%)	**11 (11.0%)**
Myanmar	0 (0.0%)	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
Philippines	7 (22.6%)	20 (42.6%)	8 (36.4%)	**35 (35.0%)**
Singapore	0 (0.0%)	0 (0.0%)	2 (9.1%)	**2 (2.0%)**
Thailand	5 (16.1%)	19 (40.4%)	5 (22.7%)	**29 (29.0%)**
Viet Nam	5 (16.1%)	0 (0.0%)	0 (0.0%)	**5 (5.0%)**
India	1 (3.2%)	1 (2.1%)	0 (0.0%)	**2 (2.0%)**
Other Asian countries	0 (0.0%)	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
United States	0 (0.0%)	1 (2.1%)	0 (0.0%)	**1 (1.0%)**
Mexico	0 (0.0%)	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
Middle East	0 (0.0%)	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
Central and South America	0 (0.0%)	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
Others	0 (0.0%)	0 (0.0%)	0 (0.0%)	**0 (0.0%)**

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents that selected 'overseas' in Q15-2 in the corresponding column country. (Q15-3. If you selected 'Overseas' in Q15-2, please specify the countries where your direct suppliers are based. [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 5.24 shows the availability of multinational companies as indirect suppliers for companies by country.

Table 5.24. Breakdown of the Presence of Multinational Companies as Indirect Suppliers for Companies by Country

Country	Yes	No	Not sure
Indonesia	26 (2.6%)	765 (75.1%)	227 (22.3%)
Malaysia	265 (25.5%)	612 (58.9%)	162 (15.6%)
Viet Nam	58 (5.6%)	740 (71.0%)	244 (23.4%)
Total	**349 (11.3%)**	**2,117 (68.3%)**	**633 (20.4%)**

Notes: 'Yes' means the company has multinational companies as indirect suppliers, including those acting as secondary customers to multinational companies. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents of the corresponding row country. (Q16. Does your company have indirect suppliers that include multinational companies (e.g. your company is a secondary customer to multinational companies)? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 5.25 shows the company establishment timeline by country.

Table 5.25. Breakdown of Company Establishment Timeline by Country

Country	Before 1900–1949	1950–1999	2000 – Present
Indonesia	3 (0.3%)	146 (14.3%)	869 (85.4%)
Malaysia	6 (0.6%)	596 (57.4%)	437 (42.1%)
Viet Nam	0 (0.0%)	0 (0.0%)	1,042 (100.0%)
Total	**9 (0.3%)**	**742 (23.9%)**	**2,348 (75.8%)**

Notes:
1. Before 1900–1949 consists of combined information from before 1900, 1900–1910, 1910–1919, 1920–1929, 1930–1939, and 1940–1949; 1950–1999 consists of combined information from 1950–1959, 1960–1969, 1970–1979, 1980–1989, and 1990–1999; and 2000–present consists of combined information from 2000–2009, 2010–2019, and 2020–present.
2. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents of the corresponding row country. It should be noted that the company information in the database provided by D&B Hoovers relies on national registries in each country, so the accuracy of the data depends on the registration system and procedures in each country. This may have affected the results for Vietnamese respondents. Factors such as the national administrative data registration process may have caused them to be identified as having been established after 2000 when they were established before 2000. Some 99.3% of the population of Vietnamese companies were established after 2000, according to the database. In the phone survey, that population was randomised, and then the questionnaires were distributed, resulting in a 100% response rate from the respondents established in 2000 or later. (Q17. Which year was your company established? (Please answer your company's information, not the parent company) [SINGLE CHOICE: choose one option])

Source: Authors.

Table 5.26 provides the age group breakdown for the company's ultimate decision maker by country.

Table 5.26. Age Group Breakdown for the Company's Ultimate Decision Maker by Country

Country	Equal to or less than 25 years old	26–41 years old	42–57 years old	58–76 years old	77 years old and over
Indonesia	13 (1.3%)	232 (22.8%)	604 (59.3%)	169 (16.6%)	0 (0.0%)
Malaysia	3 (0.3%)	157 (15.1%)	435 (41.9%)	424 (40.8%)	20 (1.9%)
Viet Nam	0 (0.0%)	497 (47.7%)	485 (46.5%)	60 (5.8%)	0 (0.0%)
Total	**16 (0.5%)**	**886 (28.6%)**	**1,524 (49.2%)**	**653 (21.1%)**	**20 (0.6%)**

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents of the corresponding row country. (Q18. What age group does your company's ultimate decision maker belong to? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 5.27 provides the gender breakdown for the company's ultimate decision maker by country.

Table 5.27. Gender Breakdown of the Company's Ultimate Decision Maker by Country

Country	Male	Female	Rather not specify
Indonesia	739 (72.6%)	92 (9.0%)	187 (18.4%)
Malaysia	513 (49.4%)	33 (3.2%)	493 (47.4%)
Viet Nam	674 (64.7%)	193 (18.5%)	175 (16.8%)
Total	**1,926 (62.1%)**	**318 (10.3%)**	**855 (27.6%)**

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents of the corresponding row country. (Q19. What is the gender of your company's ultimate decision maker? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 5.28 shows the highest level of education of the company's ultimate decision maker by country.

Table 5.28. Breakdown of Highest-Level Education of Company's Ultimate Decision Maker by Country

Country	A	B	C	D	E	F	G
Indonesia	0 (0.0%)	0 (0.0%)	109 (10.7%)	177 (17.4%)	27 (2.7%)	452 (44.4%)	253 (24.9%)
Malaysia	2 (0.2%)	20 (1.9%)	238 (22.9%)	222 (21.4%)	12 (1.2%)	322 (31.0%)	223 (21.5%)
Viet Nam	32 (3.1%)	0 (0.0%)	79 (7.6%)	216 (20.7%)	76 (7.3%)	427 (41.0%)	212 (20.3%)
Total	**34 (1.1%)**	**20 (0.6%)**	**426 (13.7%)**	**615 (19.8%)**	**115 (3.7%)**	**1,201 (38.8%)**	**688 (22.2%)**

A = never been educated in an educational institution, B = elementary school or earlier, C = middle school, D = high school, E = vocational school, F = post-secondary education institution, G = graduate school or higher.
Notes: Post-secondary education institutions include university and colleges. Graduate school or higher includes master's, doctoral, post-doctoral levels. The percentage of each row is calculated by dividing the total number of responses for each answer option in the columns by the total number of respondents of the corresponding row country. (Q20. What is the highest level of education of your company's ultimate decision maker? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 5.29 shows the current sales value in 2022 compared to the pre-pandemic level (in 2019) for companies by country.

Table 5.29. Breakdown of Current Sales Value in 2022 Compared to the Pre-Pandemic Level (in 2019) for Companies by Country

Country	More than the pre-pandemic level	Almost the same level	Less than the pre-pandemic level	Company did not exist before pandemic
Indonesia	43 (4.2%)	388 (38.1%)	525 (51.6%)	62 (6.1%)
Malaysia	27 (2.6%)	112 (10.8%)	878 (84.5%)	22 (2.1%)
Viet Nam	8 (0.8%)	156 (15.0%)	92 (8.8%)	786 (75.4%)
Total	**78 (2.5%)**	**656 (21.2%)**	**1,495 (48.2%)**	**870 (28.1%)**

Notes: Almost the same level means approximately in the range from –1% to 1%. The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents of the corresponding row country. For Viet Nam, which scored a higher rate for 'company did not exist before pandemic', it should be noted that the company information in the database provided by D&B Hoovers relies on national registries in each country, so it may have affected the results for Vietnamese respondents, resulting in 75.4% of the companies not existing before the pandemic. (Q21. What is your company's current sales value (in 2022) compared to the pre-pandemic level (in 2019)? (SINGLE CHOICE: choose one option))
Source: Authors.

Table 5.30 shows the company's profit margin ratio in 2022 compared to the pre-pandemic level (in 2019) for companies by country.

Table 5.30. Breakdown of Company's Profit Margin Ratio in 2022 Compared to the Pre-Pandemic Level (in 2019) for Companies by Country

Country	More than the pre-pandemic level	Almost the same level	Less than the pre-pandemic level	Company did not exist before pandemic
Indonesia	40 (3.9%)	377 (37.0%)	536 (52.7%)	65 (6.4%)
Malaysia	25 (2.4%)	111 (10.7%)	880 (84.7%)	23 (2.2%)
Viet Nam	8 (0.8%)	157 (15.1%)	92 (8.8%)	785 (75.3%)
Total	**73 (2.4%)**	**645 (20.8%)**	**1,508 (48.7%)**	**873 (28.2%)**

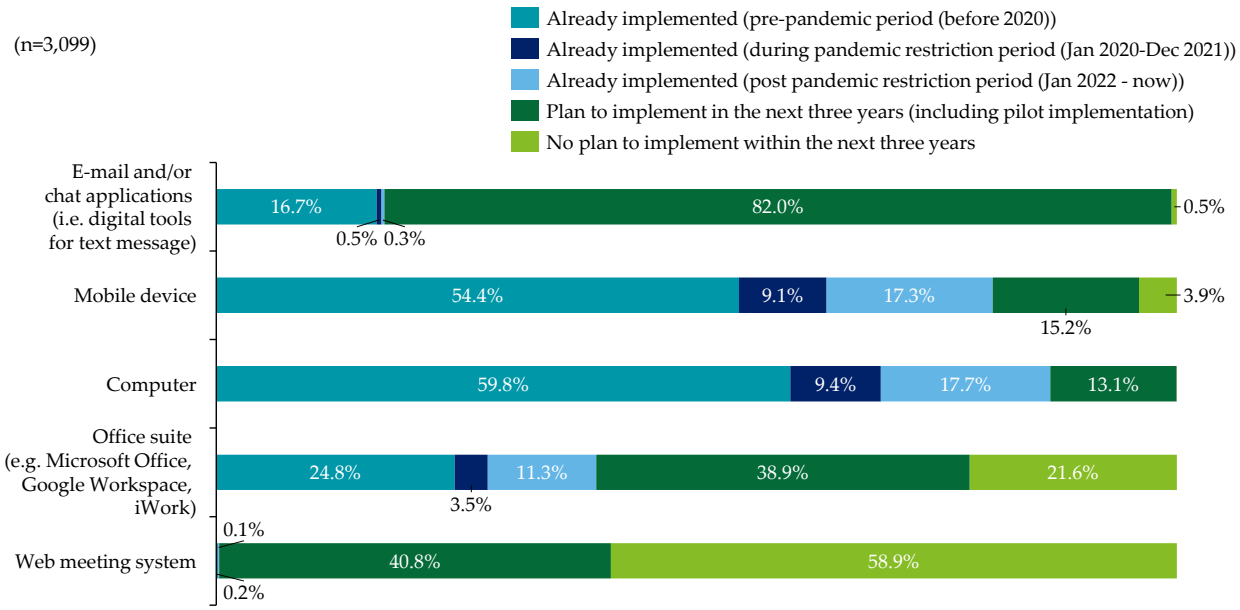
Notes: Almost the same level means approximately in the range from –1% to 1%. The percentage of each row is calculated by dividing the total number of responses for each answer by the total number of respondents of the corresponding row country. (Q22. What is your company's profit margin ratio (i.e. operating profit divided by total sales) (in 2022) compared to the pre-pandemic level (in 2019)? [SINGLE CHOICE: choose one option])
Source: Authors.

- Digitalisation Status

Figure 5.1 provides the stage of consideration in companies for implementing intra-company management tools in a given period. Combining the three-answer option representing 'already implemented', mobile device and computer scored more than 80%,

followed by office suite with around 40%. Email and/or chat applications are notably low, at less than 20%. According to the partner companies that conducted the phone survey, this low number may be because some respondents interpreted the chat applications they use daily as social network services (e.g. LINE in Indonesia and Zalo in Viet Nam). Meanwhile, understanding the need for email and/or chat applications is widespread, with 82.0% of companies considering implementing them within the next 3 years. The least implemented tool in intra-company management is web meeting systems, with almost 60% of respondents without plans to implement this tool within the next 3 years.

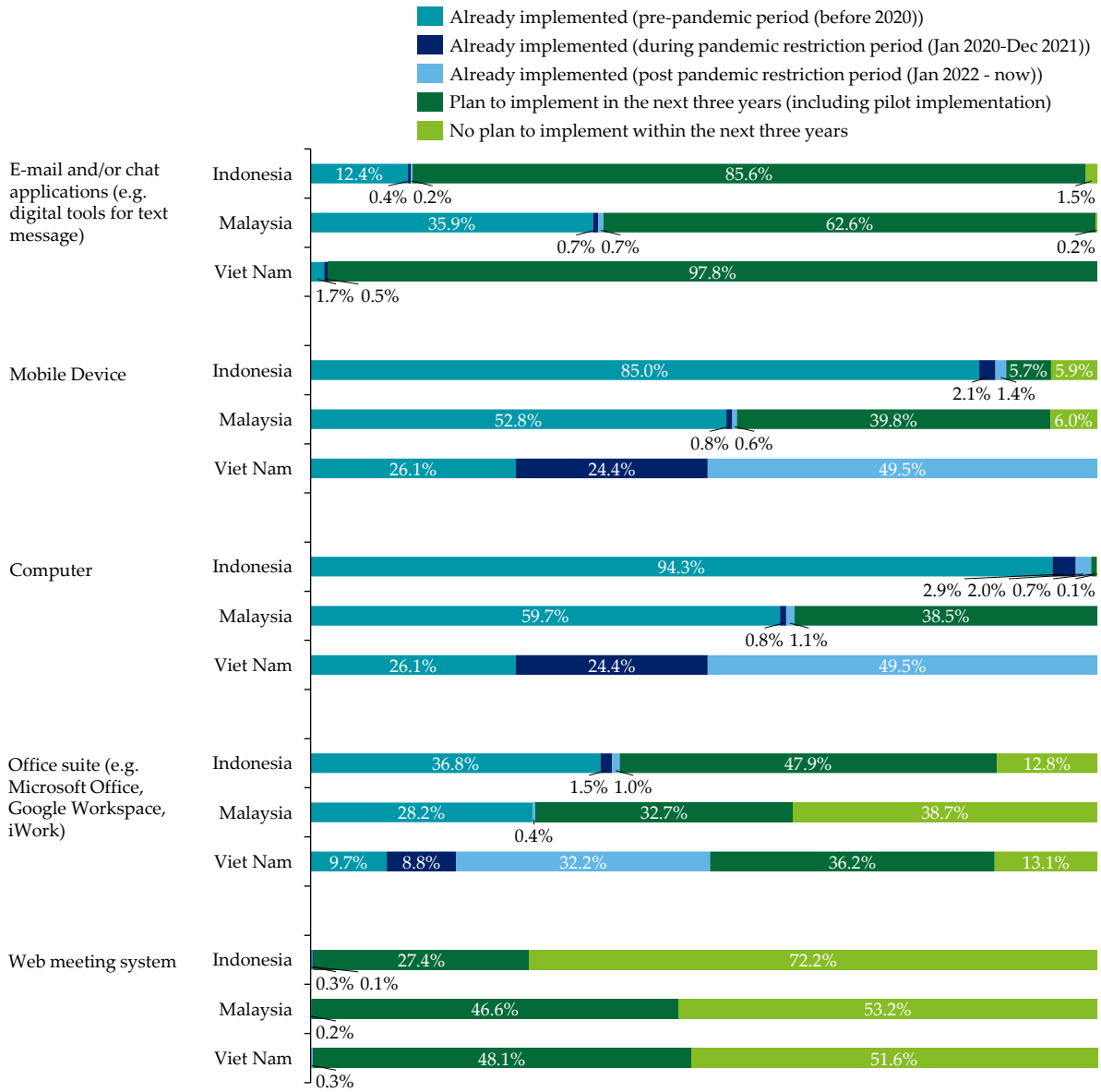
Figure 5.1. Stage of Consideration for Implementing Intra-company Management Tools



Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents of the corresponding bar answer option. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.2 shows the same data as Figure 5.1 by country. Combining the three-answer option representing 'already implemented', almost 100% of companies in Indonesia and Viet Nam have already implemented computers. Web meeting systems are the least implemented tool, with less than 1% implementation in all three countries.

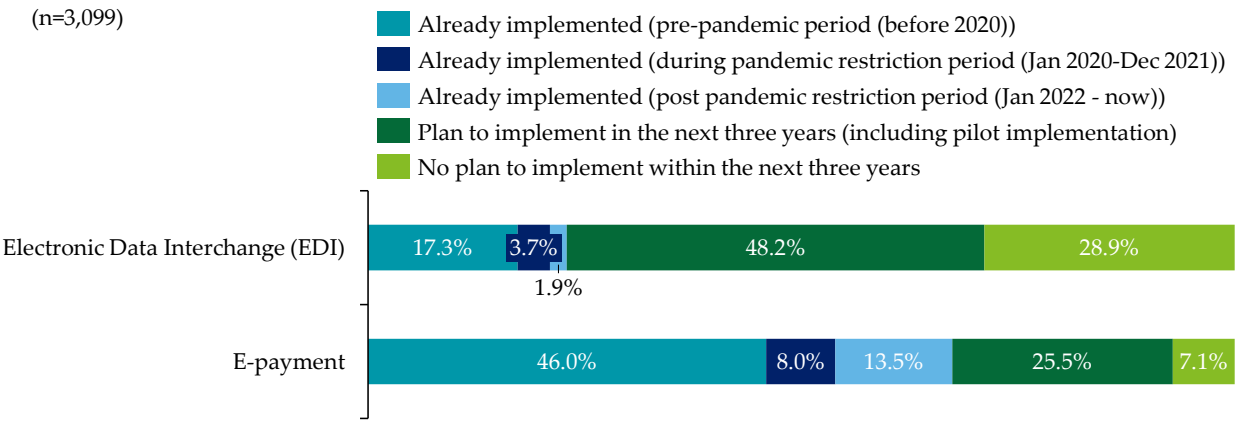
Figure 5.2. Stage of Consideration for Implementing Intra-Company Management Tools by Country



Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents in the corresponding bar country. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.3 provides the stage of consideration in companies for implementing procurement tools in a certain period. Combining the three-answer option representing 'already implemented', e-payment scored the highest at almost 70%. The least implemented tool is electronic data interchange, at about 23%.

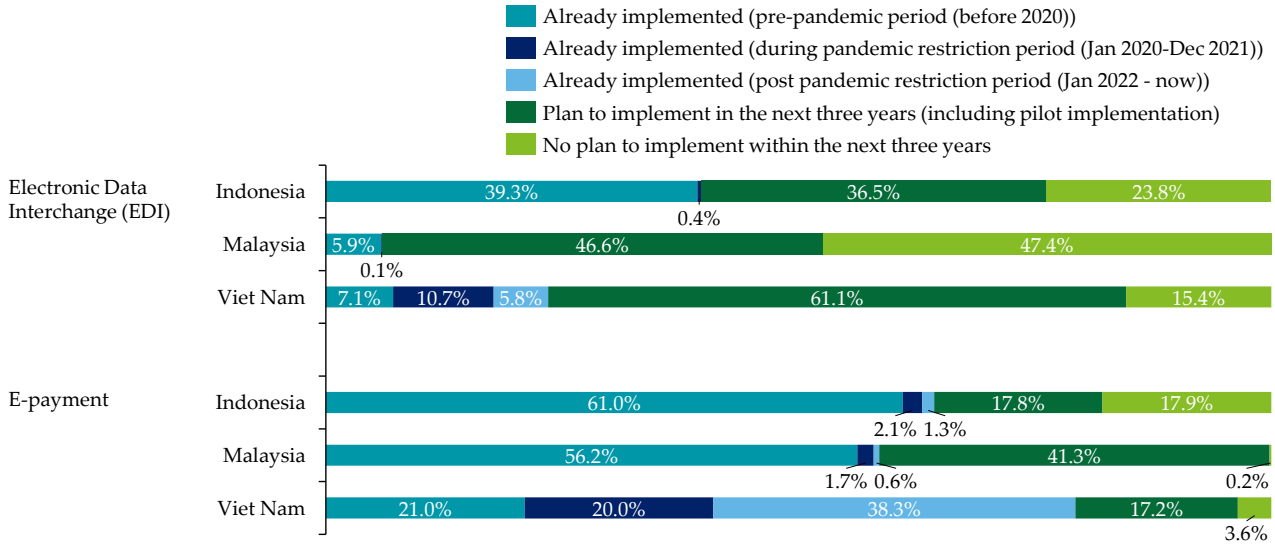
Figure 5.3. Stage of Consideration for Implementing Procurement Tools



Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents of the corresponding bar answer option. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.4 shows the same data as Figure 5.3 by country. Combining the three-answer option representing 'already implemented', almost 80% of companies in Viet Nam have already implemented e-payment. Electronic data interchange is the least implemented tool, with about 40% of companies in Indonesia choosing 'already implemented' for this tool.

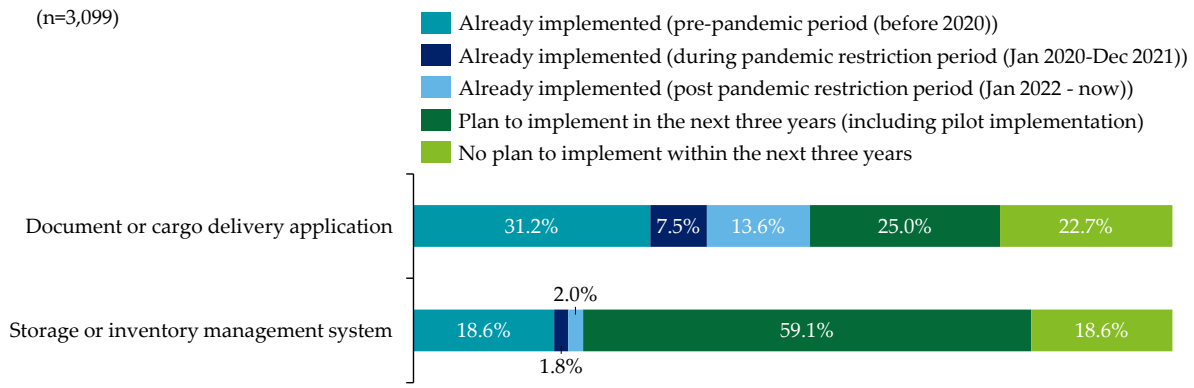
Figure 5.4 Stage of Consideration for Implementing Procurement Tools by Country



Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents in the corresponding bar country. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.5 provides the stage of consideration in companies for implementing logistics tools in a given period. Combining the three-answer option representing 'already implemented', document or cargo delivery application scored the highest at more than 50%, followed by storage or inventory management system as the least implemented tool at only about 20%.

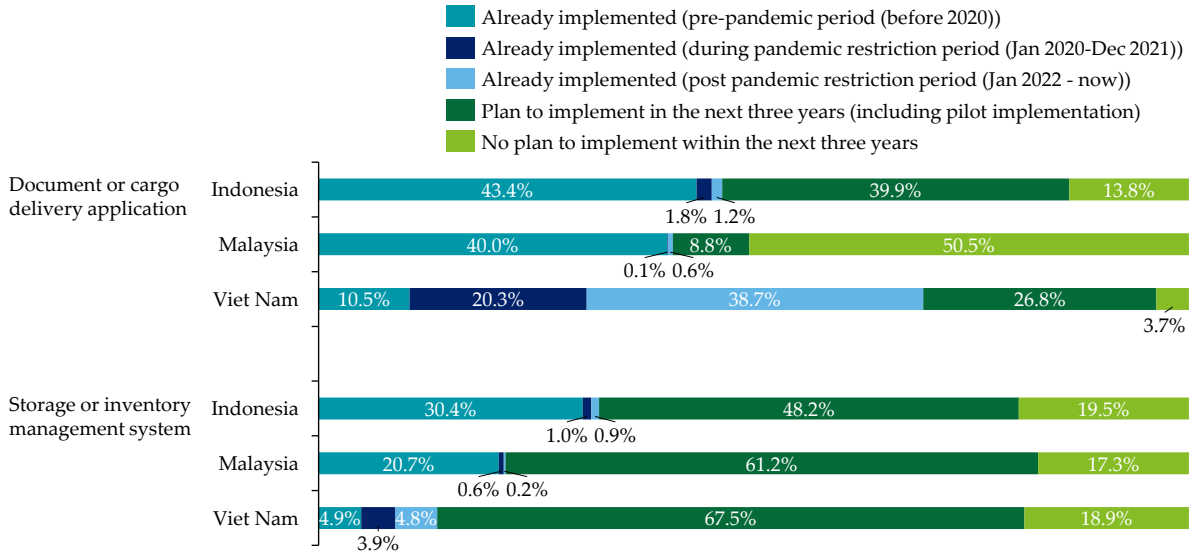
Figure 5.5. Stage of Consideration for Implementing Logistics Tools



Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents of the corresponding bar answer option. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.6 shows the same data as Figure 5.5 by country. Combining the three-answer option representing 'already implemented', almost 70% of companies in Viet Nam have already implemented document or cargo delivery applications. For storage or inventory management systems, Indonesia is the most advanced country in implementing this tool with more than 30%.

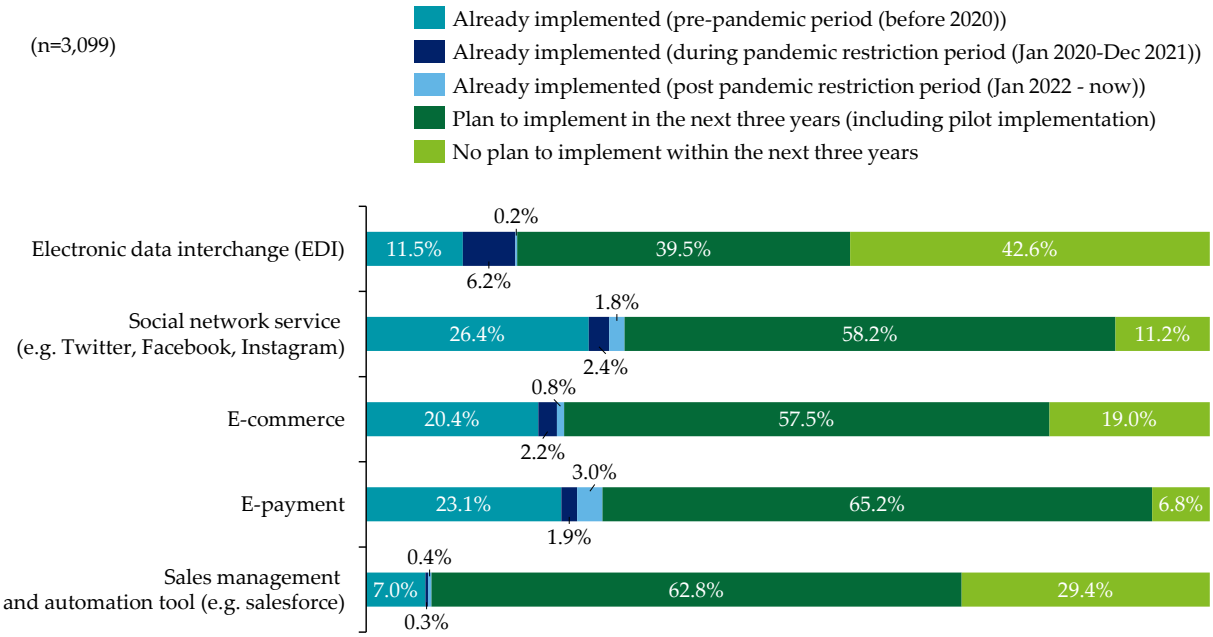
Figure 5.6. Stage of Consideration for Implementing Logistic Tools by Country



Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents in the corresponding bar country. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.7 shows the stage of consideration in companies for implementing sales & marketing tools in a given period. Combining the three-answer option representing 'already implemented', social network service scored the highest at about 20%. The least implemented tool is sales management and automation tools, at below 10%.

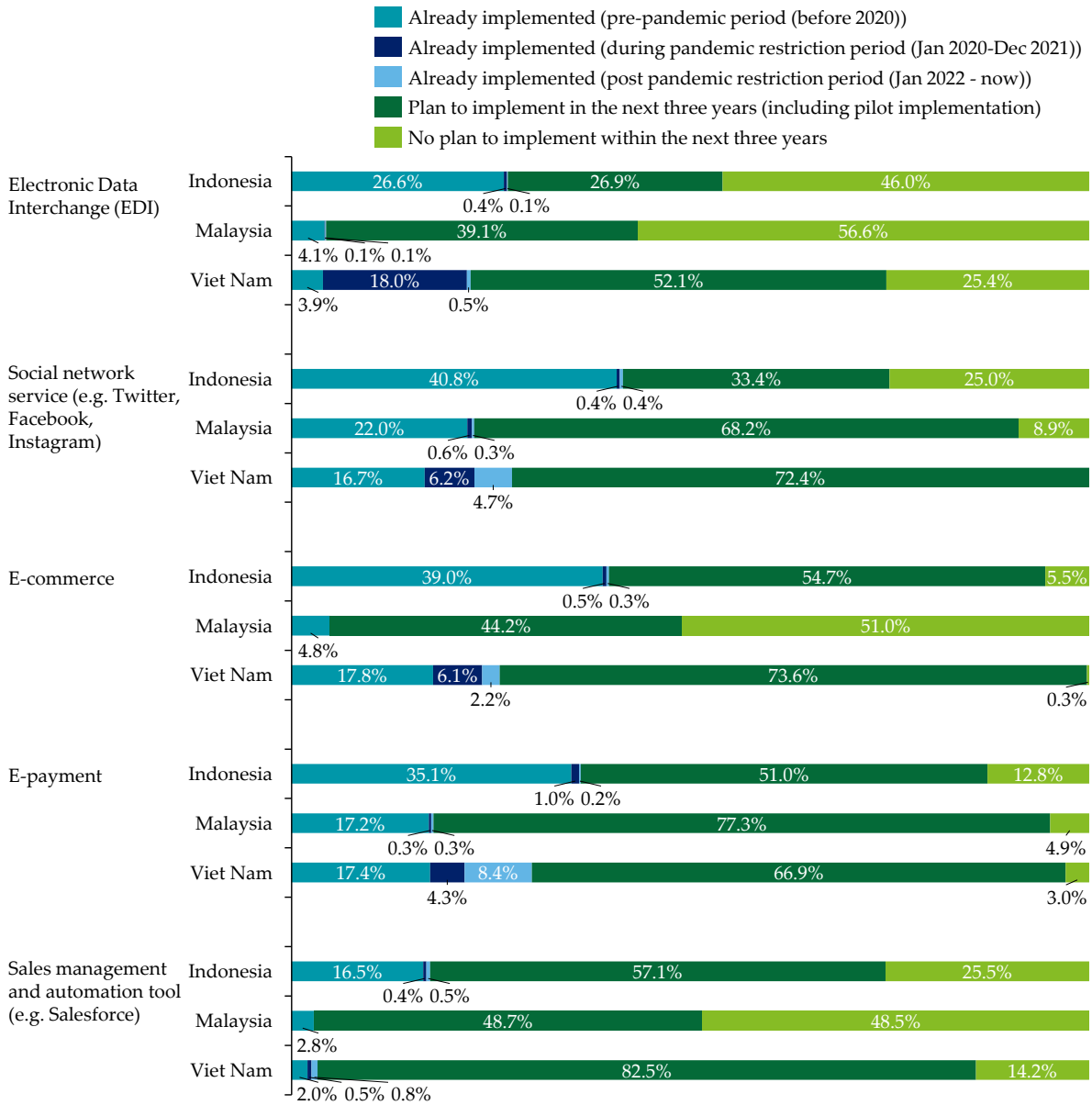
Figure 5.7. Stage of Consideration for Implementing Sales & Marketing Tools



Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents of the corresponding row answer option. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.8 shows the same data as Figure 5.7 by country. Combining the three-answer option representing 'already implemented', Indonesia is the most advanced country in implementing all sales and marketing tools, with social network service and e-commerce as the highest at about 40%, followed by e-payment at 35%, and sales management and automation tools at almost 20%.

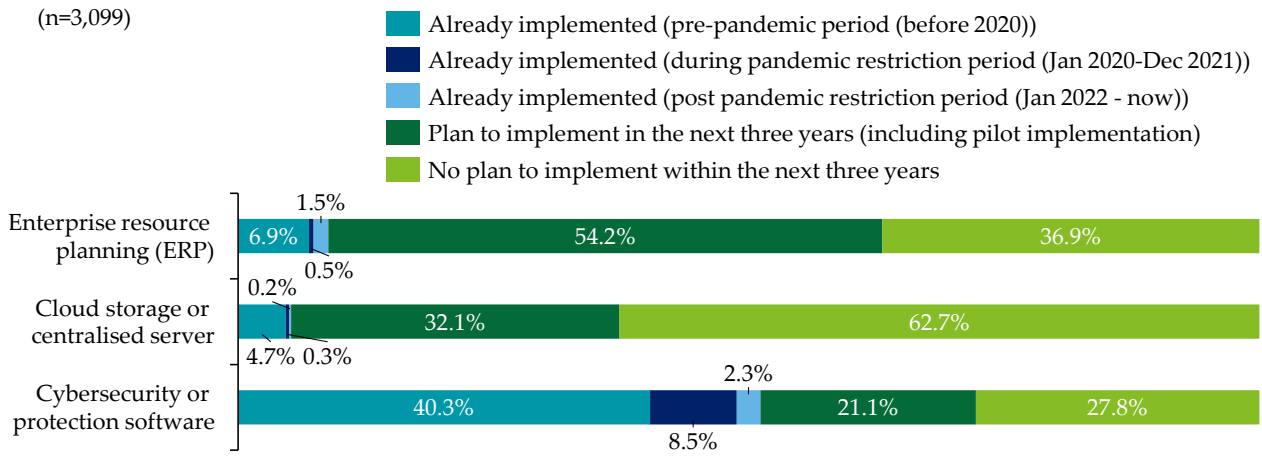
Figure 5.8. Stage of Consideration for Implementing Sales & Marketing Tools by Country



Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents in the corresponding bar country. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.9 provides the stage of consideration in companies for overall company operational tools in a given period. Combining the three-answer option representing 'already implemented', cybersecurity or protection software is the most implemented tool at more than 50%.

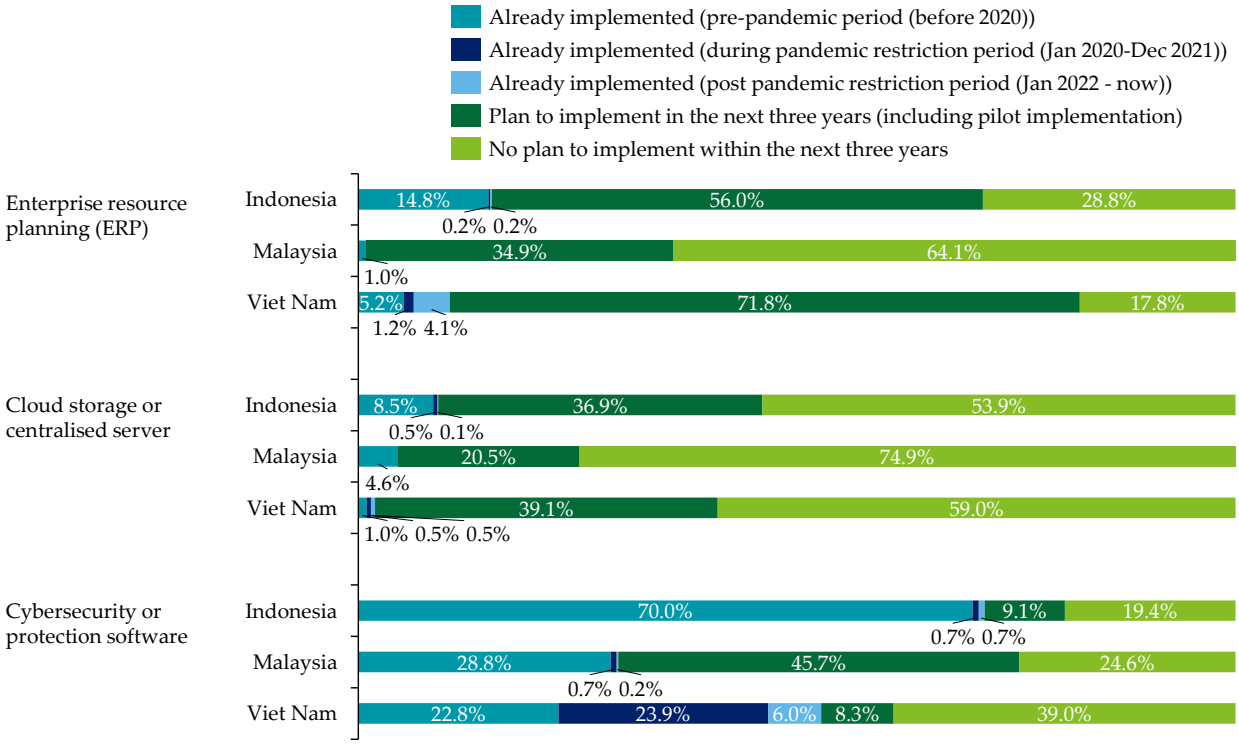
Figure 5.9. Stage of Consideration for Implementing Overall Company Operational Tools



Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents of the corresponding bar answer option. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.10 shows the same data as Figure 5.9 by country. Combining the three-answer option representing 'already implemented', Indonesia is the most advanced country in implementing all overall company operation tools, with cybersecurity or protection software the highest at about 70%.

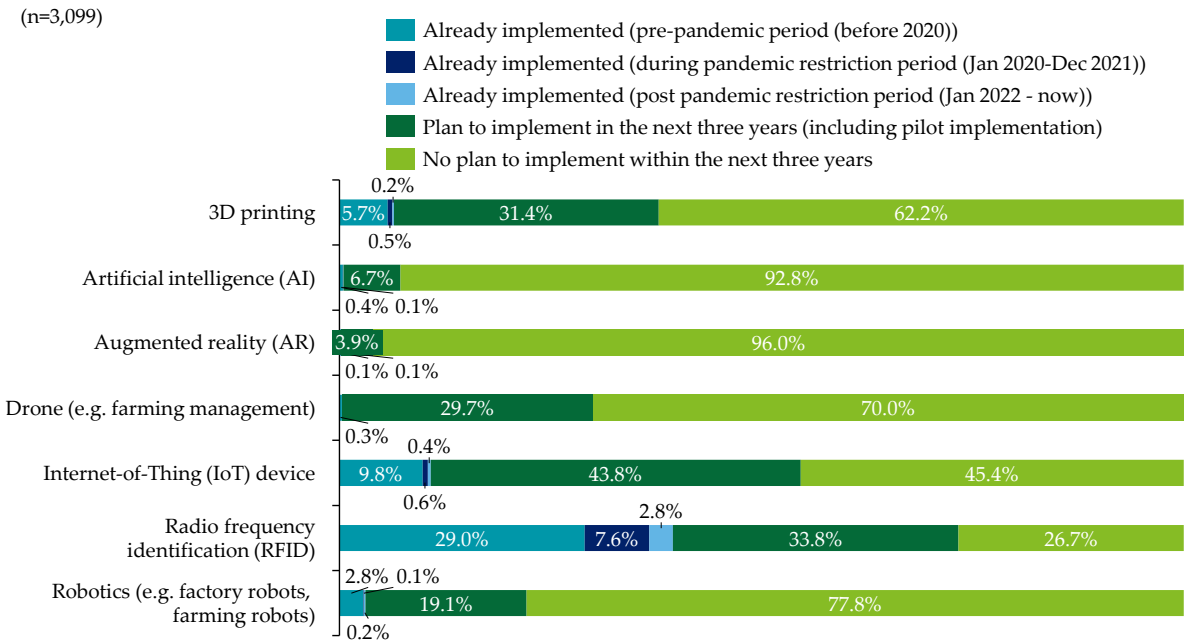
Figure 5.10. Stage of Consideration for Implementing Overall Company Operational Tools by Country



Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents in the corresponding bar country. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.11 provides the stage of consideration in companies for other advanced tools in a given period. Combining the three-answer option representing 'already implemented', radio frequency identification is the highest implemented tool at about 40%, followed by internet of things devices at about 10% and 3D printing at about 6%. For the rest of the 'others' tools, the implementation rate is below than 5%.

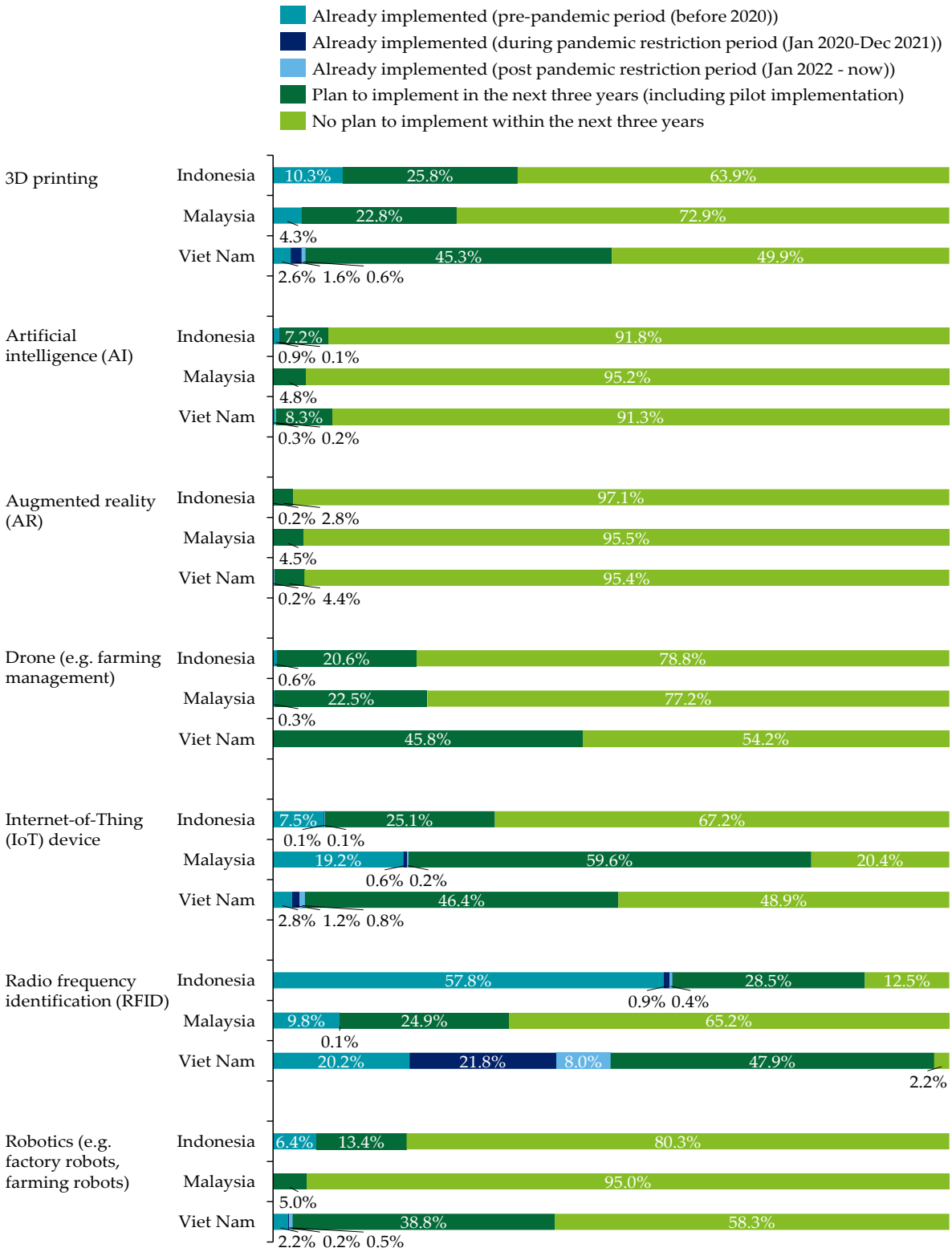
Figure 5.11. Stage of Consideration for Implementing the Other Advanced Tools



Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents of the corresponding bar answer option. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.12 shows the same data as Figure 5.11 by country. Combining the three-answer option representing 'already implemented', Indonesia is the most advanced country in implementing digital tools in 'other' advanced tools, with 60% in radio frequency identification, 10.3% in 3D printing, and 6.4% in robotics. For internet-of-things devices, Malaysia is the most advanced country, with about 20% of respondents having implemented this tool.

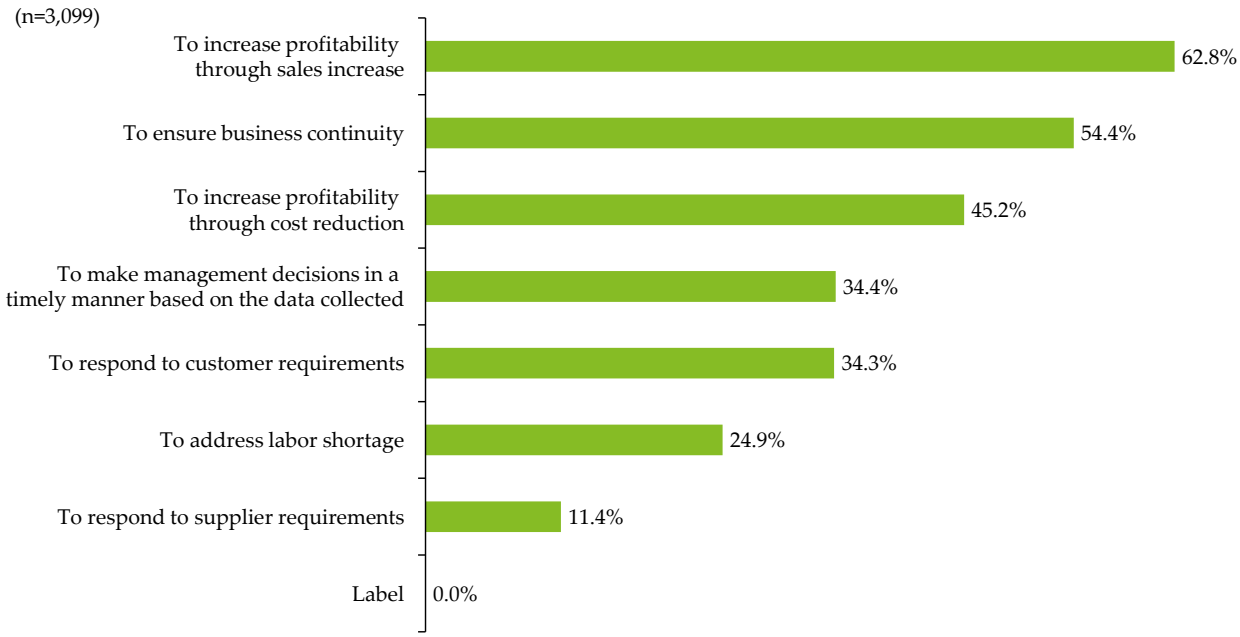
Figure 5.12. Stage of Consideration for Implementing the Other Advanced Tools by Country



Notes: The percentage of each bar is calculated by dividing the total number of responses to each answer option by the total number of respondents in the corresponding bar country. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.13 shows the major objectives of digital tool adoption. Some 62.8% of respondents selected 'to increase profitability through sales increase', followed by 'to ensure business continuity' at 54.4%, and 'to increase profitability through cost reduction' at 45.2%.

Figure 5.13. Breakdown of Major Objectives of Digital Tool Adoption



Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding bar by the total respondents of the questionnaire. (Q24-1. What are the major objectives of digital tools adoption? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 5.31 shows the same data as Figure 5.13 by country. Amongst the three countries, increasing profitability through sales is the top priority, with Viet Nam the highest at 68.1% and Indonesia the lowest at 56.2%. The second highest objective is ensuring business continuity, with Malaysia the highest at 58.1% and Indonesia the lowest at 47.2%. For the third objective on increasing profitability through cost reduction, Indonesia is the highest at 54.7% and Malaysia is the least concerned country at 32.7%.

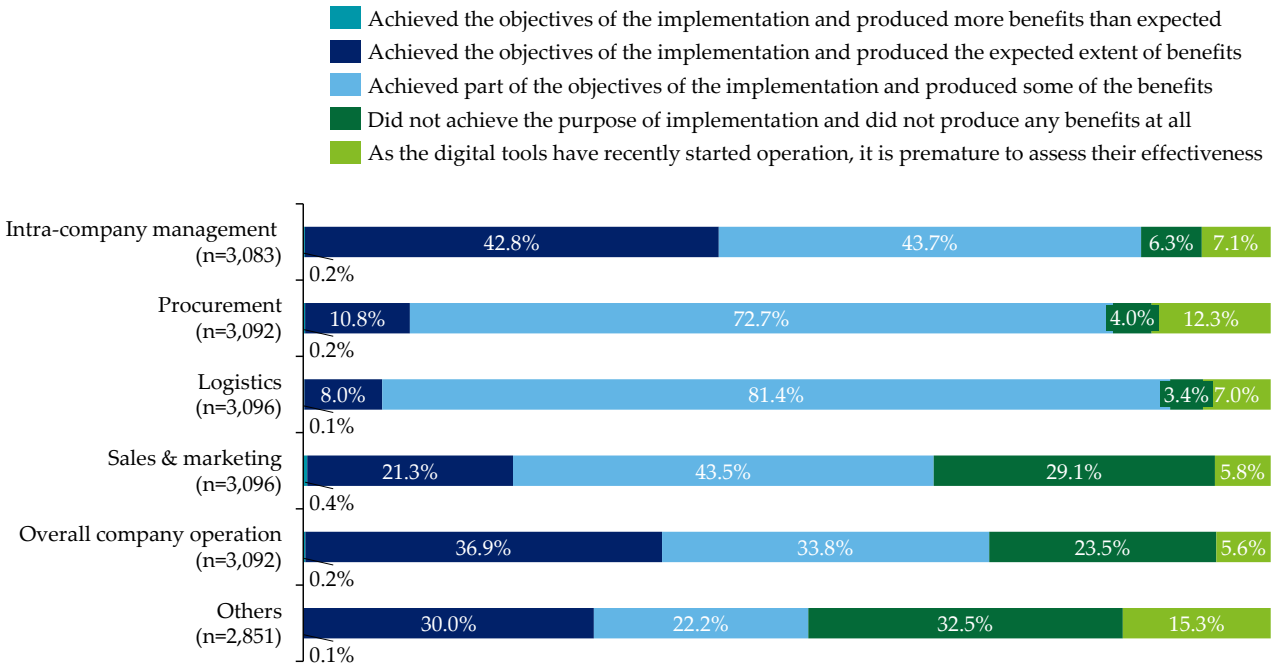
Table 5.31. Breakdown of Major Objectives of Digital Tool Adoption by Country

Country	To increase profitability through sales increase	To increase profitability through cost reduction	To ensure business continuity	To address labour shortage	To make management decisions in a timely manner based on the data collected	To respond to customer requirements (e.g. customer's risk management policy regarding their business partners)	To respond to supplier requirements (e.g. supplier's risk management policy regarding their business partners)	Other
Indonesia	572 (56.2%)	557 (54.7%)	481 (47.2%)	289 (28.4%)	446 (43.8%)	352 (34.6%)	190 (18.7%)	0 (0.0%)
Malaysia	665 (64.0%)	340 (32.7%)	604 (58.1%)	176 (16.9%)	290 (27.9%)	439 (42.3%)	113 (10.9%)	0 (0.0%)
Viet Nam	710 (68.1%)	503 (48.3%)	600 (57.6%)	307 (29.5%)	330 (31.7%)	271 (26.0%)	49 (4.7%)	0 (0.0%)
Total	**1,947 (62.8%)**	**1,400 (45.2%)**	**1,685 (54.4%)**	**772 (24.9%)**	**1,066 (34.4%)**	**1,062 (34.3%)**	**352 (11.4%)**	**0 (0.0%)**

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding row. (Q24-1. What are the major objectives of digital tools adoption? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Figure 5.14 provides the breakdown of digital tools' success in meeting implementation objectives and generating benefits. Combining the three-answer option representing 'achieved the objectives and part of objectives', intra-company management, procurement, and logistics are the highest at more than 80%. 'Others' is the least successful at about 50%.

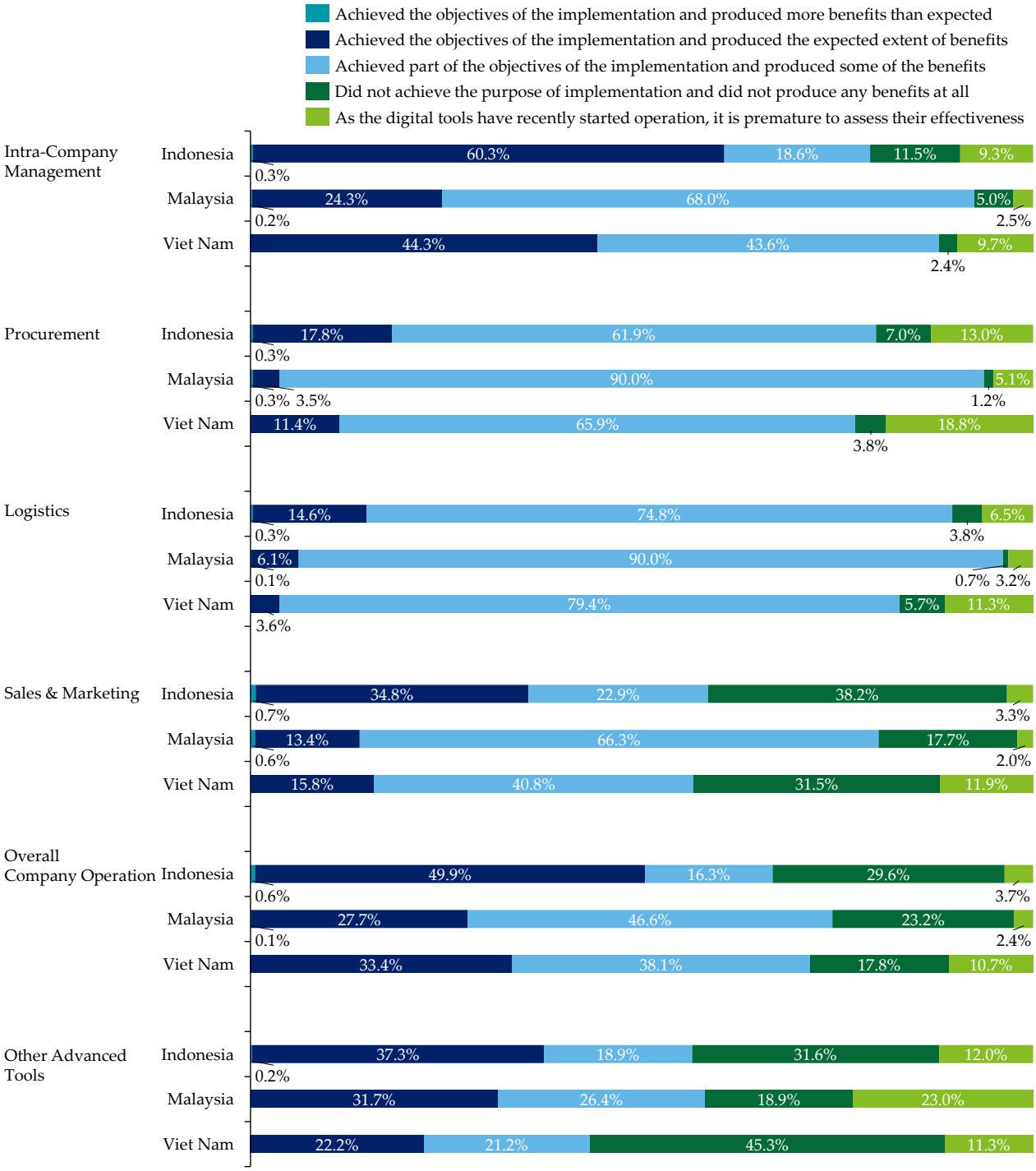
Figure 5.14. Breakdown of Digital Tools' Success in Meeting Implementation Objectives and Generating Benefits



Notes: The percentage of each bar is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding bar. (Q25. How successful has the implementation of the corresponding digital tools been in meeting implementation objectives and generating benefits? If you have experienced multiple cases of implementation, please answer based on your average experience. [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.15 shows the same data as Figure 5.14 by country. Combining the three-answer option representing 'achieved the objectives and part of objectives', about 60%–95% of companies in Malaysia have achieved those with all the digital tools.

Figure 5.15. Breakdown of Digital Tools' Success in Meeting Implementation Objectives and Generating Benefits



Notes: The percentage of each bar is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding bar by country. (Q25. How successful has the implementation of the corresponding digital tools been in meeting implementation objectives and generating benefits? If you have experienced multiple cases of implementation, please answer based on your average experience. [SINGLE CHOICE: choose one option])

Source: Authors.

Table 5.32 shows important consideration factors regarding the tools without an implementation plan within the next 3 years. Amongst the answer options, 'if digital tools have subscription or reasonable profit-sharing models' and 'if digital tools have price package options that can be customised to meet companies' needs' are the most desired factors amongst the answer options.

Table 5.32. Breakdown of Important Consideration Factors Regarding the Tools Without Implementation Plans within the Next 3 Years

Category	Consideration Factors	Intra-Company Management	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
Price	If digital tools have subscription or reasonable profit-sharing models	1,282 (66.6%)	527 (52.0%)	592 (53.4%)	1,169 (62.7%)	1,293 (60.3%)	2,011 (67.2%)
	If digital tools have price package options that can be customised to meet companies' needs	1,172 (60.9%)	611 (60.3%)	589 (53.2%)	1,006 (54.0%)	947 (44.2%)	1,729 (57.8%)
Function or features	If digital tools are available in the local language	700 (36.4%)	351 (34.6%)	384 (34.7%)	671 (36.0%)	722 (33.7%)	1,251 (41.8%)
	If digital tools conform to the business practices of the country	579 (30.1%)	245 (24.2%)	310 (28.0%)	520 (27.9%)	817 (38.1%)	875 (29.2%)
Service	If digital tools have a support programme or team to help diagnose the business issues and provide solution	534 (27.7%)	294 (29.0%)	318 (28.7%)	544 (29.2%)	803 (37.5%)	1,064 (35.5%)

Category	Consideration Factors	Intra-Company Management	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
	If digital tools have a support programme or team in-country	494 (25.7%)	214 (21.1%)	256 (23.1%)	405 (21.7%)	527 (24.6%)	823 (27.5%)
	If digital tools have a support programme or team provided in the local language	400 (20.8%)	300 (29.6%)	235 (21.2%)	473 (25.4%)	702 (32.7%)	575 (19.2%)
Others		0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)

Notes: The percentage of each cell is calculated by dividing the total number of responses to each row answer option by the total number of respondents that selected 'no plan to implement within the next three years' to any of the tools in the tool categories the corresponding column in Q23. (Q26. Please answer the following question regarding the tools selected as 'without implementation plan within the next three years' in Q23: Which factor(s) do you consider important when adopting digital tools? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 5.33 shows the same data as Table 5.32 by country. Amongst the three countries, the availability of subscription or reasonable profit-sharing models is the most important factor, with Viet Nam the most concerned country at more than 70%.

Table 5.33. Breakdown of Important Consideration Factors Regarding the Tools Without Implementation Plans within the Next 3 Years by Country

Country	Category	Consideration Factors	Intra-Company Management	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
Indonesia	Price	If digital tools have subscription or reasonable profit-sharing models	528 (69.1%)	230 (71.2%)	250 (77.6%)	556 (71.0%)	403 (65.8%)	729 (72.8%)
		If digital tools have price package options that can be customised to meet companies' needs	436 (57.1%)	206 (63.8%)	190 (59.0%)	447 (57.1%)	366 (59.8%)	616 (61.5%)
	Function or features	If digital tools are available in the local language	188 (24.6%)	88 (27.2%)	54 (16.8%)	157 (20.1%)	111 (18.1%)	300 (29.9%)
		If digital tools conform to the business	279 (36.5%)	92 (28.5%)	113 (35.1%)	302 (38.6%)	274 (44.8%)	334 (33.3%)

Country	Category	Consideration Factors	Intra-Company Management	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
		practices of the country						
	Service	If digital tools have a support programme or team to help diagnose the business issues and provide solution recommendation	246 (32.2%)	106 (32.8%)	96 (29.8%)	277 (35.4%)	175 (28.6%)	371 (37.0%)
		If digital tools have a support programme or team in-country	275 (36.0%)	88 (27.2%)	83 (25.8%)	271 (34.6%)	201 (32.8%)	311 (31.0%)
		If digital tools have a support programme or team provided in the local language	192 (25.1%)	61 (18.9%)	47 (14.6%)	186 (23.8%)	118 (19.3%)	252 (25.1%)

Country	Category	Consideration Factors	Intra-Company Management	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
	Others		0	0	0	0	0	0
			(0.0%)	(0.0%)	(0.0%)	(0.0%)	(0.0%)	(0.0%)
Malaysia	Price	If digital tools have subscription or reasonable profit-sharing models	260 (44.2%)	124 (25.2%)	153 (26.6%)	340 (43.6%)	358 (40.5%)	466 (47.0%)
		If digital tools have price package options that can be customised to meet companies' needs	367 (62.4%)	283 (57.4%)	271 (47.1%)	385 (49.4%)	352 (39.9%)	533 (53.7%)
	Function or features	If digital tools are available in the local language	441 (75.0%)	243 (49.3%)	307 (53.4%)	490 (62.9%)	285 (32.3%)	572 (57.7%)
		If digital tools conform to the business practices of the country	106 (18.0%)	102 (20.7%)	135 (23.5%)	134 (17.2%)	265 (30.0%)	236 (23.8%)
	Service	If digital tools have a support	143 (24.3%)	163 (33.1%)	208 (36.2%)	223 (28.6%)	463 (52.4%)	335 (33.8%)

Country	Category	Consideration Factors	Intra-Company Management	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
		programme or team to help diagnose the business issues and provide solution recommendation						
		If digital tools have a support programme or team in-country	105 (17.9%)	86 (17.4%)	137 (23.8%)	81 (10.4%)	89 (10.1%)	189 (19.1%)
		If digital tools have a support programme or team provided in the local language	145 (24.7%)	222 (45.0%)	174 (30.3%)	258 (33.1%)	453 (51.3%)	247 (24.9%)
	Others		0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Viet Nam	Price	If digital tools have subscription or reasonable profit-sharing models	494 (86.2%)	173 (87.8%)	189 (89.6%)	273 (90.4%)	532 (82.0%)	816 (81.7%)

Country	Category	Consideration Factors	Intra-Company Management	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
		If digital tools have price package options that can be customised to meet companies' needs	369 (64.4%)	122 (61.9%)	128 (60.7%)	174 (57.6%)	229 (35.3%)	580 (58.1%)
	Function or features	If digital tools are available in the local language	71 (12.4%)	20 (10.2%)	23 (10.9%)	24 (7.9%)	326 (50.2%)	379 (37.9%)
		If digital tools conform to the business practices of the country	194 (33.9%)	51 (25.9%)	62 (29.4%)	84 (27.8%)	278 (42.8%)	305 (30.5%)
	Service	If digital tools have a support programme or team to help diagnose the business issues and provide solution recommendation	145 (25.3%)	25 (12.7%)	14 (6.6%)	44 (14.6%)	165 (25.4%)	358 (35.8%)
		If digital tools have a support	114 (19.9%)	40 (20.3%)	36 (17.1%)	53 (17.5%)	237 (36.5%)	323 (32.3%)

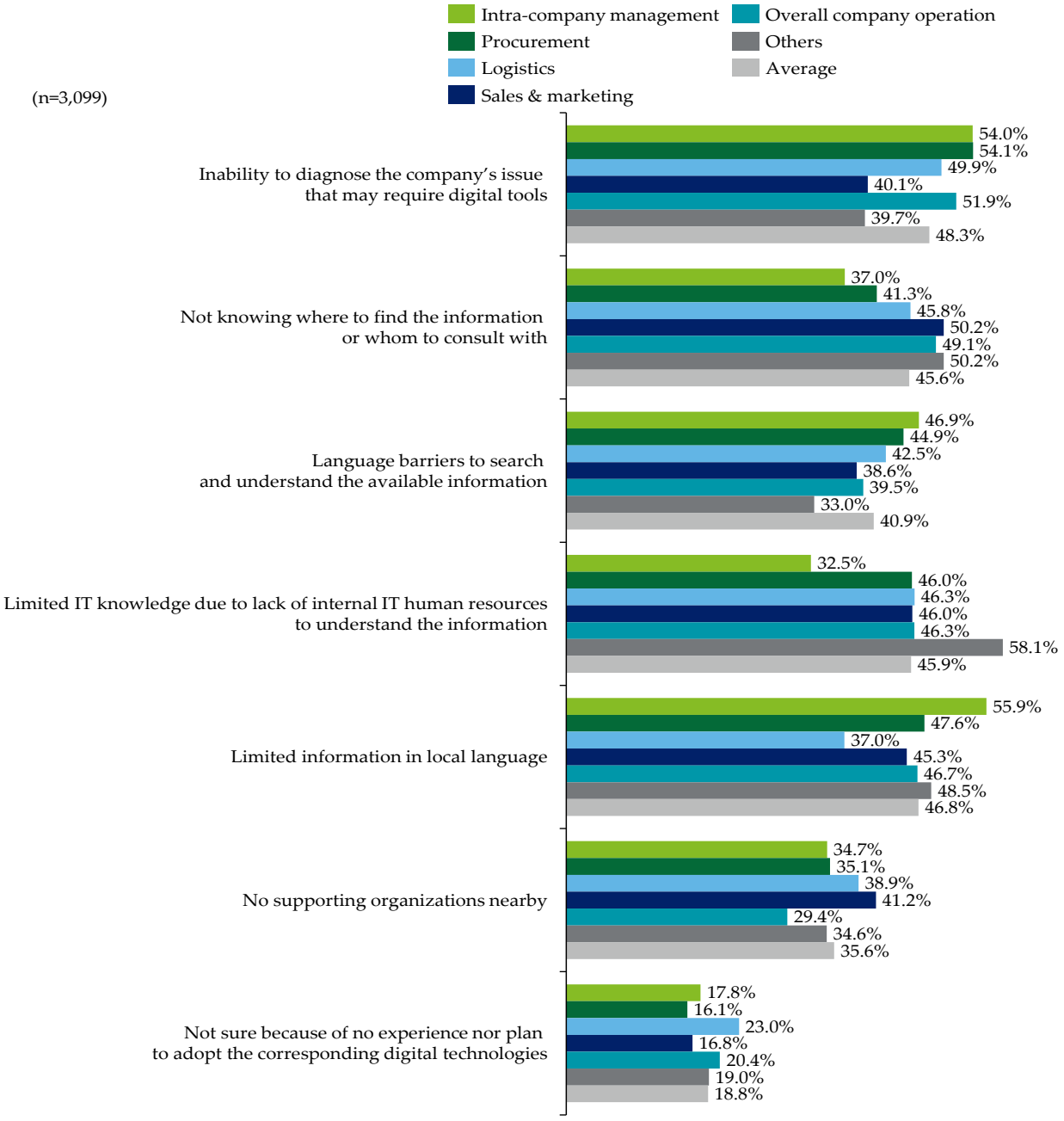
Country	Category	Consideration Factors	Intra-Company Management	Procurement	Logistics	Sales & Marketing	Overall Company Operation	Other Advanced Tools
		programme or team in-country						
		If digital tools have a support programme or team provided in the local language	63 (11.0%)	17 (8.6%)	14 (6.6%)	29 (9.6%)	131 (20.2%)	76 (7.6%)
	Others		0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)

Notes: The percentage of each row is calculated by dividing the total number of responses of the corresponding row by the total number of respondents that selected 'without implementation plan within the next three years' to each corresponding answer option in Q23 by country. (Q26. Please answer the following question regarding the tools selected as 'without implementation plan within the next three years' in Q23: Which factor(s) do you consider important when adopting digital tools? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

- Difficulties and Concerns

Figure 5.16 shows the causes of difficulties in the information gathering phase. On average, 48.3% of respondents cited difficulties due to the inability to diagnose company issues that may require digital tools as the highest amongst the answer options.

Figure 5.16. Breakdown of Causes of Difficulty in the Information Gathering Phase



IT = information technology.
Notes: 'Others' is excluded. The percentage of each bar is calculated by dividing the total number of responses of the corresponding answer option by the total number of respondents to the questionnaire. (Q27. What are the causes of difficulties in information gathering phase? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 5.34 provides the same data as Figure 5.16 by country. Regarding 'inability to diagnose the company's issue that may require digital tools', Cambodia had the highest response amongst the countries, at 82.2% on average, followed by the Philippines at 68.7%.

Table 5.34. Breakdown of Causes of Difficulty in the Information Gathering Phase by Country

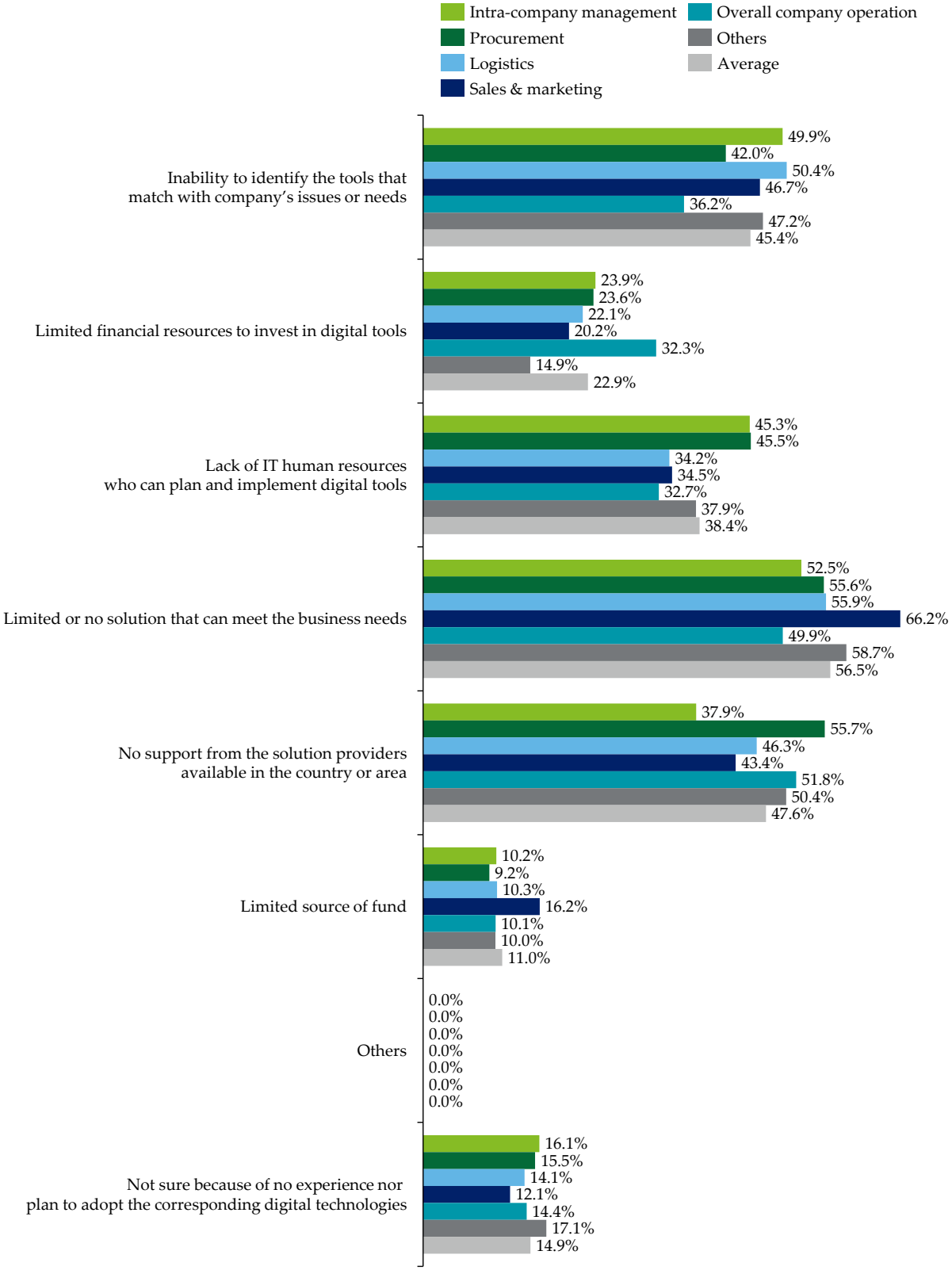
Country	Tool category	A	B	C	D	E	F	G	H
Indonesia	Intra-company management	545 (53.5%)	391 (38.4%)	483 (47.4%)	342 (33.6%)	589 (57.9%)	348 (34.2%)	1 (0.1%)	265 (26.0%)
	Procurement	546 (53.6%)	390 (38.3%)	483 (47.4%)	382 (37.5%)	590 (58.0%)	349 (34.3%)	0 (0.0%)	265 (26.0%)
	Logistics	469 (46.1%)	485 (47.6%)	430 (42.2%)	510 (50.1%)	464 (45.6%)	417 (41.0%)	0 (0.0%)	250 (24.6%)
	Sales & marketing	431 (42.3%)	525 (51.6%)	426 (41.8%)	473 (46.5%)	503 (49.4%)	421 (41.4%)	0 (0.0%)	211 (20.7%)
	Overall company operation	468 (46.0%)	528 (51.9%)	392 (38.5%)	471 (46.3%)	540 (53.0%)	379 (37.2%)	0 (0.0%)	249 (24.5%)
	Others	429 (42.1%)	522 (51.3%)	388 (38.1%)	550 (54.0%)	539 (52.9%)	379 (37.2%)	0 (0.0%)	212 (20.8%)
	Average	481 (53.5%)	474 (38.4%)	434 (47.4%)	455 (33.6%)	538 (57.9%)	382 (34.2%)	0 (0.1%)	242 (26.0%)
Malaysia	Intra-company management	549 (52.8%)	376 (36.2%)	429 (41.3%)	309 (29.7%)	511 (49.2%)	344 (33.1%)	0 (0.0%)	175 (16.8%)
	Procurement	550 (52.9%)	505 (48.6%)	364 (35.0%)	578 (55.6%)	256 (24.6%)	353 (34.0%)	1 (0.1%)	121 (11.6%)
	Logistics	489 (47.1%)	516 (49.7%)	428 (41.2%)	344 (33.1%)	285 (27.4%)	335 (32.2%)	0 (0.0%)	290 (27.9%)
	Sales & marketing	328 (31.6%)	505 (48.6%)	311 (29.9%)	484 (46.6%)	397 (38.2%)	403 (38.8%)	0 (0.0%)	247 (23.8%)
	Overall company operation	551 (53.0%)	472 (45.4%)	481 (46.3%)	493 (47.4%)	296 (28.5%)	190 (18.3%)	0 (0.0%)	211 (20.3%)

Country	Tool category	A	B	C	D	E	F	G	H
	Others	322 (31.0%)	510 (49.1%)	285 (27.4%)	560 (53.9%)	352 (33.9%)	351 (33.8%)	0 (0.0%)	312 (30.0%)
	Average	465 (52.8%)	481 (36.2%)	383 (41.3%)	461 (29.7%)	350 (49.2%)	329 (33.1%)	0 (0.0%)	226 (16.8%)
Viet Nam	Intra-company management	581 (55.8%)	381 (36.6%)	541 (51.9%)	357 (34.3%)	631 (60.6%)	383 (36.8%)	0 (0.0%)	113 (10.8%)
	Procurement	580 (55.7%)	385 (36.9%)	543 (52.1%)	464 (44.5%)	630 (60.5%)	385 (36.9%)	0 (0.0%)	113 (10.8%)
	Logistics	588 (56.4%)	417 (40.0%)	459 (44.0%)	581 (55.8%)	397 (38.1%)	452 (43.4%)	0 (0.0%)	172 (16.5%)
	Sales & marketing	483 (46.4%)	525 (50.4%)	460 (44.1%)	469 (45.0%)	503 (48.3%)	452 (43.4%)	0 (0.0%)	62 (6.0%)
	Overall company operation	588 (56.4%)	523 (50.2%)	351 (33.7%)	470 (45.1%)	611 (58.6%)	342 (32.8%)	0 (0.0%)	173 (16.6%)
	Others	480 (46.1%)	523 (50.2%)	349 (33.5%)	689 (66.1%)	613 (58.8%)	343 (32.9%)	0 (0.0%)	64 (6.1%)
	Average	550 (55.8%)	459 (36.6%)	451 (51.9%)	505 (34.3%)	564 (60.6%)	393 (36.8%)	0 (0.0%)	116 (10.8%)

A = inability to diagnose the company's issue that may require digital tools, B = not knowing where to find the information or whom to consult with, C = language barriers to search and understand the available information, D = limited IT knowledge due to a lack of internal IT human resources to understand the information, E = limited information in local language, F = no supporting organisations nearby, G = other, H = not sure because of no experience nor plan to adopt the corresponding digital technologies, IT = information technology.
Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding row country. (Q27. What are the causes of difficulties in information gathering phase? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Figure 5.17 shows the causes of difficulties in the adoption phase. On average, 56.5% of respondents have difficulties due to limited solutions or lack thereof that can meet the business needs as the highest amongst the answer options. This is followed by the inability to identify tools that match company issues or needs, at 45.4% on average.

Figure 5.17. Breakdown of Causes of Difficulties in the Adoption Phase



Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total respondents to the questionnaire. (Q28. What are the causes of difficulties in information adoption phase? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 5.35 provides the same data as Figure 5.17 by country. Regarding 'limited or no solution that can meet the business needs', Malaysia stands out amongst the countries at 61.0% on average, followed by Viet Nam (53.9%) and Indonesia (39.8%).

Table 5.35. Breakdown of Causes of Difficulty in the Adoption Phase by Country

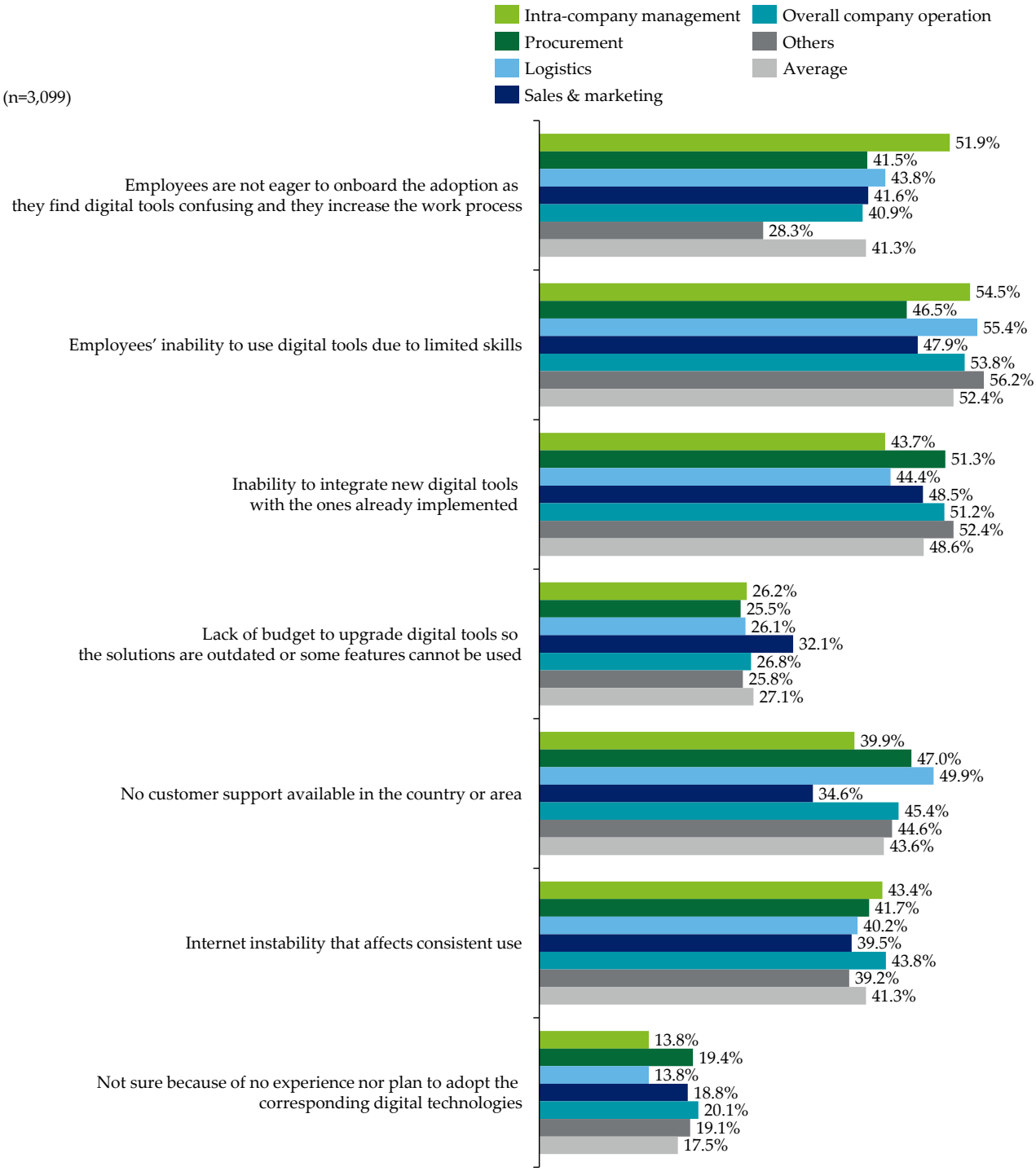
Country	Tool category	A	B	C	D	E	F	G	H
Indonesia	Intra-company management	456 (44.8 %)	247 (24.3 %)	340 (33.4 %)	621 (61.0 %)	428 (42.0 %)	127 (12.5 %)	1 (0.1%)	157 (15.4 %)
	Procurement	402 (39.5 %)	246 (24.2 %)	391 (38.4 %)	620 (60.9 %)	482 (47.3 %)	102 (10.0 %)	0 (0.0%)	158 (15.5 %)
	Logistics	466 (45.8 %)	229 (22.5 %)	313 (30.7 %)	609 (59.8 %)	454 (44.6 %)	126 (12.4 %)	0 (0.0%)	158 (15.5 %)
	Sales & marketing	465 (45.7 %)	195 (19.2 %)	313 (30.7 %)	682 (67.0 %)	457 (44.9 %)	126 (12.4 %)	0 (0.0%)	158 (15.5 %)
	Overall company operation	353 (34.7 %)	293 (28.8 %)	288 (28.3 %)	623 (61.2 %)	478 (47.0 %)	129 (12.7 %)	0 (0.0%)	158 (15.5 %)
	Others	454 (44.6 %)	192 (18.9 %)	338 (33.2 %)	620 (60.9 %)	480 (47.2 %)	127 (12.5 %)	0 (0.0%)	158 (15.5 %)
	Average	433 (44.8 %)	234 (24.3 %)	331 (33.4 %)	629 (61.0 %)	463 (42.0 %)	123 (12.5 %)	0 (0.1%)	158 (15.4 %)
Malaysia	Intra-company management	555 (53.4 %)	175 (16.8 %)	630 (60.6 %)	414 (39.8 %)	357 (34.4 %)	56 (5.4%)	0 (0.0%)	313 (30.1 %)
	Procurement	512 (49.3 %)	167 (16.1 %)	438 (42.2 %)	510 (49.1 %)	698 (67.2 %)	67 (6.4%)	0 (0.0%)	294 (28.3 %)
	Logistics	526 (50.6 %)	178 (17.1 %)	390 (37.5 %)	565 (54.4 %)	514 (49.5 %)	60 (5.8%)	0 (0.0%)	249 (24.0 %)
	Sales & marketing	414 (39.8 %)	260 (25.0 %)	399 (38.4 %)	590 (56.8 %)	424 (40.8 %)	240 (23.1 %)	0 (0.0%)	188 (18.1 %)
	Overall company operation	529 (50.9 %)	240 (23.1 %)	442 (42.5 %)	335 (32.2 %)	584 (56.2 %)	51 (4.9%)	0 (0.0%)	258 (24.8 %)

Country	Tool category	A	B	C	D	E	F	G	H
	Others	474 (45.6 %)	99 (9.5%)	405 (39.0 %)	607 (58.4 %)	538 (51.8 %)	52 (5.0%)	0 (0.0%)	341 (32.6 %)
	Average	502 (53.4 %)	187 (16.8 %)	451 (60.6 %)	504 (39.8 %)	519 (34.4 %)	88 (5.4%)	0 (0.0%)	274 (30.1 %)
Viet Nam	Intra-company management	507 (48.7 %)	306 (29.4 %)	409 (39.3 %)	562 (53.9 %)	368 (35.3 %)	126 (12.1 %)	0 (0.0%)	21 (2.0%)
	Procurement	364 (34.9 %)	306 (29.4 %)	555 (53.3 %)	562 (53.9 %)	516 (49.5 %)	111 (10.7 %)	0 (0.0%)	21 (2.0%)
	Logistics	543 (52.1 %)	267 (25.6 %)	337 (32.3 %)	527 (50.6 %)	441 (42.3 %)	126 (12.1 %)	0 (0.0%)	21 (2.0%)
	Sales & marketing	543 (52.1 %)	161 (15.5 %)	339 (32.5 %)	743 (71.3 %)	439 (42.1 %)	126 (12.1 %)	0 (0.0%)	21 (2.0%)
	Overall company operation	220 (21.1 %)	451 (43.3 %)	265 (25.4 %)	561 (53.8 %)	513 (49.2 %)	126 (12.1 %)	0 (0.0%)	21 (2.0%)
	Others	507 (48.7 %)	161 (15.5 %)	409 (39.3 %)	560 (53.7 %)	515 (49.4 %)	126 (12.1 %)	0 (0.0%)	21 (2.0%)
	Average	447 (48.7 %)	275 (29.4 %	386 (39.3 %)	586 (53.9 %)	465 (35.3 %)	124 (12.1 %)	0 (0.0%)	21 (2.0%)

A = inability to identify the tools that match with company's issues or needs, B = limited financial resources to invest in digital tools, C = lack of IT human resources who can plan and implement digital tools, D = limited or no solution that can meet the business needs, E = no support from the solution providers available in the country or area, F = limited source of fund, G = others, H = not sure because of no experience nor plan to adopt the corresponding digital technologies, IT = information technology.
Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding row country. (Q28. What are the causes of difficulties in adoption phase? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Figure 5.18 shows the causes of difficulties in the post-adoption phase. On average, 52.4% of respondents cited difficulties due to employees' inability to use digital tools because of limited skills as the highest amongst the answer options. This is followed by the inability to integrate new digital tools with the ones already implemented, at 48.6% on average.

Figure 5.18. Breakdown of Causes of Difficulty in the Post-Adoption Phase



Notes: 'Others' is not included in the list of difficulties in the figure as no such responses were obtained. The percentage of each bar is calculated by dividing the total number of responses of the corresponding bar by the total number of respondents to the questionnaire. (Q28. What are the causes of difficulties in information adoption phase? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 5.36 provides the same data as Figure 5.18 by country. Regarding 'employees' inability to use digital tools due to limited skills', all countries scored around 50% on average.

Table 5.36. Breakdown of the Causes of Difficulty in the Post-Adoption Phase by Country

Country	Tool Category	A	B	C	D	E	F	G	H
Indonesia	Intra-company management	499 (49.0%)	512 (50.3 %)	403 (39.6 %)	379 (37.2 %)	390 (38.3 %)	561 (55.1 %)	0 (0.0%)	212 (20.8%)
	Procurement	451 (44.3%)	518 (50.9 %)	456 (44.8 %)	381 (37.4 %)	393 (38.6 %)	565 (55.5 %)	0 (0.0%)	214 (21.0%)
	Logistics	449 (44.1%)	567 (55.7 %)	405 (39.8 %)	384 (37.7 %)	391 (38.4 %)	567 (55.7 %)	0 (0.0%)	213 (20.9%)
	Sales & marketing	448 (44.0%)	516 (50.7 %)	446 (43.8 %)	375 (36.8 %)	228 (22.4 %)	547 (53.7 %)	0 (0.0%)	214 (21.0%)
	Overall company operation	449 (44.1%)	568 (55.8 %)	457 (44.9 %)	381 (37.4 %)	391 (38.4 %)	565 (55.5 %)	0 (0.0%)	214 (21.0%)
	Others	347 (34.1%)	568 (55.8 %)	455 (44.7 %)	383 (37.6 %)	392 (38.5 %)	564 (55.4 %)	0 (0.0%)	214 (21.0%)
	Average	441 (43.3%)	542 (53.2 %)	437 (42.9 %)	381 (37.4 %)	364 (35.8 %)	562 (55.2 %)	0 (0.0%)	214 (21.0%)
Malaysia	Intra-company management	414 (39.8%)	698 (67.2 %)	554 (53.3 %)	143 (13.8 %)	368 (35.4 %)	354 (34.1 %)	0 (0.0%)	151 (14.5%)
	Procurement	284 (27.3%)	447 (43.0 %)	587 (56.5 %)	119 (11.5 %)	588 (56.6 %)	299 (28.8 %)	0 (0.0%)	322 (31.0%)
	Logistics	358 (34.5%)	530 (51.0 %)	571 (55.0 %)	135 (13.0 %)	677 (65.2 %)	252 (24.3 %)	0 (0.0%)	150 (14.4%)
	Sales & marketing	292 (28.1%)	491 (47.3 %)	515 (49.6 %)	335 (32.2 %)	472 (45.4 %)	260 (25.0 %)	0 (0.0%)	302 (29.1%)

Country	Tool Category	A	B	C	D	E	F	G	H
	Overall company operation	268 (25.8%)	476 (45.8 %)	584 (56.2 %)	159 (15.3 %)	540 (52.0 %)	365 (35.1 %)	0 (0.0%)	343 (33.0%)
	Others	270 (26.0%)	554 (53.3 %)	622 (59.9 %)	126 (12.1 %)	511 (49.2 %)	222 (21.4 %)	0 (0.0%)	311 (29.9%)
	Average	314 (30.3%)	533 (51.3 %)	572 (55.1 %)	170 (16.3 %)	526 (50.6 %)	292 (28.1 %)	0 (0.0%)	263 (25.3%)
Viet Nam	Intra-company management	695 (66.7%)	478 (45.9 %)	398 (38.2 %)	291 (27.9 %)	477 (45.8 %)	429 (41.2 %)	0 (0.0%)	66 (6.3%)
	Procurement	550 (52.8%)	475 (45.6 %)	548 (52.6 %)	289 (27.7 %)	477 (45.8 %)	428 (41.1 %)	0 (0.0%)	66 (6.3%)
	Logistics	549 (52.7%)	619 (59.4 %)	400 (38.4 %)	289 (27.7 %)	477 (45.8 %)	428 (41.1 %)	0 (0.0%)	66 (6.3%)
	Sales & marketing	549 (52.7%)	476 (45.7 %)	542 (52.0 %)	285 (27.4 %)	372 (35.7 %)	417 (40.0 %)	0 (0.0%)	66 (6.3%)
	Overall company operation	550 (52.8%)	623 (59.8 %)	546 (52.4 %)	290 (27.8 %)	477 (45.8 %)	428 (41.1 %)	0 (0.0%)	66 (6.3%)
	Others	260 (25.0%)	620 (59.5 %)	546 (52.4 %)	289 (27.7 %)	479 (46.0 %)	428 (41.1 %)	0 (0.0%)	66 (6.3%)
	Average	526 (50.4%)	549 (52.6 %)	497 (47.7 %)	289 (27.7 %)	460 (44.1 %)	426 (40.9 %)	0 (0.0%)	66 (6.3%)

A = employees are not eager to onboard the adoption as they find digital tools confusing and they increase the work process, B = employees' inability to use digital tools due to limited skills, C = inability to integrate new digital tools with the ones already implemented, D = lack of budget to upgrade digital tools so the solutions are outdated or some features cannot be used, E = no customer support available in the country or area, F = internet instability that affects consistent use, G = others, H = not sure because of no experience nor plan to adopt the corresponding digital technologies.

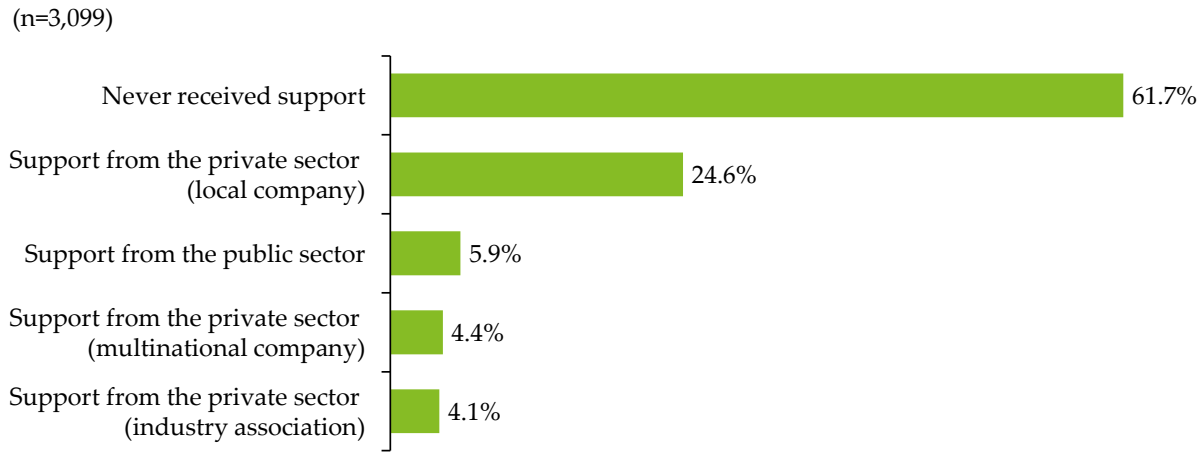
Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding row country. (Q29. What are the causes of difficulties in post adoption phase? [MULTIPLE CHOICE: choose all options that apply])

Source: Authors.

- Need for Support

Figure 5.19 shows the support that respondents have received in digital tool adoption. Some 61.7% of respondents have never received support, followed by support from the private sector through a local company at 24.6% and support from the public sector at 5.9%.

Figure 5.19. Breakdown of Support Received in Digital Tool Adoption



Notes: Support from the public sector includes governments and public institutions. Support from the private sector (industry association) includes private manufacturing industry associations to which manufacturing companies belong. The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total respondents to the questionnaire. (Q30. Which support have you ever received in digital tool adoption? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 5.37 provides the same data as Figure 5.19 by country. For companies that have never received support, Viet Nam has the highest rate at 79.0% while Malaysia has the lowest rate at 43.2%. Regarding support from the private sector through a local company, Malaysia has the highest rate at 36.3% while Viet Nam has the lowest rate at 17.3%. Regarding support from the public sector, Indonesia has the highest rate at 10.7% while Viet Nam has the lowest rate at zero.

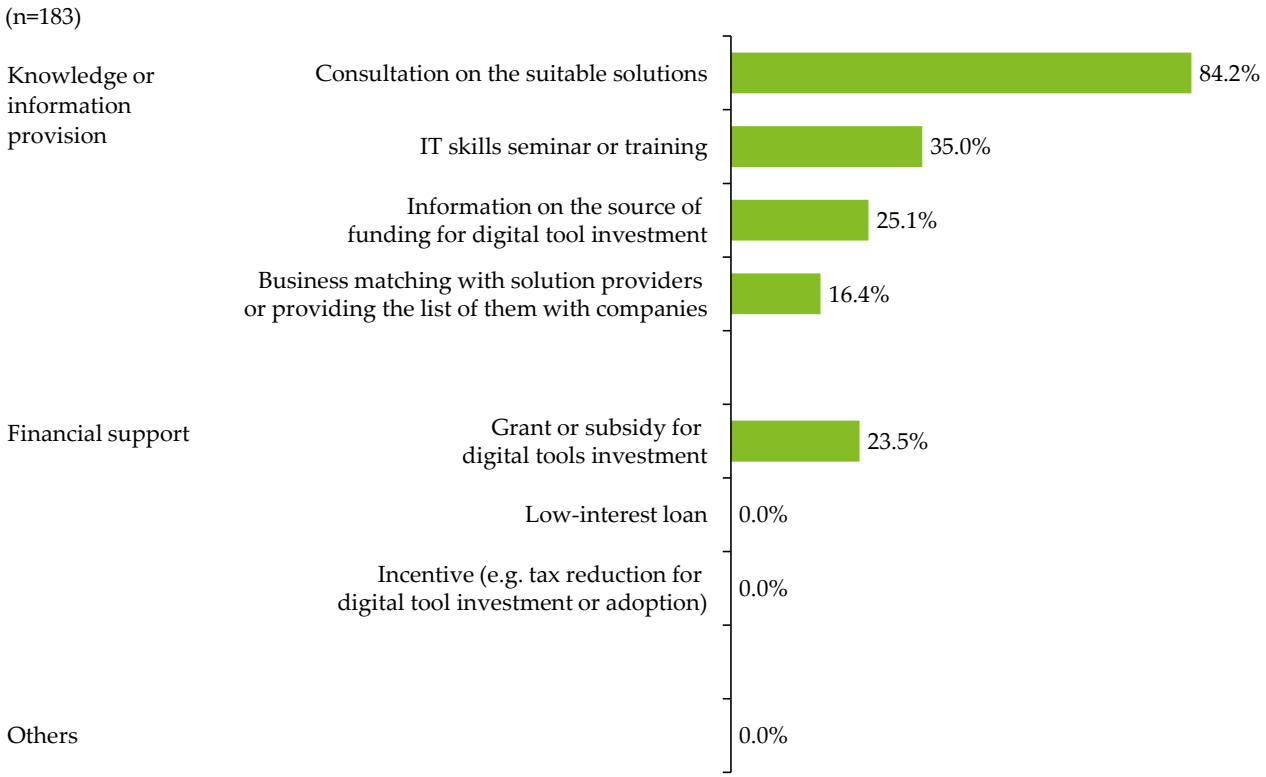
Table 5.37. Breakdown of Support Received in Digital Tool Adoption by Country

Country	Never Received Support	Support from Private Sector (Industry Association)	Support from Private Sector (Multinational Company)	Support from Private Sector (Local Company)	Support from the Public Sector
Indonesia	639 (62.8%)	13 (1.3%)	74 (7.3%)	206 (20.2%)	109 (10.7%)
Malaysia	449 (43.2%)	115 (11.1%)	24 (2.3%)	377 (36.3%)	74 (7.1%)
Viet Nam	823 (79.0%)	0 (0.0%)	39 (3.7%)	180 (17.3%)	0 (0.0%)
Total	**1,911**	**128**	**137**	**783**	**183**

Notes: Support from the public sector includes governments and public institutions. Support from the private sector (industry association) includes private manufacturing industry associations to which manufacturing companies belong. The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding row country. (Q30. Which support have you ever received in digital tool adoption? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Figure 5.20 shows the support received from the public sector. For knowledge or information provision, 84.2% of respondents selected 'consultation on the suitable solutions' as the most common support received. For financial support, 23.5% of respondents selected 'grant or subsidy for digital tools investment', and no responses were obtained for `low-interest loan', 'incentive (e.g. tax reduction for digital tool investment or adoption)', and 'others'.

Figure 5.20. Breakdown of the Support Received from the Public Sector



IT = information technology.
Notes: No respondent selected 'low-interest loan', 'incentive', or 'others'. Support from the public sector includes governments and public institutions. The percentage of each bar is calculated by dividing the total number of responses of the corresponding bar by the total number of respondents that selected 'support from the public sector (government or public institution)' in Q30. (Q31. If you selected 'support from the public sector (government or public institution)' in Q30, what support have you received? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 5.38 provides the same data as Figure 5.20 by country. Indonesia had the highest share of responses citing 'consultation on the suitable solutions' as the most common form of support received in knowledge or information provision, at 88.1%. It also had the highest share of responses citing 'grant or subsidy for digital tools investment' as the most common form of support received in financial support, at 25.7%.

Table 5.38. Breakdown of the Support Received from the Public Sector by Country

Country	IT skills seminar or training	Consultation on the suitable solutions	Business matching with solution providers or providing the list of them with companies	Information on the source of funding for digital tool investment	Grant or subsidy for digital tools investment	Low-interest loan	Incentive	Others
Indonesia	7	96	24	44	28	0	0	0
	(6.4%)	(88.1%)	(22.0%)	(40.4%)	(25.7%)	(0.0%)	(0.0%)	(0.0%)
Malaysia	57	58	6	2	15	0	0	0
	(77.0%)	(78.4%)	(8.1%)	(2.7%)	(20.3%)	(0.0%)	(0.0%)	(0.0%)
Viet Nam	0	0	0	0	0	0	0	0
	(0.0%)	(0.0%)	(0.0%)	(0.0%)	(0.0%)	(0.0%)	(0.0%)	(0.0%)
Total	**64**	**154**	**30**	**46**	**43**	**0**	**0**	**0**
	(35.0%)	**(84.2%)**	**(16.4%)**	**(25.1%)**	**(23.5%)**	**(0.0%)**	**(0.0%)**	**(0.0%)**

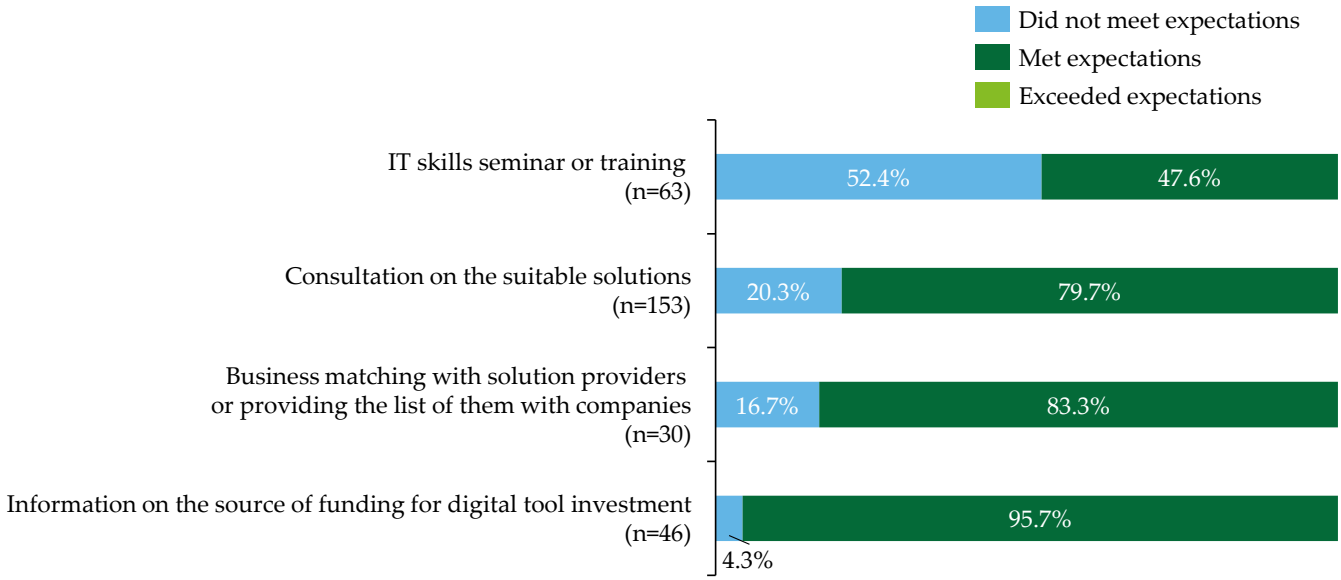
IT = information technology.

Notes: Support from the public sector includes governments and public institutions. 'Incentive' includes tax reductions for digital tools investment or adoption. The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding row by country that selected 'support from the public sector (government or public institution)' in Q30. (Q31. If you selected 'support from the public sector (government or public institution)' in Q30, what support have you received? [MULTIPLE CHOICE: choose all options that apply])

Source: Authors.

Figure 5.21 shows the satisfaction level for the support received in knowledge or information provision from the public sector. 'IT skills seminar or training' is the only answer option that scored more than 50% for 'did not meet expectations'. The limited sample should be noted, as the figure shows.

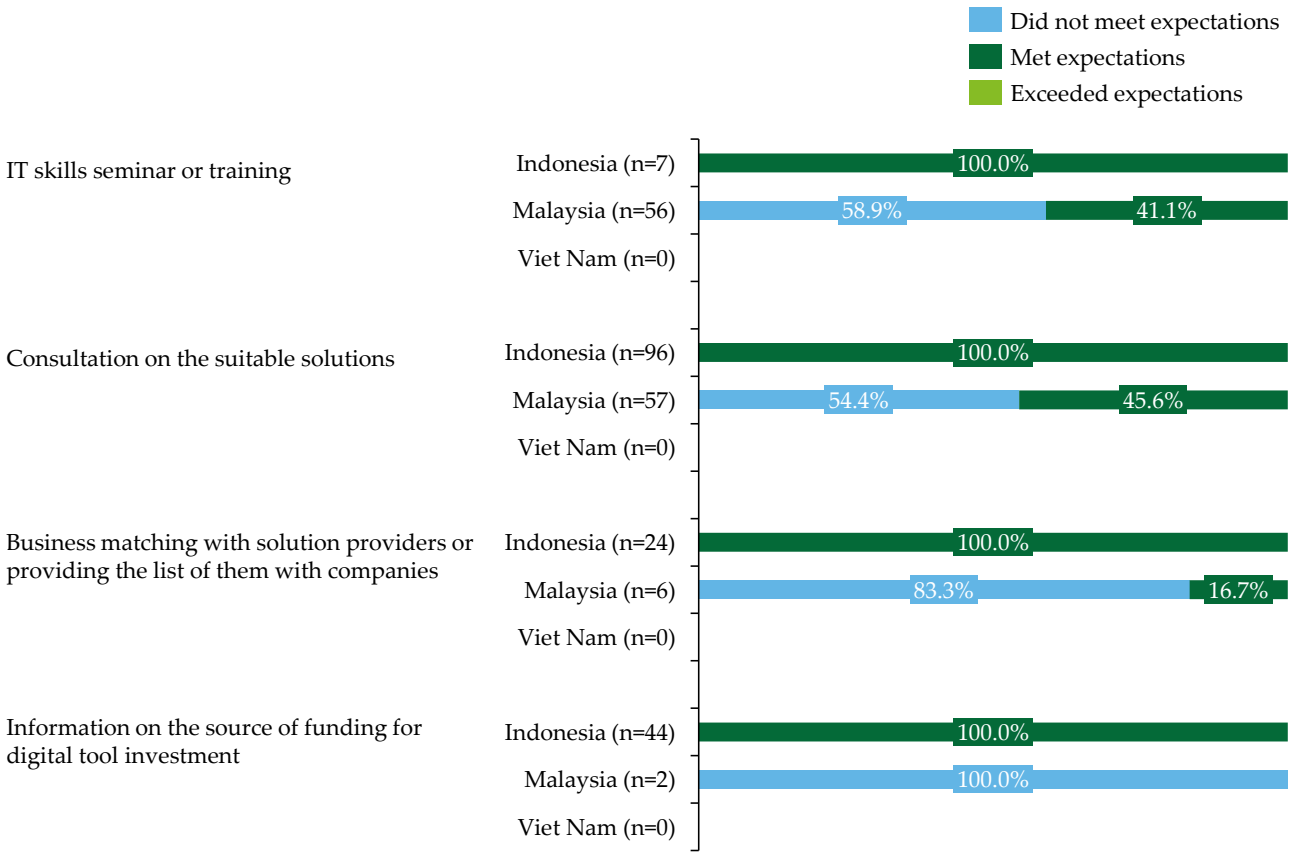
Figure 5.21. Breakdown of the Satisfaction Level for the Support Received in Knowledge or Information Provision from the Public Sector



IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding bar by the total respondents that selected 'support from the public sector (government or public institution)' in Q30. (Q32. Did the support you received as answered in Q31 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.22 provides the same data as Figure 5.21 by country. All the respondents from Indonesia reported that the support provided by the public sector 'met expectations'. In Malaysia, 100% of respondents selected 'did not meet expectations' for 'information on the source of funding for digital tool investment'. The limited sample should be noted, as the figure shows.

Figure 5.22. Breakdown of the Satisfaction Level for the Support Received in Knowledge or Information Provision from the Public Sector by Country



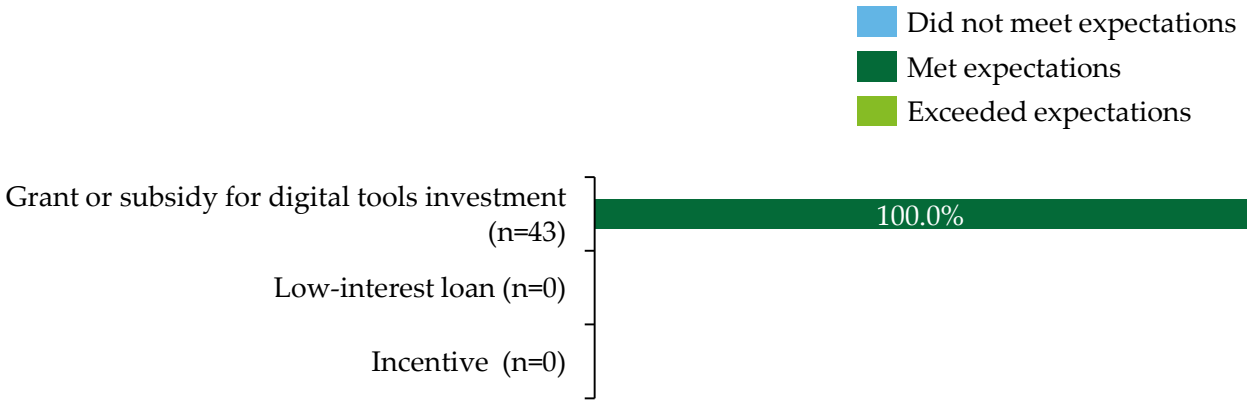
IT = information technology.

Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total number of respondents in the corresponding row country that selected 'support from the public sector (government or public institution)' in Q30. (Q32. Did the support you received as answered in Q31 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option])

Source: Authors.

Figure 5.23 shows the satisfaction level for the support received in financial support from the public sector. All the respondents selected 'met expectations' in 'grant or subsidy for digital tools investment'.

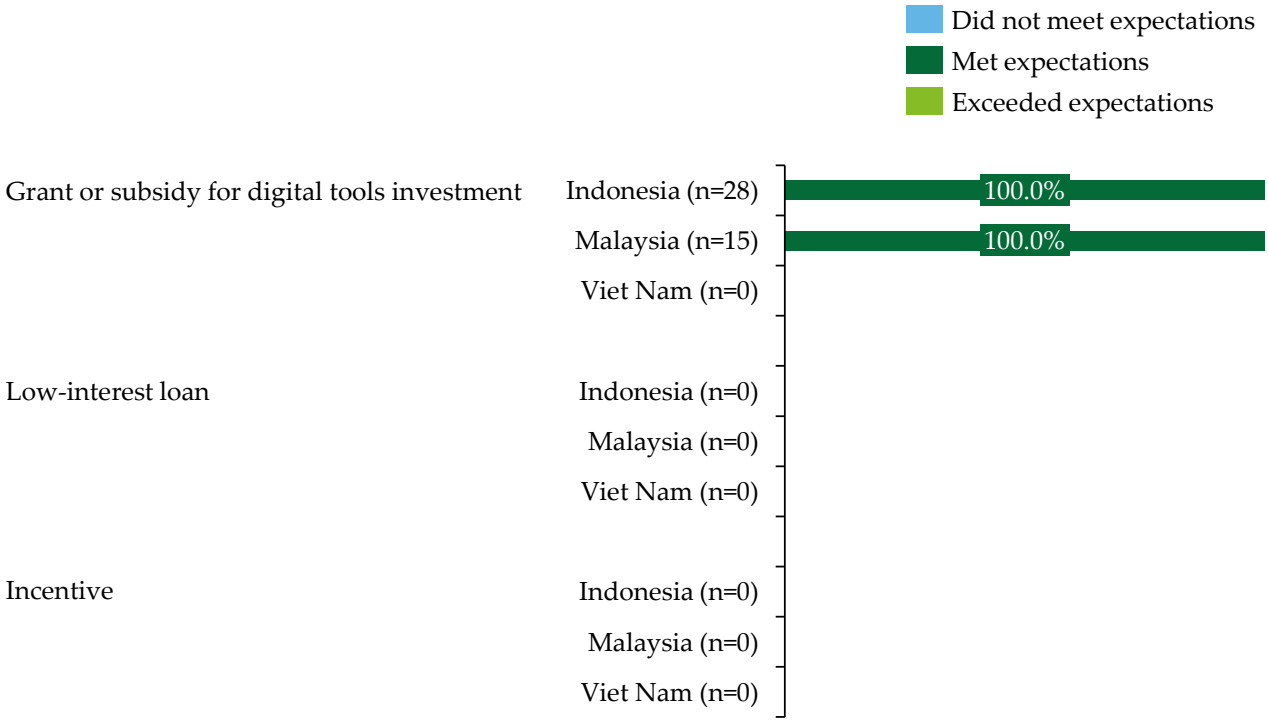
Figure 5.23. Breakdown of the Satisfaction Level for the Support Received in Financial Support from the Public Sector



Notes: The percentage of the bar is calculated by dividing the total number of responses of the corresponding row by the total number of respondents that selected 'support from the public sector (government or public institution)' in Q30. (Q32. Did the support you received as answered in Q31 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.24 provides the same data as Figure 5.23 by country. All the respondents selected 'met expectations'.

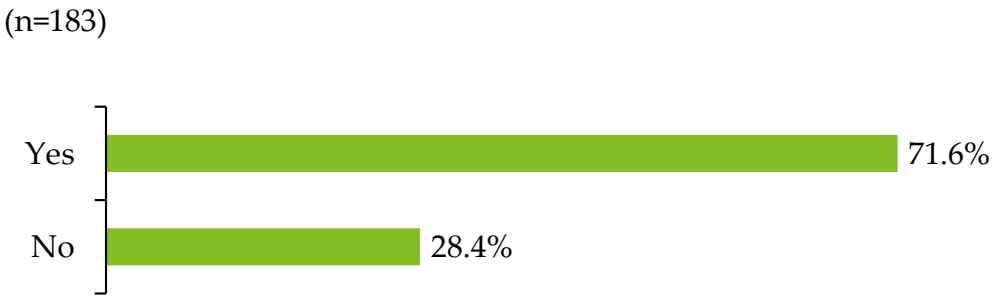
Figure 5.24. Breakdown of the Satisfaction Level for the Support Received in Financial Support from Public Sector by Country



Notes: The percentage of the bar is calculated by dividing the total number of responses of the corresponding row by the total number of respondents in the corresponding row country that selected 'support from the public sector (government or public institution)' in Q30. (Q32. Did the support you received as answered in Q31 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.25 shows the respondents' ability to adopt digital tools as a result of public sector support. Some 71.6% of respondents were able to adopt the tools based on the support provided.

Figure 5.25. Breakdown of the Respondents' Ability to Adopt Digital Tools After Receiving Public Sector Support



Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total number of respondents that selected 'Support from the public sector (government or public institution)' in Q30. (Q33. Were you able to adopt the tools as a result of the support? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 5.39 shows the same data as Figure 5.25 by country. Some 96.3% respondents from Indonesia were able to adopt digital tools after receiving public sector support. In Malaysia, 64.9% of respondents reported they were unable to adopt digital tools.

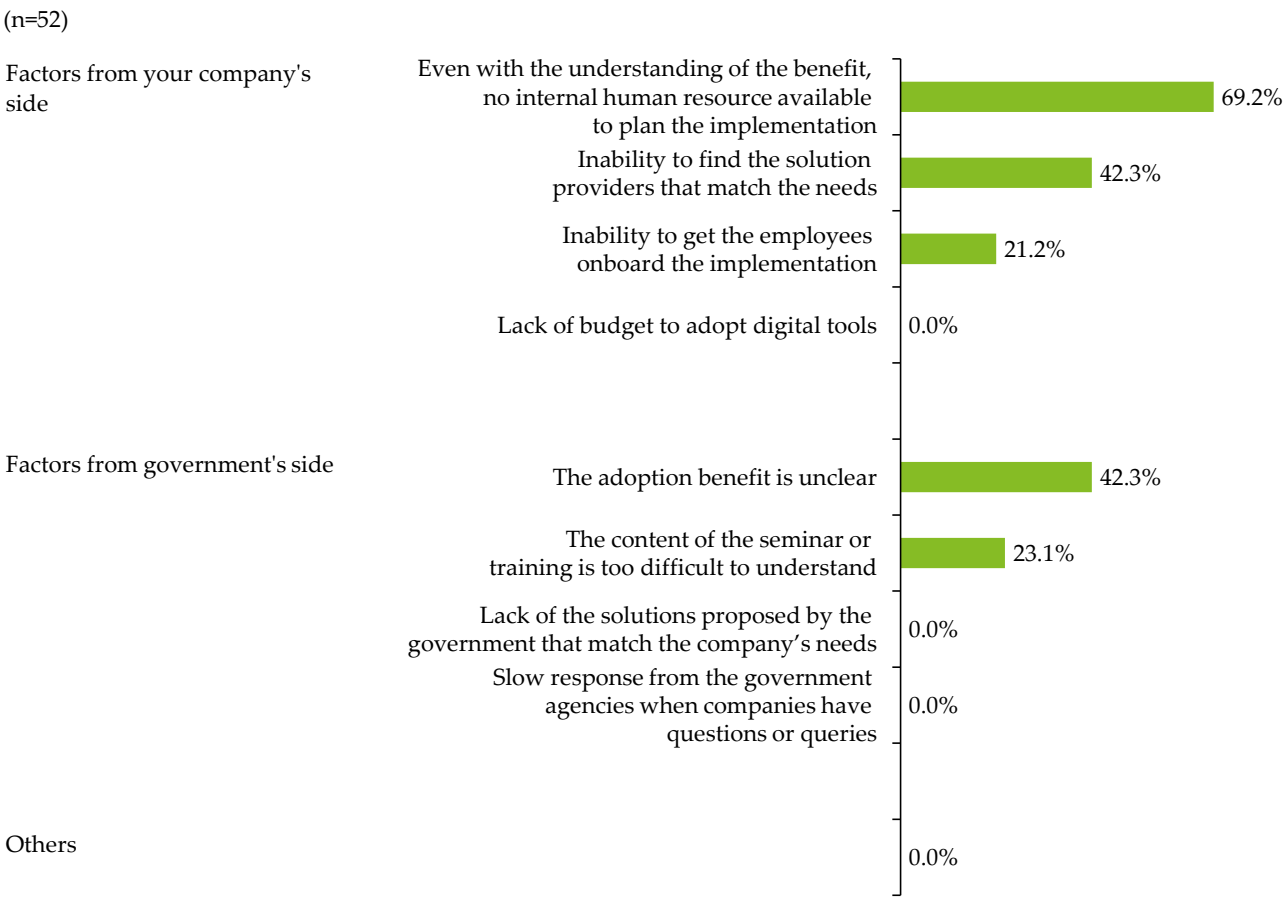
Table 5.39. Breakdown of the Respondents' Ability to Adopt Digital Tools After Receiving Public Sector Support by Country

Country	Yes	No
Indonesia	105 (96.3%)	4 (3.7%)
Malaysia	26 (35.1%)	48 (64.9%)
Viet Nam	0 (0.0%)	0 (0.0%)
Total	**131 (71.6%)**	**52 (28.4%)**

Notes: The percentage for each row is calculated by dividing the total number of responses of the corresponding row by the total number of respondents in the corresponding row country that selected 'support from the public sector (government or public institution)' in Q30. (Q33. Were you able to adopt the tools as a result of the support? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.26 shows the reasons why respondents could not proceed to implementation after receiving public sector support. Based on factors from the respondents' company's side, 69.2% of respondents selected 'even with the understanding of the benefit, no internal human resource available to plan the implementation'. Based on factors from the government's side, 42.3% of respondents selected 'the adoption benefit is unclear'.

Figure 5.26. Breakdown of Why Respondents Could Not Proceed to Implementation After Receiving Public Sector Support



Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total number of respondents in the corresponding row that selected 'no' in Q33. (Q34. What do you think are the reasons why you could not proceed to implementation after receiving the support? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 5.40 shows the same data as Figure 5.26 by country. The limited sample size should be noted, with only four responses in Indonesia and none in Viet Nam.

Table 5.40. Breakdown of Why Respondents Could Not Proceed to Implementation After Receiving Public Sector Support by Country

Country	A	B	C	D	E	F	G	H	I
Indonesia	4	2	0	0	0	0	0	0	0
(n=4)	(100.0%)	(50.0%)	(0.0%)	(0.0%)	(0.0%)	(0.0%)	(0.0%)	(0.0%)	(0.0%)
Malaysia	32	9	22	0	22	12	0	0	0
(n=48)	(66.7%)	(18.8%)	(45.8%)	(0.0%)	(45.8%)	(25.0%)	(0.0%)	(0.0%)	(0.0%)
Viet Nam	0	0	0	0	0	0	0	0	0
(n=0)	(0.0%)	(0.0%)	(0.0%)	(0.0%)	(0.0%)	(0.0%)	(0.0%)	(0.0%)	(0.0%)
Total	**36**	**11**	**22**	**0**	**22**	**12**	**0**	**0**	**0**
(n=52)	**(69.2%)**	**(21.2%)**	**(42.3%)**	**(0.0%)**	**(42.3%)**	**(23.1%)**	**(0.0%)**	**(0.0%)**	**(0.0%)**

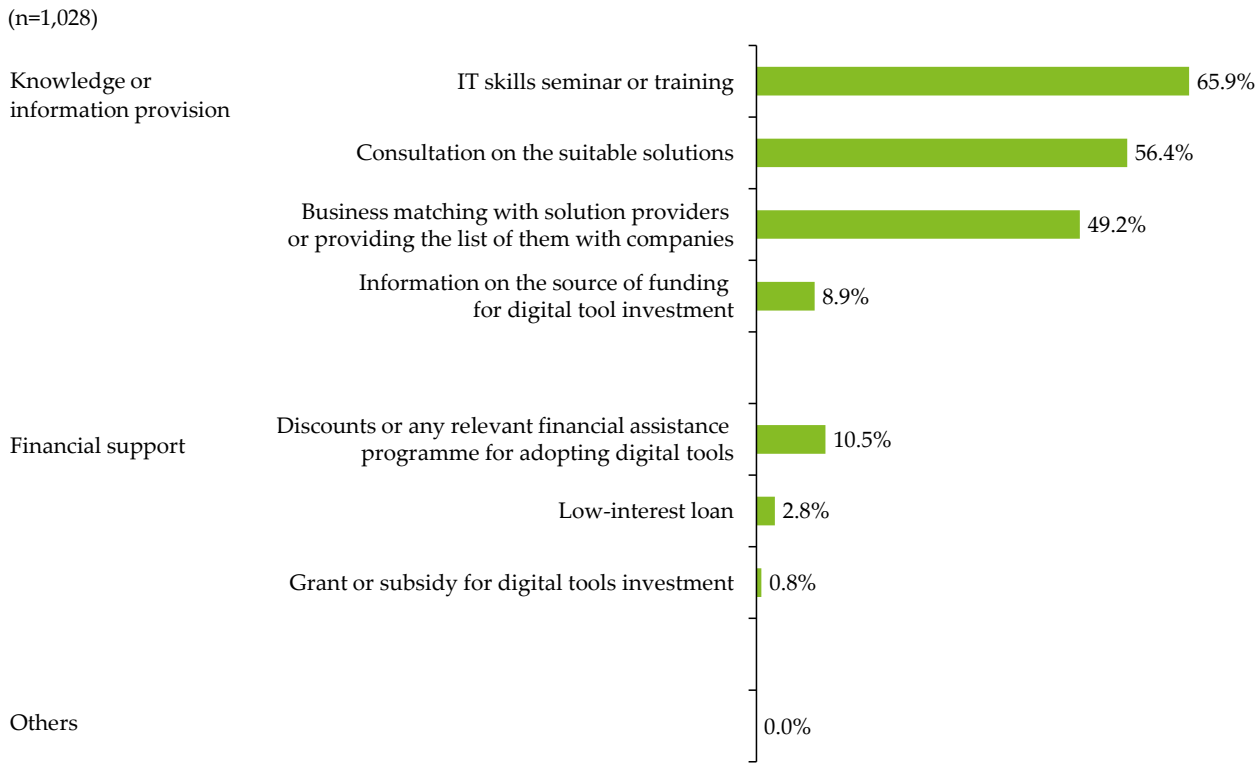
A = even with the understanding of the benefit, no internal human resource available to plan the implementation; B = inability to get the employees onboard the implementation; C = inability to find the solution providers that match the needs; D = lack of budget to adopt digital tools; E = the adoption benefit is unclear; F = the content of the seminar or training is too difficult to understand; G = lack of the solutions proposed by the government that match the company's needs; H = slow response from the government agencies when companies have questions or queries; I = others.

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding row country that selected 'no' in Q33. (Q34. What do you think are the reasons why you could not proceed to implementation after receiving the support? [MULTIPLE CHOICE: choose all options that apply])

Source: Authors.

Figure 5.27 shows the support received from the private sector. For knowledge or information provision, 65.9% of respondents selected 'IT skills seminar or training' as the most common support received. For financial support, 10.5% of respondents selected 'discounts or any relevant financial assistance programme for adopting digital tools'.

Figure 5.27. Breakdown of the Support Received from the Private Sector



IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total number of respondents that selected 'yes' in Q33. (Q35. If you selected 'support from private sector' in Q30, what support have you received? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 5.41 provides the same data as Figure 5.27 by country. Malaysia had the highest share of respondents that cited 'IT skills seminar or training' as the most common form of support received in knowledge or information provision, at 75.2%, while Viet Nam had the lowest share at 52.1%. Indonesia had the highest share of respondents that cited 'discounts or any relevant financial assistance programme for adopting digital tools' as the most common form of support received in terms of financial support, at 17.1%, while Malaysia had the lowest at 5.6%.

Table 5.41. Breakdown of the Support Received from the Private Sector by Country

Country	IT Skills Seminar or Training	Consultation on the Suitable Solutions	Business Matching with Solution Providers or Providing the List of Them with Companies	Information on the Source of Funding for Digital Tool Investment	Grant or Subsidy for Digital Tools Investment	Low-Interest Loan	Discounts Or Any Relevant Financial Assistance Programme for Adopting Digital Tools	Others
Indonesia (n=293)	175 (59.7%)	108 (36.9%)	152 (51.9%)	33 (11.3%)	1 (0.3%)	15 (5.1%)	50 (17.1%)	0 (0.0%)
Malaysia (n=516)	388 (75.2%)	408 (79.1%)	181 (35.1%)	56 (10.9%)	7 (1.4%)	6 (1.2%)	29 (5.6%)	0 (0.0%)
Viet Nam (n=219)	114 (52.1%)	64 (29.2%)	173 (79.0%)	2 (0.9%)	0 (0.0%)	8 (3.7%)	29 (13.2%)	0 (0.0%)
Total (n=1,028)	**677 (65.9%)**	**580 (56.4%)**	**506 (49.2%)**	**91 (8.9%)**	**8 (0.8%)**	**29 (2.8%)**	**108 (10.5%)**	**0 (0.0%)**

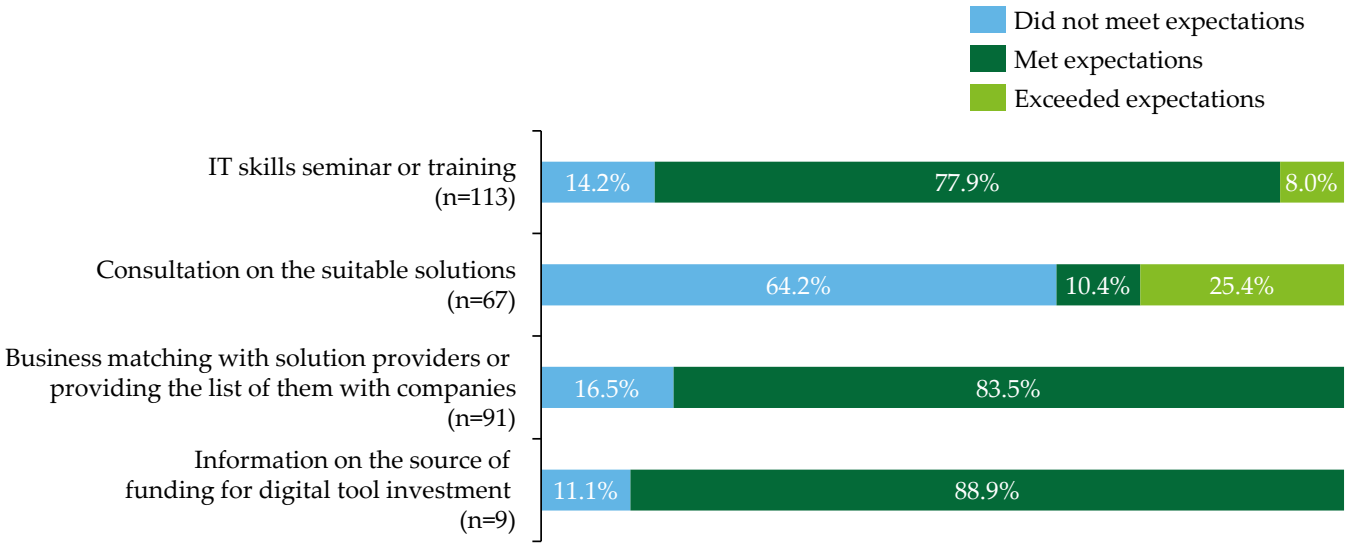
IT = information technology.

Notes: Support from the private sector includes industry associations, multinational companies, and local companies. The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents that selected 'yes' in Q33. (Q35. If you selected 'support from private sector' in Q30, what support have you received? [MULTIPLE CHOICE: choose all options that apply])

Source: Authors.

Figure 5.28 shows the level of satisfaction for the support received in knowledge or information provision from the private sector. 'Consultation on the suitable solutions' received the lowest share of 'did not meet expectations' responses, at 64.2%.

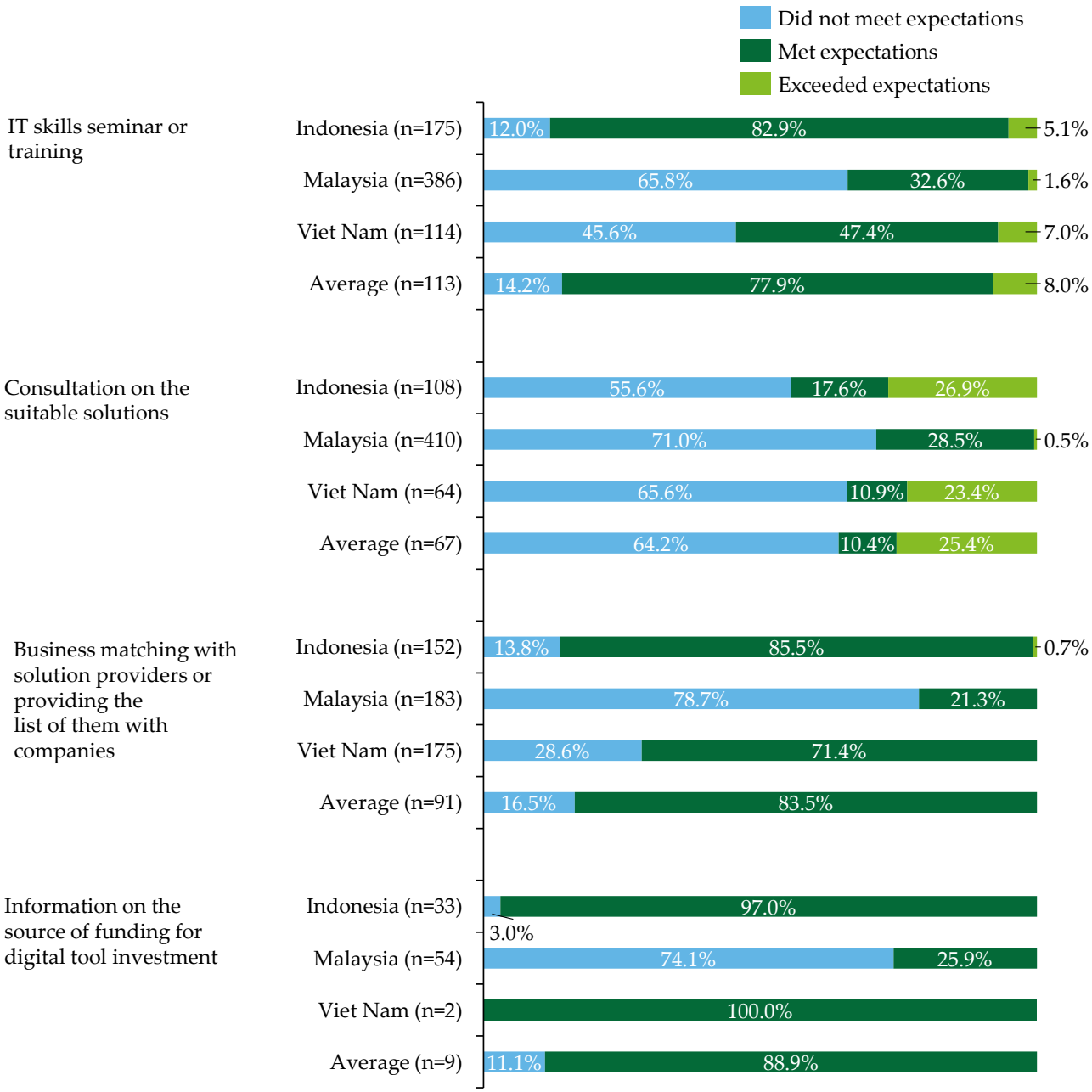
Figure 5.28. Breakdown of the Level of Satisfaction for the Support Received in Knowledge or Information Provision from the Private Sector



IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total number of respondents that selected 'support from the private sector' in Q30. (Q36. Did the support you received as answered in Q35 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.29 provides the same data as Figure 5.28 by country. Malaysia scored higher than the other countries for 'did not meet expectations' for all answer options, at around or more than 70%.

Figure 5.29. Breakdown of the Level of Satisfaction for the Support Received in Knowledge or Information Provision from the Private Sector by Country

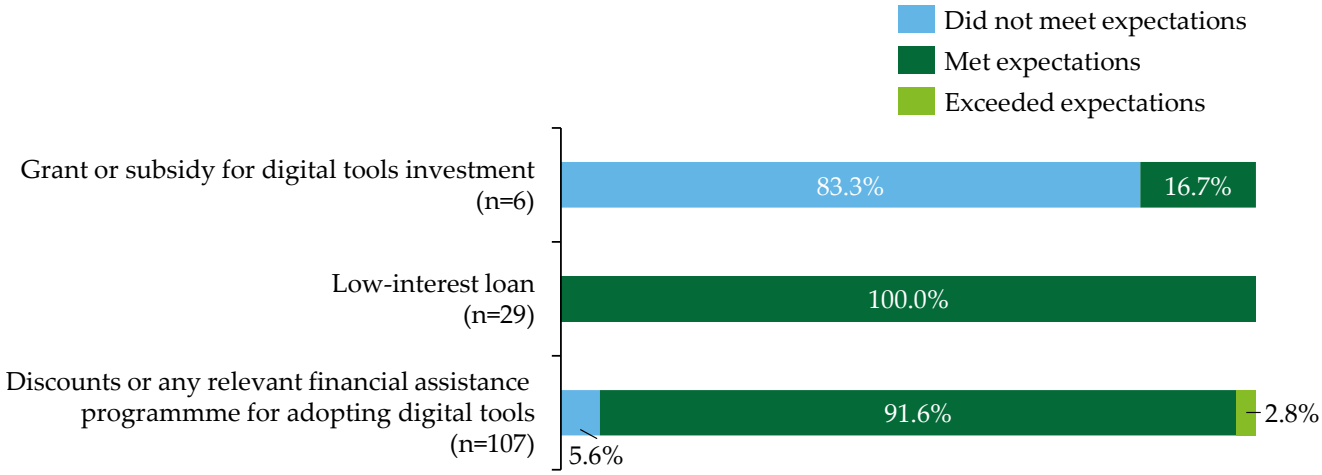


IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total number of respondents in the corresponding row country that selected 'support from the private sector' in Q30. (Q36. Did the support you received as answered in Q35 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.30 shows the level of satisfaction regarding the financial support received from the public sector. The support with the highest share of 'met expectations' and 'exceeded

expectations' is 'low-interest loan', at 100%, followed by 'discounts or any relevant financial assistance programme for adopting digital tools' at 91.6%, while 'grant or subsidy for digital tools investment' scored the least at 16.7%.

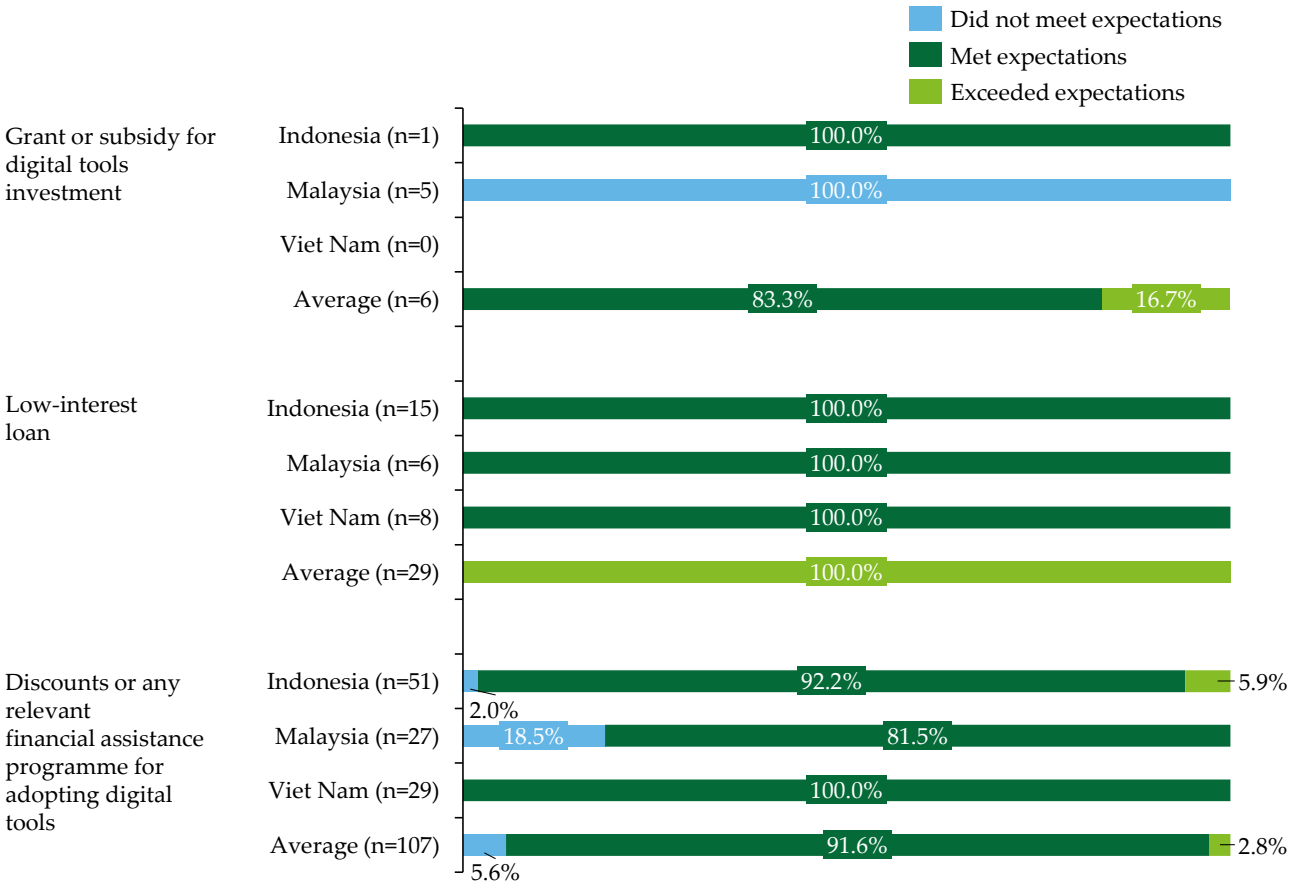
Figure 5.30. Breakdown of the Level of Satisfaction for the Financial Support Received from the Private Sector



Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total number of respondents that selected 'support from the private sector' in Q30. (Q36. Did the support you received as answered in Q35 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.31 provides the same data as Figure 5.30 by country. Combining the two-answer option – 'met expectations' and 'exceeded expectations' – 100% of respondents in all countries achieved those expectations in 'low interest loan'. For 'discount or any relevant financial assistance programme for adopting digital tools', Viet Nam scored 100%, followed by Indonesia at 98.0% and Malaysia at around 80%. The limited sample should be noted, as the figure shows.

Figure 5.31. Breakdown of the Level of Satisfaction for the Financial Support Received from the Private Sector by Country



Notes: Viet Nam had no responses for 'grant or subsidy for digital tools investment'. The percentage of each bar is calculated by dividing the total number of responses of the corresponding bar by the total number of respondents in the corresponding row country that selected 'support from the private sector' in Q30. (Q36. Did the support you received as answered in Q35 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.32 shows the respondents' ability to adopt digital tools as a result of the private sector support. Some 53.6% of respondents were unable to adopt the tools based on the support provided.

Figure 5.32. Breakdown of the Respondents' Ability to Adopt Digital Tools After Receiving Private Sector Support

Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total number of respondents that selected 'support from the private sector' in Q30. (Q37. Were you able to adopt the tools as a result of the support? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 5.42 shows the same data as Figure 5.32 by country. Some 74.0% of respondents in Malaysia were unable to adopt digital tools after receiving support from the private sector. Conversely, 71.5% of respondents in Indonesia were able to adopt digital tools after receiving private sector support.

Table 5.42. Breakdown of the Respondents' Ability to Adopt Digital Tools After Receiving Private Sector Support by Country

Country	Yes	No
Indonesia	193 (71.5%)	77 (28.5%)
Malaysia	134 (26.0%)	382 (74.0%)
Viet Nam	140 (63.6%)	80 (36.4%)
Total	**467 (46.4%)**	**539 (53.6%)**

Notes: The percentage for each row is calculated by dividing the total number of responses of the corresponding row by the total number of respondents in the corresponding column country that selected 'support from the private sector' in Q30. (Q37. Were you able to adopt the tools as a result of the support? [SINGLE CHOICE: choose one option])
Source: Authors.

Figure 5.33 shows the reasons why respondents could not proceed to implementation after receiving private sector support. Based on factors from the company's side, 52.3% of respondents selected 'even with the understanding of the benefit, no internal human resource available to plan the implementation'. Based on factors from the private sector support providers' side, 26.5% of respondents selected 'the adoption benefit is unclear'.

Figure 5.33. Breakdown of Why Respondents Could Not Proceed to Implementation After Receiving Private Sector Support

(n=539)

Notes: Support from the private sector includes industry associations, multinational companies, and local companies. The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total number of respondents in the corresponding row that selected 'no' in Q37. (Q38. What do you think are the reasons why you could not proceed to implementation after receiving the support? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 5.43 shows the same data as Figure 5.33 by country. For the response of 'even with the understanding of the benefit, no internal human resource available to plan the implementation' amongst the factors on the company's side, Indonesia stands out at 80.5%. It also led the field in responding 'the adoption benefit is unclear' for factors from the private support providers' side, at 35.1%.

Table 5.43. Breakdown of Why Respondents Could Not Proceed to Implementation After Receiving Private Sector Support by Country

Country	A	B	C	D	E	F	G	H	I
Indonesia	62	7	57	1	27	1	26	1	1
(n=77)	(80.5%)	(9.1%)	(74.0%)	(1.3%)	(35.1%)	(1.3%)	(33.8%)	(1.3%)	(1.3%)
Malaysia	199	200	123	27	116	82	67	0	0
(n=382)	(52.1%)	(52.4%)	(32.2%)	(7.1%)	(30.4%)	(21.5%)	(17.5%)	(0.0%)	(0.0%)
Viet Nam (n=80)	21	56	73	0	0	0	0	4	0
	(26.3%)	(70.0%)	(91.3%)	(0.0%)	(0.0%)	(0.0%)	(0.0%)	(5.0%)	(0.0%)
Total	**282**	**263**	**253**	**28**	**143**	**83**	**93**	**5**	**1**
(n=539)	**(52.3%)**	**(48.8%)**	**(46.9%)**	**(5.2%)**	**(26.5%)**	**(15.4%)**	**(17.3%)**	**(0.9%)**	**(0.2%)**

A = even with the understanding of the benefit, no internal human resource available to plan the implementation; B = inability to get the employees onboard the implementation; C = inability to find the solution providers that match the needs; D = lack of budget to adopt digital tools; E = the adoption benefit is unclear; F = the content of the seminar or training is too difficult to understand; G = lack of the solutions proposed by the government that match the company's needs; H = slow response from the government agencies when companies have questions or queries; I = others.

Notes: Support from private sector includes industry associations, multinational companies, and local companies. The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding column country that selected 'no' in Q37. (Q38. What do you think are the reasons why you could not proceed to implementation after receiving the support? [MULTIPLE CHOICE: choose all options that apply])

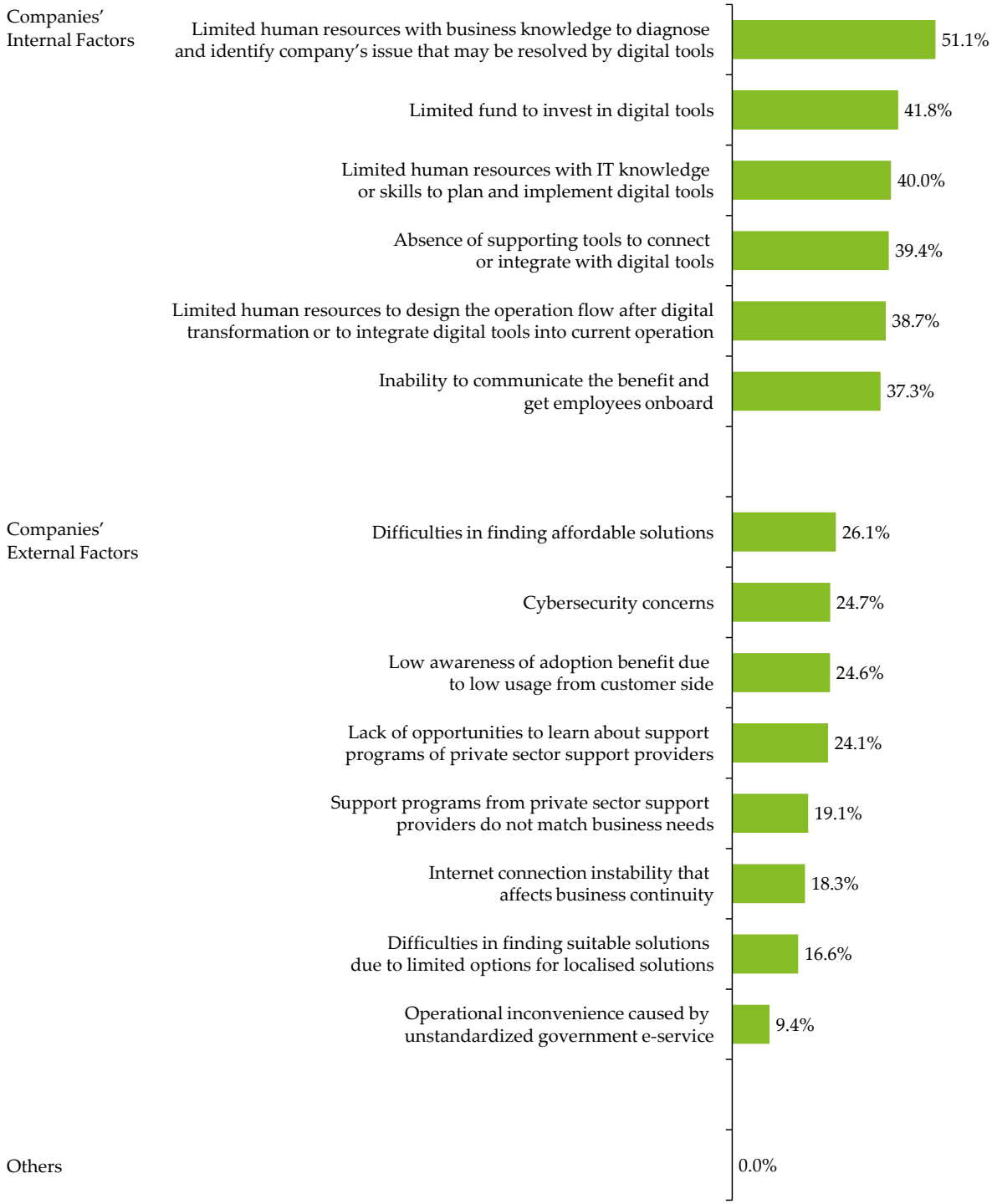
Source: Authors.

Figure 5.34 shows issues that the government should emphasise to encourage digital adoption based on feedback from companies. Based on internal company factors, 51.1% of respondents selected 'limited human resources with business knowledge to diagnose and identify company's issue that may be resolved by digital tools'. Based on external company factors, 26.1% of respondents selected 'difficulties in finding affordable solutions' amongst the top answer options.

Table 5.44 shows the same data as Figure 5.34 by country. Viet Nam had the highest share citing 'limited human resources with business knowledge to diagnose and identify company's issue that may be resolved by digital tools' as the most common internal company factor, at 57.0%. Indonesia had the highest share citing 'difficulties in finding affordable solutions' as the most common external company factor, at 34.0%.

Figure 5.34 Breakdown of Issues that the Government Should Emphasise to Encourage Digital Adoption

(n=3,099)



ASEAN = Association of Southeast Asian Nations, IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total number of respondents to the questionnaire. (Q39. Which issues of ASEAN companies do you think the government should emphasise in order to encourage digital adoption? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 5.44. Breakdown of Issues that the Government Should Emphasise to Encourage Digital Adoption by Country

Country	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Indonesia (n=1,018)	244 (24.0%)	453 (44.5%)	605 (59.4%)	346 (34.0%)	325 (31.9%)	457 (44.9 %)	441 (43.3 %)	470 (46.2 %)	241 (23.7%)	139 (13.7%)	352 (34.6%)	188 (18.5%)	222 (21.8%)	355 (34.9%)	0 (0.0%)
Malaysia (n=1,039)	168 (16.2%)	387 (37.2%)	146 (14.1%)	159 (15.3%)	535 (51.5%)	534 (51.4 %)	390 (37.5 %)	246 (23.7 %)	130 (12.5%)	200 (19.2%)	109 (10.5%)	48 (4.6%)	156 (15.0%)	73 (7.0%)	0 (0.0%)
Viet Nam (n=1,042)	155 (14.9%)	382 (36.7%)	544 (52.2%)	304 (29.2%)	379 (36.4%)	594 (57.0 %)	367 (35.2 %)	441 (42.3 %)	392 (37.6%)	175 (16.8%)	303 (29.1%)	55 (5.3%)	214 (20.5%)	319 (30.6%)	0 (0.0%)
Total (n=3,099)	**567 (18.3%)**	**1222 (39.4%)**	**1295 (41.8%)**	**809 (26.1%)**	**1239 (40.0%)**	**1585 (51.1 %)**	**1198 (38.7 %)**	**1157 (37.3 %)**	**763 (24.6%)**	**514 (16.6%)**	**764 (24.7%)**	**291 (9.4%)**	**592 (19.1%)**	**747 (24.1%)**	**0 (0.0%)**

IT = information technology.

A = internet connection instability that affects business continuity, B = absence of supporting tools to connect or integrate with digital tools, C = limited funds to invest in digital tools, D = difficulties in finding affordable solutions, E = limited human resources with IT knowledge or skills to plan and implement digital tools, F = limited human resources with business knowledge to diagnose and identify company's issue that may be resolved by digital tools, G = limited human resources to design the operation flow after digital transformation or to integrate digital tools into current operation, H = inability to communicate the benefit and get employees onboard, I = low awareness of adoption benefit due to low usage from customer side, J = difficulties in finding suitable solutions due to limited options for localised solutions, K = cybersecurity concerns, L = operational inconvenience caused by unstandardised government e-service, M = support programmes from private sector support providers do not match business needs, N = lack of opportunities to learn about support programmes of private sector support providers, O = others.

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding column country of the questionnaire. (Q39. Which issues of ASEAN companies do you think the government should emphasise in order to encourage digital adoption? [MULTIPLE CHOICE: choose all options that apply])

Source: Authors.

3. Conclusion

This chapter has reported the results of the phone survey conducted in Indonesia, Malaysia, and Viet Nam. Regarding the implementation of digital tools, like the web survey results, the most implemented category was intra-company management tools. The most implemented tool was mobile devices, while computers scored more than 80%. Email and/or chat applications scored less than 30%. E-payment tools for procurement scored the second highest, after intra-company management tools, with almost 70% implementation, and cybersecurity or protection software scored relatively high with almost 50%. The 'other' advanced tools category scored lower than other tool categories (approximately or less than 10% implementation), apart from radio frequency identification (about 40% implementation). The surveyed companies' main objective in implementing the tools was to increase profitability through an increase in sales, similar to the web survey results. Business continuity was the second highest priority. The survey observed that those objectives were mostly achieved by implementing the tools for some of the categories, but 'other' advanced tools scored the least with around 50%. Companies without any implementation plan within the next 3 years would consider implementing digital tools if they had a subscription or reasonable profit-sharing models and if digital tools had price package options that could be customised to meet companies' needs.

Regarding the difficulties and concerns in each adoption phase, lack of business and digital skills was generally observed as the main challenge for the surveyed companies. This trend is shared by the web survey. For example, in the information gathering phase, almost half the respondents cited difficulties due to the inability to diagnose company issues that might require digital tools as the most important factor affecting their adoption of digital tools, reiterating the web survey results. Regarding the adoption of digital tools, the main difficulties were limited solutions or lack thereof in meeting business needs. This was followed by the inability to identify tools matching company issues or needs. After adopting the tools, the problem reported by the highest share of respondents was difficulties due to employees' inability to use digital tools, as a result of limited skills.

The survey observed the need for support to enable companies to go digital. When asked about any kind of support received in the past, 61.7% of respondents answered that they had never received support, which is higher than the web survey result (46.1%). The most common form of support received from the private sector was from local companies (24.6%), while only 5.9% of respondents had received public sector support. Amongst the respondents who had received public sector support, consultation on suitable solutions was the most common form of support while grants or subsidies for digital tools investment was the most common in terms of financial support. These forms of support were generally considered to have met recipients' expectations, especially financial support, but the limited sample size receiving public sector support should be noted. The support from the public sector was observed to contribute to the successful

implementation amongst the respondents, with more than 70% being able to adopt the tools. Meanwhile, respondents who had not succeeded in adopting the tools cited 'even with the understanding of the benefit, no internal human resource available to plan the implementation' or 'the adoption benefit is unclear' as the top reasons for their failure to do so. In terms of private sector support, '[information technology] IT skills seminar or training' was the most common form of support for knowledge or information provision. Financial support was not widely accepted, but 'discounts or any relevant financial assistance programme for adopting digital tools' scored the highest, at 10.5%. These forms of support mostly met the respondents' expectations. Only around half the recipients succeeded in adopting the tools, compared with more than 80% of the recipients in the web survey. For companies that could not proceed with the adoption, their major reasons were 'even with the understanding of the benefit, no internal human resource available to plan the implementation' on the respondents' side; and 'the adoption benefit is unclear' on the private support providers' side.

Amongst the expected issues that the government should emphasise, regarding companies' internal factors, 'limited human resources with business knowledge to diagnose and identify company's issue that may be resolved by digital tools' was selected most frequently. As for companies' external factors, 'difficulties in finding affordable solutions' emerged as the top concern amongst the answer options.

Chapter 6

General Analysis of the Digital Divide in ASEAN

1. Introduction

To understand the actual state of the digital divide in the region, it is necessary to analyse the data from multiple perspectives. This chapter explores the survey data from various angles, including country, company size, location, and industry.

In the first section, the chapter reports on the adoption of digital tools, and the project team aims to provide a clear path for micro, small, and medium-sized enterprises (MSMEs) to become digitalised. Next, the main objectives of introducing digital tools in the surveyed companies and their effectiveness are identified. The chapter also provides a comprehensive perspective by describing the status of utilisation of supporting implementing digital tools in the surveyed companies in general, and the use of public and private sector support in particular.

2. Analysis of Digital Tool Adoption and the Pathway Towards Going Digital in ASEAN

This section reports the analysis of the implementation of digital tools from multiple perspectives, including the surveyed companies' attributes, and suggests a pathway for MSMEs in the Association of Southeast Asian Nations (ASEAN) to go digital.

2.1. Digital Tool Adoption in ASEAN

This section reports on the adoption of digital tools amongst the surveyed companies from different angles based on the data presented in the previous chapter. This study conducted two surveys – a web survey targeting all ASEAN Member States to grasp the overall trend across the region; and a phone survey targeting Indonesia, Malaysia, and Viet Nam – to investigate the situation on the ground. The aim of the phone survey was to cover companies that do not have an online business environment, which the web survey may not have been able to cover. This section focuses on data from the three countries' web and phone surveys.

The data used by the project team were weighted to approximate the number of companies in each country by weighting the data for the three target countries using the population of companies in each segment from the web and phone surveys.

2.2. Data Preparation

To analyse the adoption rate of the surveyed companies, a comprehensive approach was employed to prepare data for each company size, utilising the web and phone surveys, with the following methodology.

The web survey collected the responses of all company sizes – micro, small, medium-sized, and large. The phone survey focused on micro and small companies. Considering the different nature of the respondents of both surveys, the project team applied the following method for the sampling:

- The phone survey data are used for analysing micro and small companies since the phone survey focused on micro and small companies under conditions like field surveys. Moreover, the phone survey data cover companies that may not operate online and may report more realistic data than the web surveys.
- The web survey data are used for analysing medium-sized and large companies since the web survey covers those respondents, but the phone survey does not.

The data collection method for both the web and phone surveys was stratified sampling.[1] This section will present the aggregated data, using industry and location weights, to identify overall trends and insights into digitalisation, such as tool adoption rates. It should be noted that, as shown in the Appendix, there is a difference in adoption rates of up to 90% between the phone and web surveys – even for the same tool and segment.

2.3. Analysis of Adoption Rates of Each Digital Tool

Table 6.1 shows the implementation rate of each digital tool by country and company.

[1] This method involves dividing the population into distinct groups (strata) based on certain characteristics and selecting samples from each group. The web survey aimed to collect 6,000 samples from 300 segments (20 samples per segment) and 3,000 samples from the phone survey (100 samples per segment). The segments that fell short of the target number of responses were compensated by collecting more than the target number of responses in other segments. In the web survey, segments that did not reach the target number of responses were supplemented by sample sizes from other segments. Therefore, it should be noted that the number of samples per segment was more unevenly distributed in the web survey than in the phone survey.

Table 6.1. Adoption Rate of Digital Tools by Country and Company Size

Category	Digital Tool	Indonesia				Malaysia				Viet Nam			
		Large	Medium	Small	Micro	Large	Medium	Small	Micro	Large	Medium	Small	Micro
Intra-company management	Email and/or chat applications (e.g. digital tools for text message)	98.3%	89.8%	17.6%	12.0%	96.4%	99.2%	45.5%	25.2%	96.9%	97.4%	7.6%	0.2%
	Mobile device	97.7%	95.3%	73.1%	79.8%	99.0%	99.3%	64.4%	52.3%	99.5%	98.6%	100.0%	100.0%
	Computer	98.1%	93.1%	96.1%	100.0%	99.0%	99.6%	62.1%	53.0%	99.2%	100.0%	100.0%	100.0%
	Office suite (e.g. Microsoft Office, Google Workspace, iWork)	97.4%	87.3%	25.3%	25.5%	99.9%	99.6%	26.1%	32.4%	97.9%	96.7%	52.9%	50.4%
	Web meeting system	95.2%	84.3%	0.2%	0.0%	98.6%	95.2%	0.2%	0.0%	95.3%	78.2%	0.1%	0.0%
	Intra-company management average	97.3%	89.9%	42.5%	43.4%	98.6%	98.6%	39.6%	32.6%	97.8%	94.2%	52.1%	50.1%
Procurement	Electronic data interchange – procurement	89.8%	70.5%	45.0%	44.6%	92.8%	78.3%	4.4%	0.2%	88.3%	55.8%	28.0%	34.6%

Category	Digital Tool	Indonesia				Malaysia				Viet Nam			
		Large	Medium	Small	Micro	Large	Medium	Small	Micro	Large	Medium	Small	Micro
	E-payment – procurement	92.2%	71.0%	50.9%	52.5%	98.4%	98.5%	61.6%	53.2%	93.4%	94.7%	76.2%	66.0%
	Procurement average	91.0%	70.8%	47.9%	48.5%	95.6%	88.4%	33.0%	26.7%	90.9%	75.2%	52.1%	50.3%
Logistics	Document or cargo delivery application	95.4%	82.6%	36.7%	22.6%	94.9%	70.4%	47.5%	40.0%	77.2%	45.5%	68.9%	85.8%
	Storage or inventory management system	94.3%	81.2%	42.7%	49.9%	94.0%	83.9%	17.5%	13.2%	75.9%	36.3%	9.8%	5.5%
	Logistics average	94.9%	81.9%	39.7%	36.3%	94.5%	77.2%	32.5%	26.6%	76.6%	40.9%	39.4%	45.6%
Sales & marketing	Electronic data interchange – sales & marketing	92.6%	70.7%	25.1%	29.5%	94.2%	90.7%	6.9%	3.7%	83.7%	47.7%	23.3%	31.4%
	Social networking service (e.g. Twitter,	93.3%	89.3%	45.2%	47.5%	99.8%	99.2%	29.9%	16.7%	89.4%	91.3%	32.2%	16.9%

Category	Digital Tool	Indonesia				Malaysia				Viet Nam			
		Large	Medium	Small	Micro	Large	Medium	Small	Micro	Large	Medium	Small	Micro
	Facebook, Instagram)												
	E-commerce	86.0%	76.1%	39.5%	55.7%	51.3%	77.9%	1.0%	0.4%	83.5%	66.1%	33.9%	13.8%
	E-payment – sales & marketing	91.3%	81.6%	36.4%	41.5%	97.5%	98.8%	25.0%	8.2%	93.4%	95.3%	32.9%	18.7%
	Sales management and automation tool (e.g. Salesforce)	91.9%	68.1%	26.6%	23.2%	92.8%	83.2%	0.4%	0.1%	80.5%	50.1%	2.7%	0.2%
	Sales & marketing average	91.0%	77.2%	34.6%	39.5%	87.1%	89.9%	12.6%	5.8%	86.1%	70.1%	25.0%	16.2%
Overall company operation	Enterprise resource planning	90.9%	66.9%	22.7%	9.1%	94.9%	62.1%	0.2%	0.1%	40.9%	15.8%	8.5%	3.7%
	Cloud storage or centralised server	89.3%	70.9%	12.7%	3.6%	88.7%	68.2%	1.4%	0.1%	38.3%	9.9%	2.9%	1.2%

Category	Digital Tool	Indonesia				Malaysia				Viet Nam			
		Large	Medium	Small	Micro	Large	Medium	Small	Micro	Large	Medium	Small	Micro
Other advanced tools	Cybersecurity or protection software	88.9%	67.9%	68.5%	86.5%	73.6%	76.1%	38.3%	20.3%	40.9%	9.8%	58.2%	51.2%
	Overall company operation average	89.7%	68.6%	34.7%	33.1%	85.7%	68.8%	13.3%	6.8%	40.1%	11.8%	23.2%	18.7%
	3D printing	83.7%	63.2%	9.7%	3.6%	24.2%	66.1%	4.0%	8.5%	11.8%	2.7%	4.5%	1.6%
	Artificial intelligence	74.1%	49.3%	1.1%	0.0%	22.3%	65.8%	0.0%	0.0%	11.2%	1.9%	0.1%	0.1%
	Augmented reality	69.7%	44.6%	0.0%	0.0%	20.1%	44.8%	0.0%	0.0%	9.9%	1.8%	0.1%	0.1%
	Drone (e.g. farming management)	66.6%	41.8%	0.7%	0.0%	17.8%	57.1%	0.4%	0.0%	11.4%	7.8%	0.0%	0.0%
	Internet of things device	75.7%	55.2%	5.1%	6.1%	30.4%	77.0%	33.1%	16.3%	25.2%	26.1%	2.2%	1.1%
	Radio frequency identification	73.2%	55.2%	49.0%	71.0%	27.3%	62.8%	7.2%	3.8%	15.0%	5.4%	47.7%	47.4%

Category	Digital Tool	Indonesia				Malaysia				Viet Nam			
		Large	Medium	Small	Micro	Large	Medium	Small	Micro	Large	Medium	Small	Micro
	Robotics (e.g. factory robots, farming robots)	60.8%	35.8%	2.6%	0.0%	22.3%	30.9%	0.0%	0.0%	12.8%	6.1%	0.8%	0.2%
	Others average	72.0%	49.3%	9.7%	11.5%	23.5%	57.8%	6.4%	4.1%	13.9%	7.4%	7.9%	7.2%

Notes: The percentage for each row is calculated by dividing the number of respondents selecting the tool for any of the following stages: (i) already implemented (pre-pandemic period (before 2020)), (ii) already implemented (during pandemic restriction period (Jan 2020–Dec 2021)), (iii) already implemented (post-pandemic restriction period (Jan 2022–present)), by the total responses of the questionnaire. The colour indicates the degree of adoption; 0% adoption is filled with white, and 100% adoption is filled with a stronger green colour. 'Micro' represents companies with 1–4 employees. 'Small' represents companies with 5–19 employees. 'Medium' represents companies with 20–199 employees. 'Large' represents companies with more than 200 employees. (Q23. Which stage of consideration is your company in for each of the tools? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

- Large companies

  In large companies, most digital tools exhibit high adoption rates. All tools in the intra-company management category show nearly 100% adoption rates across the three countries. This can be attributed to large companies having many employees, highlighting the importance of efficient information sharing and communication. Additionally, many large companies utilise digital tools across various areas such as procurement, logistics, sales and marketing, and overall company operations. This indicates the significance of digitalisation in facilitating efficient business activities. Notably, e-payment and social networking services (SNS) adoption rates are high, reaching around 90% in all three countries. This reflects the importance and level of adoption of e-payment and SNS in ASEAN. Large companies also leverage digital tools for security and privacy, as evidenced by the high adoption rates of cybersecurity or protection software, demonstrating their commitment to safeguarding critical information and data.

- Medium-sized companies

  Although the adoption rates of medium-sized companies are slightly lower than those of large companies, the overall usage of digital tools is expanding. More than 90% of medium-sized companies in all three countries adopt most tools in the intra-company management category. In procurement, logistics, and sales and marketing, the adoption rates of tools facilitating external transactions and communication, such as electronic data interchange (EDI), e-payment, and SNS, are high. On the other hand, the adoption rates of tools primarily aimed at improving internal operational efficiencies, such as sales management and automation tools (e.g. Salesforce), enterprise resource planning (ERP), and cloud storage or centralised servers, are lower than those of large companies. This is particularly pronounced in Viet Nam. It can be attributed to the resource and budget constraints faced by medium-sized companies and the fact that they may not prioritise streamlining and efficiency enhancement to the same extent due to their smaller scale. Regarding security and privacy, medium-sized companies have implemented specific measures but exhibit lower adoption rates than large companies.

- Small companies

  Digital tool adoption rates are generally relatively low in small companies. The adoption rates of internal communication tools such as email and/or chat applications, office suites, and web meeting systems, which maintained high rates in large and medium-sized companies, are significantly lower. Additionally, the adoption rates of computers and mobile devices were lower in small companies in Malaysia. In procurement, logistics, and sales and marketing, the adoption rates of tools such as e-payment and SNS show a slightly higher tendency. However, overall, the proliferation of digital tools is still limited. Small companies may face challenges in terms of security measures,

as indicated by the lower adoption rates of cybersecurity or protection software compared with medium-sized and large companies in Indonesia and Malaysia. Insufficient security awareness, investment, and countermeasures may increase cyber threat risks for small companies.

- Micro companies

  The adoption rates of digital tools are generally low in micro companies. Notably, using fundamental internal communication tools such as email and/or chat applications and web meeting systems is limited. This can be attributed to the fact that communication can be achieved without relying heavily on digital tools because of the small number of employees. In the sales and marketing domain, the adoption rates of external communication tools like SNS, which were relatively high in other company sizes, are significantly lower. Micro companies may also face security challenges. In Malaysia, only around 20% of micro companies have implemented cybersecurity or protection software, indicating a high-risk situation.

In conclusion, the smaller the company size, the lower the adoption rate of digital tools. Large companies demonstrate high adoption rates across all areas, highlighting their recognition of the importance of digitalisation for efficiency enhancement and information sharing. On the other hand, small and micro companies still lag in terms of the proliferation of digital tools. These companies face the challenge of leveraging digital tools for operational efficiency and addressing security issues. Small and micro companies must prioritise appropriate measures and strategies in these areas. It should also be noted that smaller companies face the risk of cyberattacks since cybersecurity solutions are not widely adopted.

2.3.1. Analysis of Digital Tool Adoption from the Companies' Attribute Perspectives

Table 6.2 shows the average number of digital tools implemented by country and company size. When examining the number by country, Indonesia and Malaysia demonstrate high implementation rates for both large and medium-sized companies, with around 20 implemented out of a maximum of 24 digital tools in the answer option in Table 6.2. On the other hand, compared with Indonesia and Malaysia, Viet Nam exhibits a lower rate of digital tool implementation amongst large and medium-sized companies, indicating potential delays in digital advancement.

Looking at the data from a company size perspective, large and medium-sized companies generally show higher figures than small or micro companies. In Malaysia, the average number of digital tools implemented by large and medium-sized companies is around 20, compared with less than five for small or micro companies, indicating a substantial divergence. This could imply that large and medium-sized companies have invested resources and budgets in digitalisation. Conversely, the likelihood that small and micro companies lack the resources and technical capabilities necessary for implementing digital tools is suggested.

An interesting observation is that while Malaysia has higher rates of digital tools adoption than Viet Nam in large and medium-sized companies, the trend is reversed for small and micro companies. This suggests that while Malaysia pursues digitalisation in larger companies, the digital divide by company size is more severe than in Viet Nam.

Table 6.2. Average Number of Digital Tools Implemented by Country and Company Size

Country	Large	Medium	Small	Micro
Indonesia	20.9	16.9	7.3	7.6
Malaysia	17.3	18.8	4.8	3.5
Viet Nam	14.7	11.4	6.9	6.3

Source: Authors.

Table 6.3 shows the average number of digital tools implemented by country, company size, and industry. Looking at industry, agriculture, forestry, and fishing tend to have a relatively low number of digital tools implemented in all countries. Factors such as lack of resources and education, technical constraints, or the unique characteristics of these traditional industries may influence this trend. On the other hand, manufacturing (heavy manufacturing) showed a relatively high number of digital tools implemented. For instance, the average number of tools implemented by medium-sized companies in Viet Nam is 12.8, indicating a notably higher implementation rate than in other industries. In manufacturing (heavy manufacturing), where automation and efficiency can be required more than in other industry categories, implementing digital tools is likely to happen.

Table 6.3. Average Number of Digital Tools Implemented by Country, Company Size, and Industry

Country	Company size	Agriculture, forestry, and fishing	Manufacturing (heavy mfg.)	Manufacturing (light mfg. 1 - consumer goods or consumables)	Manufacturing (light mfg. 2 - others)	Services
Indonesia	Large	18.4	20.9	21.4	20.2	20.9
	Medium	15.1	17.4	18.3	16.5	16.8
	Small	7.6	8.3	9.5	8.6	7.2
	Micro	6.0	7.0	8.2	7.2	7.7
Malaysia	Large	17.6	16.5	15.8	14.4	18.7
	Medium	14.4	15.8	16.0	15.4	21.0
	Small	4.7	4.9	5.1	4.9	4.8
	Micro	6.3	4.3	3.0	2.3	3.5
Viet Nam	Large	13.2	14.8	14.3	13.2	15.2
	Medium	10.0	12.8	12.0	12.0	11.2
	Small	6.4	7.7	7.3	7.1	6.9
	Micro	5.8	6.8	6.3	6.8	6.3

Mfg. = manufacturing.
Source: Authors.

Table 6.4 shows the average number of implemented digital tools by country, company size, and location. No clear trend was observed regarding location. The differences in the average number of digital tools implemented were more pronounced between company sizes rather than locations, again highlighting the substantial influence of large-sized companies' resources and knowledge on digitalisation.

Table 6.4. Average Number of Digital Tools Implemented by Country, Company Size, and Location

Country	Company size	Rural	Urban
Indonesia	Large	22.2	20.4
	Medium	15.7	17.1
	Small	6.9	7.5
	Micro	6.5	8.4
Malaysia	Large	16.4	19.1
	Medium	18.9	18.8
	Small	5.2	4.3
	Micro	5.3	1.5
Viet Nam	Large	14.0	15.6
	Medium	10.8	12.1
	Small	7.0	6.9
	Micro	6.3	6.3

Source: Authors.

The analysis highlighted a digital divide evidenced by disparities in adopting digital tools based on company size, industry, and country. By country, it was found that companies in Malaysia and Indonesia, which have medium- to high-income level economies, are more digitalised, while Viet Nam lags. By company size, digitalisation becomes less advanced as company size decreases. A large gap was found between small and medium-sized companies. Agriculture, forestry, and fishing was the least advanced industry in adopting digital tools, with other industries showing no significant differences. On the other hand, manufacturing (heavy manufacturing) showed slightly higher figures due to a higher proportion of industries being integrated into global supply chains. Finally, the study did not reveal significant differences by location.

2.3.2. Definition of Digitalisation Levels of Digital Tools

Providing a comprehensive framework for ASEAN companies, particularly MSMEs, to effectively embrace digitalisation can offer valuable insights into formulating strategies to support digital transformation amongst MSMEs in ASEAN. Drawing upon the survey findings, this chapter presents a systematic breakdown of the digitalisation process that ASEAN companies should undertake, with the corresponding digital tools deployed at each stage.

3. Method

The following method identifies the desired digital tools for each digitalisation level. Since digitalisation steps vary by industry, this analysis will be conducted on an industry-by-industry basis.

1. Calculate the adoption rate of each digital tool.
2. Calculate the average and standard deviation of the adoption rates calculated in 1.
3. Based on the values calculated above, categorise the levels of each tool by the following rules:

   (Basic) Tools with an adoption rate higher than the average + 0.5σ.

   (Low intermediate tools) Tools with an adoption rate lower than the average + 0.5σ and higher than the average.

   (High intermediate tools) Tools with an adoption rate lower than the average and higher than the average – 0.5σ.

   (Advanced tools) Tools with an adoption rate lower than the average – 0.5σ.

4. Data Preparation

This section observes the trends of digitalisation accompanying the growth of companies, with a cross-sectional analysis across different company sizes. Ideally, the analysis should have been conducted in all three countries where the phone survey was conducted: Indonesia, Malaysia, and Viet Nam. However, the national statistics in Indonesia and Malaysia define company size in terms of the number of employees and the size of sales, making it impossible to weigh back the data from the survey data. Therefore, this chapter focuses on Viet Nam by analysing data weighing back the number of employees using the official statistics of Viet Nam. On the other hand, for industry and location information, data from the global D&B Hoovers database will continue to be used with appropriate weighting adjustments.

5. Analysis Result

Tables 6.5 reports the adoption rate based on the above approach.

Table 6.5. Adoption Rate of Digital Tools by Industry

Category	Digital Tool	Agriculture, Forestry, and Fishing	Manufacturing (heavy mfg.)	Manufacturing (light mfg. 1 – consumer goods or consumables)	Manufacturing (light mfg. 2 – others)	Services
Intra-company management	Email and/or chat applications (e.g. digital tools for text message)	15.4%	29.2%	23.8%	19.4%	10.1%
	Mobile device	100.0%	99.7%	99.9%	100.0%	99.9%
	Computer	100.0%	100.0%	100.0%	100.0%	100.0%
	Office suite (e.g. Microsoft Office, Google Workspace, iWork)	60.0%	50.4%	67.1%	58.4%	55.1%
	Web meeting system	8.9%	21.8%	18.2%	16.9%	6.4%
Procurement	Electronic data interchange – procurement	19.8%	27.7%	40.4%	33.6%	35.8%
	E-payment - procurement	79.3%	94.5%	78.0%	80.0%	70.1%
Logistics	Document or cargo delivery application	65.0%	68.0%	69.7%	68.4%	78.9%
	Storage or inventory management system	15.8%	28.3%	24.6%	18.8%	8.7%
Sales & marketing	Electronic data interchange – sales & marketing	17.4%	39.6%	29.8%	31.6%	31.3%

Category	Digital Tool	Agriculture, Forestry, and Fishing	Manufacturing (heavy mfg.)	Manufacturing (light mfg. 1 – consumer goods or consumables)	Manufacturing (light mfg. 2 – others)	Services
	Social networking service (e.g. Twitter, Facebook, Instagram)	32.5%	49.6%	43.5%	35.9%	27.0%
	E-commerce	24.3%	45.3%	37.6%	35.5%	23.4%
	E-payment – sales & marketing	34.4%	53.2%	41.2%	40.9%	28.4%
	Sales management and automation tool (e.g. Salesforce)	8.5%	24.9%	15.4%	14.1%	4.8%
Overall company operation	Enterprise resource planning	7.6%	15.9%	14.6%	14.4%	5.5%
	Cloud storage or centralised server	1.4%	6.5%	5.6%	4.3%	2.9%
	Cybersecurity or protection software	35.4%	51.9%	40.4%	46.1%	50.7%
Other advanced tools	3D printing	0.0%	6.7%	2.1%	9.2%	2.2%
	Artificial intelligence	0.0%	3.2%	0.5%	1.3%	0.3%
	Augmented reality	0.2%	2.2%	0.3%	1.1%	0.3%
	Drone (e.g. farming management)	3.2%	1.4%	3.5%	0.2%	0.8%

Category	Digital Tool	Agriculture, Forestry, and Fishing	Manufacturing (heavy mfg.)	Manufacturing (light mfg. 1 – consumer goods or consumables)	Manufacturing (light mfg. 2 – others)	Services
	Internet of things device	5.5%	12.7%	6.3%	8.9%	3.1%
	Radio frequency identification	35.9%	49.3%	36.4%	42.2%	44.1%
	Robotics (e.g. factory robots, farming robots)	2.9%	6.3%	4.2%	4.5%	0.5%

Mfg. = manufacturing.
Notes: As previously noted, this analysis is based on survey data from companies in Viet Nam.
Source: Authors.

Table 6.6 defines the tools to be implemented at each digitalisation stage by industry based on the digital tool adoption rates provided in Table 6.5.

Table 6.6. Definition of Digital Tools in Vietnam by Digitalisation Stage and Industry

Category	Digital Tool	Agriculture, Forestry, and Fishing	Manufacturing (heavy mfg.)	Manufacturing (light mfg. 1 – consumer goods or consumables)	Manufacturing (light mfg. 2 – others)	Services
Intra-company management	Email and/or chat applications (e.g. digital tools for text message)	High intermediate	High intermediate	High intermediate	High intermediate	Advanced
	Mobile device	Basic	Basic	Basic	Basic	Basic
	Computer	Basic	Basic	Basic	Basic	Basic
	Office suite (e.g. Microsoft Office, Google Workspace, iWork)	Basic	Low intermediate	Basic	Basic	Basic
	Web meeting system	Advanced	Advanced	Advanced	Advanced	Advanced
Procurement	Electronic data interchange – procurement	High intermediate	High intermediate	Low intermediate	Low intermediate	Low intermediate

Category	Digital Tool	Agriculture, Forestry, and Fishing	Manufacturing (heavy mfg.)	Manufacturing (light mfg. 1 – consumer goods or consumables)	Manufacturing (light mfg. 2 – others)	Services
	E-payment – procurement	Basic	Basic	Basic	Basic	Basic
Logistics	Document or cargo delivery application	Basic	Basic	Basic	Basic	Basic
	Storage or inventory management system	High intermediate	High intermediate	High intermediate	High intermediate	Advanced
Sales & marketing	Electronic data interchange – sales & marketing	High intermediate	Low intermediate	High intermediate	High intermediate	Low intermediate
	Social networking service (e.g. Twitter, Facebook, Instagram)	Low intermediate	Low intermediate	Low intermediate	Low intermediate	High intermediate
	E-commerce	High intermediate	Low intermediate	Low intermediate	Low intermediate	High intermediate
	E-payment – sales & marketing	Low intermediate	Basic	Low intermediate	Low intermediate	High intermediate

Category	Digital Tool	Agriculture, Forestry, and Fishing	Manufacturing (heavy mfg.)	Manufacturing (light mfg. 1 – consumer goods or consumables)	Manufacturing (light mfg. 2 – others)	Services
	Sales management and automation tool (e.g. Salesforce)	Advanced	High intermediate	Advanced	Advanced	Advanced
Overall company operation	Enterprise resource planning	Advanced	Advanced	Advanced	Advanced	Advanced
	Cloud storage or centralised server	Advanced	Advanced	Advanced	Advanced	Advanced
	Cybersecurity or protection software	Low intermediate	Low intermediate	Low intermediate	Low intermediate	Basic
Other advanced tools	3D printing	Advanced	Advanced	Advanced	Advanced	Advanced
	Artificial intelligence	Advanced	Advanced	Advanced	Advanced	Advanced
	Augmented reality	Advanced	Advanced	Advanced	Advanced	Advanced
	Drone (e.g. farming management)	Advanced	Advanced	Advanced	Advanced	Advanced
	Internet of things device	Advanced	Advanced	Advanced	Advanced	Advanced

Category	Digital Tool	Agriculture, Forestry, and Fishing	Manufacturing (heavy mfg.)	Manufacturing (light mfg. 1 – consumer goods or consumables)	Manufacturing (light mfg. 2 – others)	Services
	Radio frequency identification	Low intermediate	Low intermediate	Low intermediate	Low intermediate	Low intermediate
	Robotics (e.g. factory robots, farming robots)	Advanced	Advanced	Advanced	Advanced	Advanced

Mfg. = manufacturing.
Source: Authors.

Table 6.6 shows that each industry follows a slightly different path towards digitalisation based on its needs and challenges. However, in general, the following steps are believed to be followed in the progression of digitalisation.

- Step 1: introduction of basic digital tools (basic level)

  In all industries, mobile devices, computers, e-payment for procurement, and document or cargo delivery are classified under the basic level and exhibit high adoption rates. These tools serve as fundamental means of communication and enable the execution of tasks in the modern business environment. Their importance is universally recognised across industries. The adoption rate of cybersecurity or protection software is relatively high in manufacturing and services, categorising it as basic. This can be attributed to the fact that most companies in these industries are sometimes required to handle large amounts of customer data and confidential information, making their protection a significant and primary concern.

- Step 2: digitalisation of customer communication and sales processes (low and high intermediate levels)

  In manufacturing, especially light manufacturing, the prioritised adoption is seen in SNS, e-commerce, and e-payment for sales and marketing, which were classified as low intermediate level. This is particularly relevant in the manufacturing of consumer goods or consumables, as direct engagement with consumers directly impacts performance, leading to the prioritisation of digitising communication with customers and sales processes. Face-to-face services categorises these tools as high intermediate, suggesting that their adoption has been delayed. Interestingly, tools such as email and/or chat applications and web meeting systems are categorised as advanced or high intermediate levels across all industries. This indicates the possibility that remote communication offered by these tools has yet to permeate all industries fully.

- Step 3: introduction of advanced digital tools (advanced level)

  Advanced digital tools such as 3D printing, artificial intelligence, augmented reality, drones, internet-of-things (IoT) devices, and robotics have meagre adoption rates across all industries. Many of these tools are emerging technologies, and while their potential value is widely recognised, they are still in the early stages of implementation. Companies may face high implementation costs and technical barriers, hindering widespread adoption.

Based on these observations, the digitalisation of MSMEs in ASEAN begins with introducing essential digital tools such as devices and basic communication tools, followed by digitising customer interactions and sales processes based on industry and market environments. However, the trajectory and pace of digitalisation are influenced by the characteristics of each industry, indicating that not all industries follow the same path.

6. Objectives and Effectiveness of Digital Tool Adoption in ASEAN

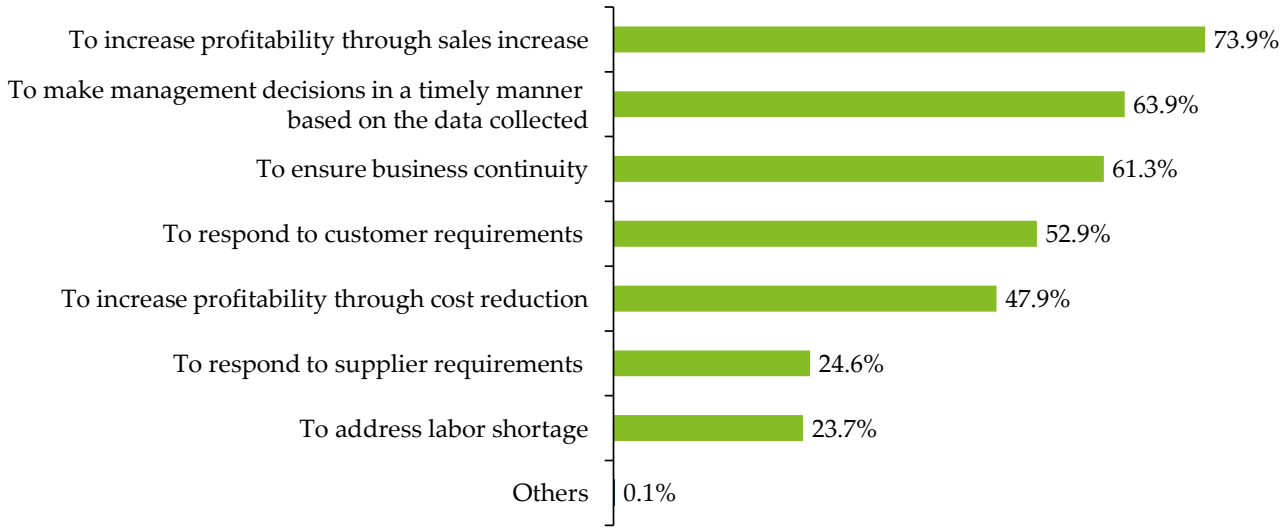
This section reports the major objectives and effectiveness of the digital tool adoption amongst the surveyed companies. The analysis is carried out on the data without weighting, including all the countries surveyed in the web and phone surveys.

6.1. Major Objectives of Digital Tool Adoption

Figure 6.1 shows the companies' objectives in implementing digital tools.

Figure 6.1. Major Objectives of Digital Tool Adoption (Web Survey)

(n=6,048)



Notes: The percentage of each bar is calculated by dividing the total number of respondents selecting the answer option in the corresponding bar by the total number of responses to the questionnaire. (Q24-1. What are the major objectives of digital tools adoption? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

The highest percentage, 73.9%, indicates that the primary objective is to increase profitability through sales growth. This suggests that companies recognise the potential of digital technologies in expanding their customer base and generating more revenue. Additionally, 63.9% of companies prioritise making timely management decisions based on data collected, emphasising the significance of data-driven decision-making and the role of digital technologies in facilitating informed choices. Ensuring business continuity is also a significant objective, with 61.3% of companies acknowledging the importance of digital tools in maintaining resilience during unexpected disruptions. This highlights the recognition of technology as a critical factor in mitigating risks and maintaining operations resulting from uncontrollable incidents such as the coronavirus disease (COVID-19) pandemic. Responding to customer requirements (52.9%) and increasing

profitability through cost reduction (47.9%) are also important objectives, focusing on meeting customer expectations and improving operational efficiency.

While addressing supplier requirements (24.6%) and labour shortage (23.7%) have lower percentages, they still indicate the recognition of technology's potential to mitigate workforce challenges and align with supplier policies amongst all ASEAN companies (Figure 6.1). Including various miscellaneous objectives (0.1%) highlights the diverse motivations, including improving product hygiene procedures, optimising resources management, accessing government services, and promoting sustainability.

Table 6.7 shows the major objectives of digital tool adoption in the web survey by industry. These three aforementioned objectives (increase profitability through sales increase, ensure business continuity, and make management decisions in a timely manner based on the data collected) are the top priorities for companies in all industries. To take agriculture, forestry, and fishing as an example, 75.0% of companies have the objective of increasing profitability through an increase in sales, 61.6% utilise digital tools to make management decisions in a timely manner based on the data collected, and 57.0% implement digital tools to ensure business continuity.

Table 6.7. Major Objectives of Digital Tool Adoption by Industry (Web Survey)

Objectives	Agriculture, Forestry, and Fishing (n=747)	Services (n=2,126)	Manufacturing (n=3,175)
To increase profitability through sales increase	560 (75.0%)	1,469 (69.1%)	2,443 (76.9%)
To increase profitability through cost reduction	320 (42.8%)	1,070 (50.3%)	1,505 (47.4%)
To ensure business continuity	426 (57.0%)	1,386 (65.2%)	1,893 (59.6%)
To address labour shortage	140 (18.7%)	520 (24.5%)	772 (24.3%)
To make management decisions in a timely manner based on the data collected	460 (61.6%)	1,349 (63.5%)	2,054 (64.7%)

Objectives	Agriculture, Forestry, and Fishing (n=747)	Services (n=2,126)	Manufacturing (n=3,175)
To respond to customer requirements	384 (51.4%)	1,076 (50.6%)	1,738 (54.7%)
To respond to supplier requirements	122 (16.3%)	573 (27.0%)	790 (24.9%)
Others	1 (0.1%)	5 (0.2%)	2 (0.1%)

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding column. (Q24-1. What are the major objectives of digital tools adoption? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 6.8 shows the major objectives of digital tool adoption in the web survey by company size.

Table 6.8. Major Objectives of Digital Tool Adoption by Company Size

Objectives	Web Survey				Phone Survey	
	Micro (n=278)	Small (n=1,409)	Medium (n=2,878)	Large (n=1,483)	Micro (n=677)	Small (n=2,422)
To increase profitability through sales increase	232 (83.5%)	1,062 (75.4%)	2,118 (73.6%)	1,060 (71.5%)	464 (68.5%)	1,483 (61.2%)
To increase profitability through cost reduction	140 (50.4%)	636 (45.1%)	1,445 (50.2%)	674 (45.4%)	308 (45.5%)	1,092 (45.1%)
To ensure business continuity	121 (43.5%)	837 (59.4%)	1,839 (63.9%)	908 (61.2%)	379 (56.0%)	1,306 (53.9%)
To address labour shortage	43 (15.5%)	271 (19.2%)	700 (24.3%)	418 (28.2%)	192 (28.4%)	580 (23.9%)
To make management decisions in a timely manner based on the data collected	161 (57.9%)	930 (66.0%)	1,829 (63.6%)	943 (63.6%)	213 (31.5%)	853 (35.2%)
To respond to customer requirements	137 (49.3%)	619 (43.9%)	1,578 (54.8%)	864 (58.3%)	191 (28.2%)	871 (36.0%)
To respond to supplier requirements	53 (19.1%)	224 (15.9%)	766 (26.6%)	442 (29.8%)	45 (6.6%)	307 (12.7%)
Others	1 (0.4%)	2 (0.1%)	2 (0.1%)	3 (0.2%)	0 (0.0%)	0 (0.0%)

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding column.
(Q24-1. What are the major objectives of digital tools adoption? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Most micro and small companies surveyed via the web and phone share similar perspectives regarding the objectives of adopting digital tools. Two primary goals are increasing profitability through an increase in sales and ensuring business continuity. According to the web survey, in micro companies, the main expected benefits are

increasing profitability through an increase in sales (83.5%), making timely management decisions based on data collected (57.9%), and increasing profitability through cost reduction (50.4%). For small companies, the key objectives also focus on increasing profitability through sales growth (75.4%), making timely management decisions based on collected data (66.0%), and ensuring business continuity (59.4%). In the phone survey, 68.5% of micro and 61.2% of small companies prioritise increasing profitability through an increase in sales. Micro and small companies also identify the ability to make management decisions promptly based on the data collected in adopting digital tools. However, the percentages for this objective are lower in the phone survey than the web survey, with 31.5% of micro and 35.2% of small companies selecting this option. Notably, the companies surveyed via phone tend to prioritise increasing profitability through cost reduction more than making timely data-based management decisions, with 45.5% of micro and 45.1% of small companies in the phone survey choosing this option. These variations in the digital tool implementation objectives are understandable, as they depend on each company's context and characteristics.

At the country level, these objectives (increase profitability through sales increase, ensure business continuity, and make management decisions in a timely manner based on the data collected) remain consistent as the top three for countries such as Brunei, Myanmar, and Viet Nam (Chapter 4, Table 4.31). In addition, for other countries, one or more of these objectives emerge as major focal points when companies adopt digital tools. For example, as observed in the web survey results (Chapter 4, Table 4.31), responding to customer requirements is of particular interest for companies in Cambodia (62.4%), Malaysia (61.9%), and the Philippines (60.1%). The top concern for companies from the Philippines is increasing profitability through cost reduction (75.8%).

Generally, the priorities of the surveyed companies in adopting digital tools are to increase profitability, ensure business continuity, make timely management decisions, and address the labour shortage. The findings imply a diverse range of objectives, reflecting the varying needs and priorities of companies in the region. Understanding these objectives enables policymakers and businesses to develop targeted strategies for bridging the digital divide and fostering digital transformation within ASEAN.

6.2. Effectiveness of Digital Tool Adoption

Table 6.9 shows the effectiveness of digital tool implementation. The digital tool implementation shows varying levels of success across the different categories.

Table 6.9. Effectiveness of Digital Tool Implementation (Web Survey)

Tool Category	Achieved the objectives of the implementation and produced more benefits than expected	Achieved the objectives of the implementation and produced the expected extent of benefits	Achieved part of the objectives of the implementation and produced some of the benefits	Did not achieve the purpose of implementation and did not produce any benefits at all	As digital tools have recently started operation, it is premature to assess their effectiveness
Intra-company management	1,770 (29.8%)	3,115 (52.4%)	903 (15.2%)	72 (1.2%)	83 (1.4%)
Procurement	1,223 (21.9%)	3,158 (56.6%)	1,037 (18.6%)	85 (1.5%)	73 (1.3%)
Logistics	1,070 (24.3%)	2,355 (53.5%)	831 (18.9%)	94 (2.1%)	48 (1.1%)
Sales & marketing	1,549 (26.5%)	2,840 (48.7%)	1,260 (21.6%)	119 (2.0%)	69 (1.2%)
Overall company operation	969 (26.5%)	1,889 (51.7%)	648 (17.7%)	93 (2.5%)	53 (1.5%)
Other advanced tools	855 (29.4%)	1,156 (39.7%)	798 (27.4%)	47 (1.6%)	57 (2.0%)

Notes: The percentage of each column is calculated by dividing the total number of respondents selecting the answer option in the corresponding column for each tool category by the total number of respondents selecting any of the 'already implemented' in Q23 for each tool category. (Q25. How successful has the implementation of the corresponding digital tools been in meeting implementation objectives and generating benefits? If you have experienced multiple cases of implementation, please answer based on your average experience. [SINGLE CHOICE: choose one option])
Source: Authors.

The intra-company management category has the highest percentage of companies achieving the objectives and obtaining the expected or more than expected level of benefits in aggregate (82.2%). Implementing these tools has been relatively successful, resulting in fruitful outcomes for the surveyed companies. Similarly, the procurement (78.6%), overall company operations (78.3%), logistics (77.9%), and sales and marketing (75.2%) categories show significant levels of achievement and benefits. Companies intentionally adopt functional tools, which may justify why these categories are conducive to successful implementation. It is important to note that the other advanced tools category has the lowest percentage of companies achieving the objectives and obtaining the expected or more than expected level of benefits (69.0%). A substantial percentage (27.4%) of companies only partially achieved their objectives and obtained some benefits from tool implementation in this category. Other advanced tools likely comprises a diverse range of tools serving different purposes, making it difficult to draw general conclusions about the overall success or challenges faced.

Figure 6.2 shows the effectiveness of digital tool implementation by company size.

Figure 6.2. Effectiveness of Digital Tool Implementation by Company Size

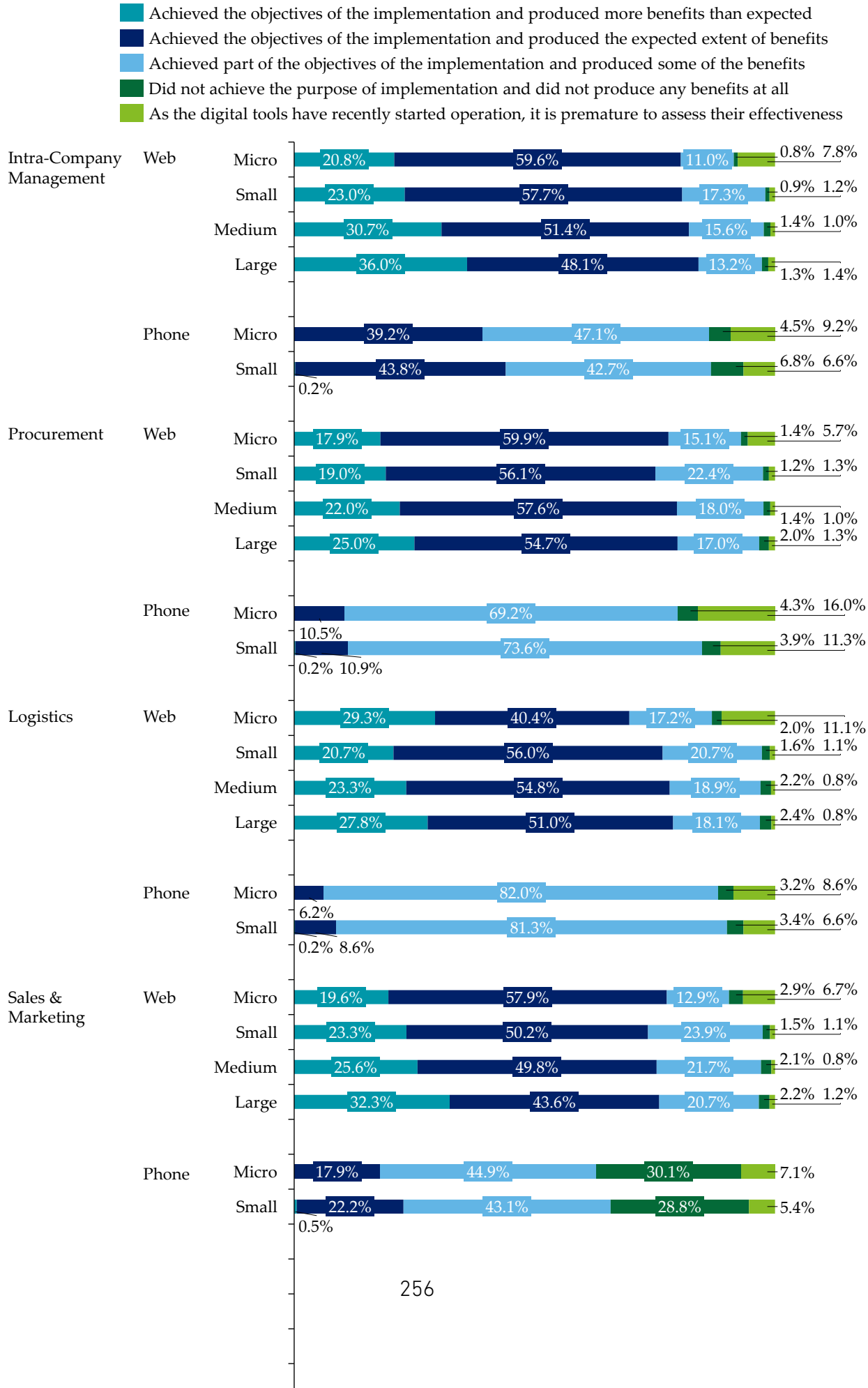
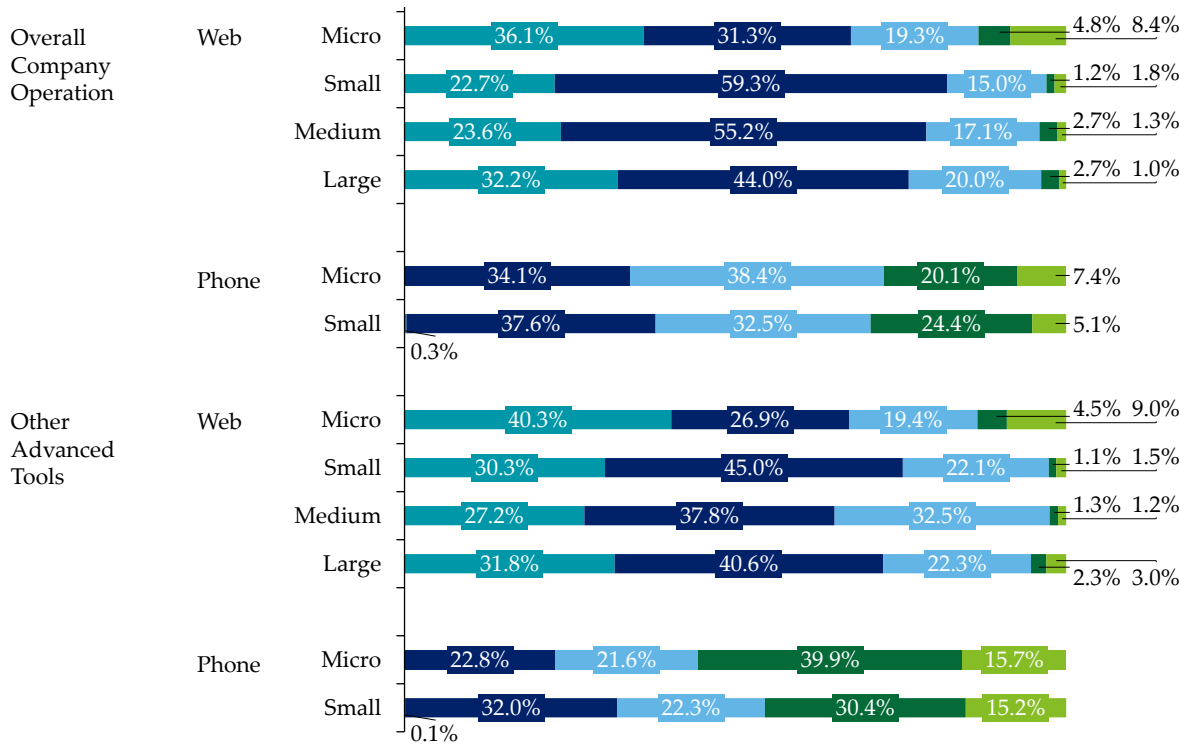


Figure 6.2. *Continued*



Notes: The percentage of each bar is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding row by company size. (Q25. How successful has the implementation of the corresponding digital tools been in meeting implementation objectives and generating benefits? If you have experienced multiple cases of implementation, please answer based on your average experience. [SINGLE CHOICE: choose one option])
Source: Authors.

Like the overall ASEAN trends, the web survey results consistently show a high number of companies achieving their objectives and experiencing significant benefits (as expected or more than expected) across all company sizes. For small companies, all the categories have more than 70% achieving their objectives and experiencing significant benefits (as expected or more than expected). This trend is similar for micro companies, which achieved around or more than 70% for all tool categories.

However, the phone survey presents a striking contrast with a much lower number of companies achieving their objectives. On average, more than 22% of micro companies report achieving their expected or greater benefits, with the highest percentage seen in intra-company management tools (39.2%) and the lowest in logistics (6.2%). Similarly, small companies have realised their expected or greater benefits, with the highest percentage seen in intra-company management tools (44.0%) and the lowest in logistics (8.8%). Most companies in the phone survey only partially achieve their implementation objectives and receive some benefits. Even more concerning, a significant portion of micro and small companies in the phone survey fail to achieve their implementation

objectives and do not experience any benefits at all in sales and marketing tools (30.1% for micro companies and 28.8% for small companies), overall company operations (20.1% for micro companies and 24.4% for small companies), and other advanced tools (39.9% for micro companies and 30.4% for small companies).

These differences may be attributed to variations in the characteristics of the companies participating in the web and phone surveys. However, the web and phone surveys showed that smaller companies tend not to achieve their implementation objectives and generate benefits through digital tool adoption.

When evaluating the effectiveness of digital tool implementation in ASEAN Member States, it is evident that all countries have achieved impressive results, with an average of more than 70% of companies in the web survey achieving implementation objectives and reaping benefits (as expected, more than expected, or part of it) (Chapter 4, Figure 4.15).

Possible assumptions for the discrepancies in implementation success could include factors such as the complexity of the tools, resistance to change within the companies, inadequate training or understanding of the tools by employees, or insufficient integration with existing systems or processes, which will be delved into further in the following sections of the chapter.

6.3. Use of Support in Adopting Digital Tools

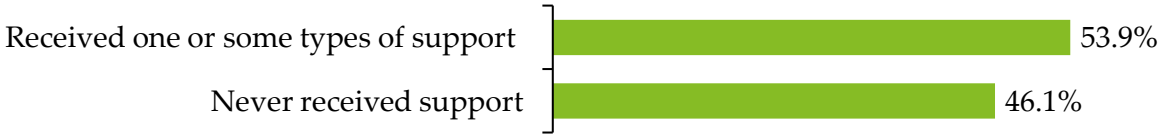
This section first provides an overview of the general utilisation of support in adopting digital tools in the surveyed companies. Next, it dives deeper to report on the utilisation of support from the public and private sectors, respectively.

6.3.1. General utilisation of support

Figure 6.3 shows that more than half the respondents have received some form of support.

Figure 6.3. Support Utilisation in Digital Tool Adoption (Web Survey)

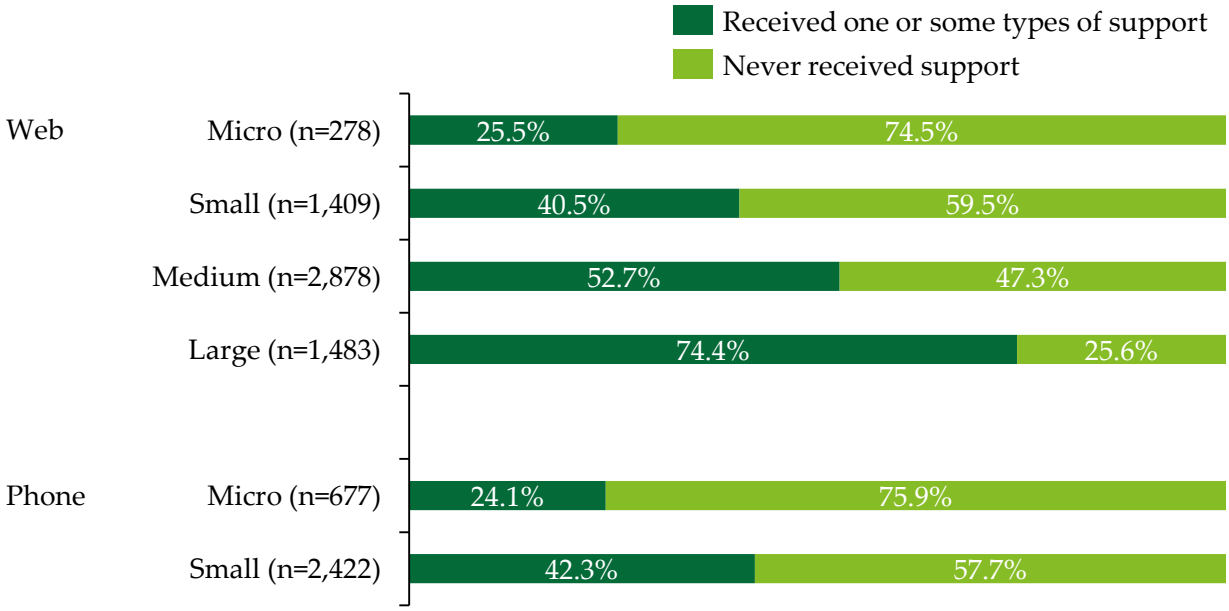
(n=6,048)



Notes: The percentage of each bar is calculated by dividing the total number of respondents selecting the answer option in the corresponding row by the total number of responses to the questionnaire. 'Received one or some types of support' is the sum of respondents selecting any of these four options: 'support from the private sector (industry association)', 'support from the private sector (multinational company)', 'support from the private sector (local company)', and 'support from the public sector (government or public institution)'. (Q30. Which support have you ever received in digital tool adoption? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

When analysing the support situation based on company size, it is evident that there are significant disparities in the support received by different company sizes. The data indicate that larger companies are more likely to receive support than smaller companies. As shown in Figure 6.4, in the web survey, 74.4% of large companies have received one or some form of public and/or private sector support, and only 25.6% have never received support. In contrast, 74.5% of micro companies have never received any support, and only 25.5% have received it. The phone survey shows a similar trend, where 75.9% of micro and 57.7% of small companies have never received any support.

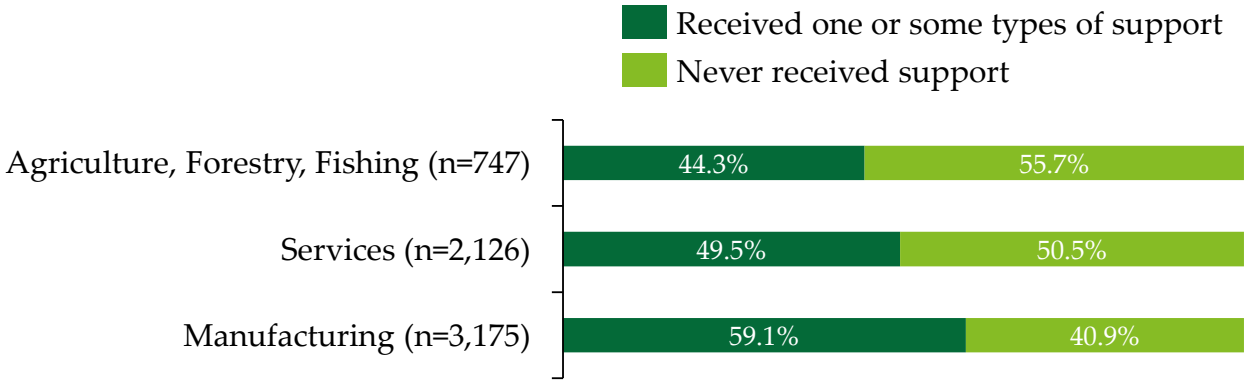
Figure 6.4. Support Utilisation in Digital Tool Adoption by Company Size



Notes: The percentage of each bar is calculated by dividing the total number of respondents selecting each answer option by the total number of responses to the questionnaire by company size. 'Received one or some types of support' is the sum of respondents selecting any of these four options: 'support from the private sector (industry association)', 'support from the private sector (multinational company)', 'support from the private sector (local company)', and 'support from the public sector (government or public institution)'. (Q30. Which support have you ever received in digital tool adoption? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Figure 6.5 shows the types of support the surveyed companies have received by industry. Manufacturing companies have the highest percentage of companies receiving some form of support (59.1%), followed by services (49.5%) and agriculture, forestry, and fishing (44.3%).

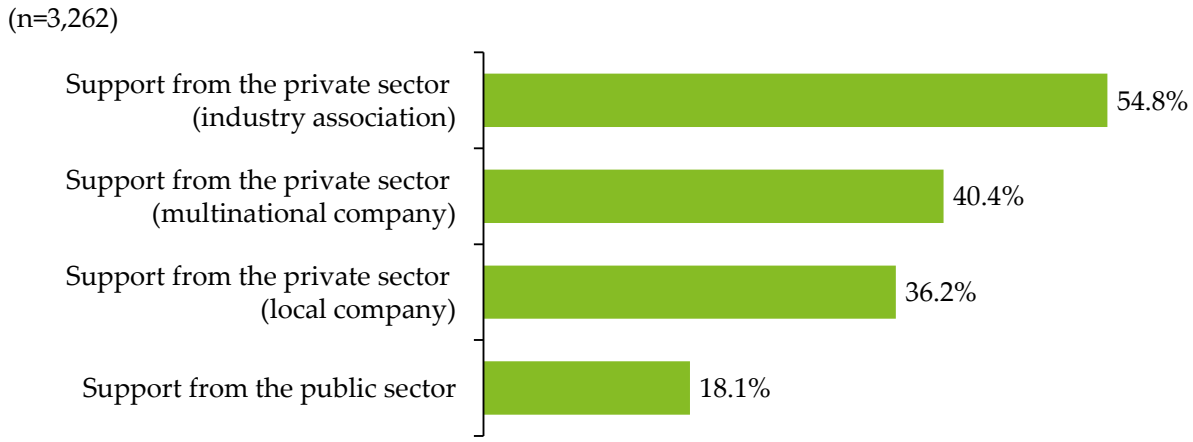
Figure 6.5. Support Utilisation in Digital Tool Adoption by Industry (Web Survey)



Notes: The percentage of each bar is calculated by dividing the total number of respondents selecting each answer option by the total number of responses to the questionnaire by industry. 'Received one or some types of support' is the sum of respondents selecting any of these four options: 'support from the private sector (industry association)', 'support from the private sector (multinational company)', 'support from the private sector (local company)', and 'support from the public sector (government or public institution)'. (Q30. Which support have you ever received in digital tool adoption? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

When examining the type of support, as observed in Figure 6.6, the private sector is more actively involved, with higher percentages of companies receiving support from industry associations (54.8%), multinational companies (40.4%), and local companies (36.2%) compared with the public sector (18.1%). Thus, although public sector support is currently limited, it is expected to help and support the companies that the private sector is currently unable to support.

Figure 6.6. Types of Support in Digital Tool Adoption (Web Survey)



Notes: The percentage of each bar is calculated by dividing the total number of respondents selecting the answer option in the corresponding bar by the total number of respondents having received one or more types of support.
The total number of respondents having received one or more types of support is the sum of respondents selecting any of these four options: 'support from the private sector (industry association)', 'support from the private sector (multinational company)', 'support from the private sector (local company)', and 'support from the public sector (government or public institution)'.
(Q30. Which support have you ever received in digital tool adoption? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 6.10 shows the types of support the surveyed companies received by company size. Micro companies scored lower than the ASEAN average in all types of support. According to the phone survey, support from local companies is the most widely utilised amongst the surveyed companies. Amongst private sector entities, it appears that local companies, with a presence in the same geographical area, using the local language, and possessing better knowledge of the local market, are more accessible to micro companies seeking support for digital tool implementation. These figures highlight the need for increased efforts from public and private sector players, particularly industry associations and multinational companies, to engage with micro and small companies to provide relevant and necessary support.

Table 6.10. Types of Support in Digital Tool Adoption by Company Size

Support	Web survey					Phone survey		
	Total (n=6,048)	Micro (n=278)	Small (n=1,409)	Medium (n=2,878)	Large (n=1,483)	Total (n=3,099)	Micro (n=677)	Small (n=2,422)
Support from the private sector (industry association)	2,786 (29.6%)	29 (10.4%)	340 (24.1%)	807 (28.0%)	611 (38.6%)	128 (4.1%)	7 (1.0%)	121 (5.0%)
Support from the private sector (multinational company)	1,781 (21.8%)	21 (7.6%)	235 (16.7%)	561 (19.5%)	500 (31.6%)	137 (4.4%)	22 (3.2%)	115 (4.7%)
Support from the private sector (local company)	1,317 (19.8%)	33 (11.9%)	186 (13.2%)	582 (20.2%)	380 (24.0%)	763 (24.6%)	123 (18.2%)	640 (26.4%)
Support from the public sector (government or public institution)	591 (9.8%)	24 (8.6%)	74 (5.3%)	240 (8.3%)	253 (16.0%)	183 (5.9%)	15 (2.2%)	168 (6.9%)

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding column. (Q30. Which support have you ever received in digital tool adoption? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 6.11 shows the types of support the surveyed companies received by industry. Similar to the ASEAN patterns, industry associations and multinational companies are the primary sources of support for companies in all three industries. Notably, manufacturing (57.3%) stands out with industry associations, illustrating the collaborative nature of the manufacturing industry and the vital role of industry associations in bridging digital gaps. Services have benefited significantly from public sector support (25.4%), compared with agriculture (18.1%) and manufacturing (14.1%).

Table 6.11. Types of Support in Digital Tool Adoption by Industry (Web Survey)

Support	Agriculture, Forestry, and Fishing (n=331)	Services (n=1,053)	Manufacturing (n=1,878)
Support from the private sector (industry association)	182 (55.0%)	529 (50.2%)	1,076 (57.3%)
Support from the private sector (multinational company)	139 (42.0%)	446 (42.4%)	732 (39.0%)
Support from the private sector (local company)	110 (33.2%)	367 (34.9%)	704 (37.5%)
Support from the public sector (government or public institution)	60 (18.1%)	267 (25.4%)	264 (14.1%)

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding column. (Q30. Which support have you ever received in digital tool adoption? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 6.12 shows the support the surveyed companies think the government should emphasise in encouraging digital adoption. The respondents emphasise initiatives to address the lack of information and communication technology (ICT) skills, business knowledge, and financial gaps, which are internal challenges amongst the companies.

Table 6.12, Support that the Government Should Emphasise to Encourage Digital Tool Adoption

Type	Issue	Web Survey (n=6,048)	Phone Survey (n=3,099)
Companies' internal factors	Limited human resources with IT knowledge or skills to plan and implement digital tools	3,719 (61.5%)	1,239 (40.0%)
	Limited human resources to design the operation flow after digital transformation or to integrate digital tools into current operation	3,421 (56.6%)	1,198 (38.7%)
	Limited human resources with business knowledge to diagnose and identify company's issue that may be resolved by digital tools	3,237 (53.5%)	1,585 (51.1%)
	Limited fund to invest in digital tools	3,085 (51.0%)	1,295 (41.8%)
	Absence of supporting tools to connect or integrate with digital tools	1,664 (27.5%)	1,222 (39.4%)
	Inability to communicate the benefit and get employees onboard	1,436 (23.7%)	1,157 (37.3%)
	Difficulties in finding suitable solutions due to limited options for localised solutions	3,071 (50.8%)	514 (16.6%)
Companies' external factors	Low awareness of adoption benefit due to low usage from customer side	2,874 (47.5%)	763 (24.6%)
	Difficulties in finding affordable solutions	2,647 (43.8%)	809 (26.1%)
	Lack of opportunities to learn about support programmes of private sector support providers	2,060 (34.1%)	747 (24.1%)
	Operational inconvenience caused by unstandardised government e-service	1,895 (31.3%)	291 (9.4%)
	Cybersecurity concerns	1,808 (29.9%)	764 (24.7%)
	Internet connection instability that affects business continuity	1,585 (26.2%)	567 (18.3%)
	Support programmes from private sector support providers do not match business needs	1,565 (25.9%)	592 (19.1%)

Type	Issue	Web Survey (n=6,048)	Phone Survey (n=3,099)
Others		38 (0.6%)	0 (0.0%)

ASEAN = Association of Southeast Asian Nations, IT = information technology.
Notes: The percentage of each row is calculated by dividing the total number of respondents selecting the answer option in the corresponding row by the total number of respondents of the corresponding column. (Q39. Which issues of ASEAN companies do you think the government should emphasise in order to encourage digital adoption? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

The web survey data reveal that 61.5% of respondents indicate a limited number of human resources with the information technology (IT) knowledge or skills to plan and implement digital tools. Additionally, 56.6% of respondents seek assistance in resolving issues related to limited human resources for designing operational flows after digital transformation or integrating digital tools into current operations. Moreover, 53.5% of companies express a need for support plans to address the lack of human resources with business knowledge, specifically in diagnosing and identifying company issues that can be resolved through digital tools. Furthermore, 51.0% of companies mention limited funds available for investing in digital tools.

The phone survey data also reveal that companies' internal factors are more significant challenges to address than external factors. Amongst the answer options, 'limited human resources with business knowledge to diagnose and identify company's issue that may be resolved by digital tools' scored the highest, at 51.1%.

When examining company size in Table 6.13, it is worth noting that internal hindrances such as 'limited human resources with business knowledge to diagnose and identify company's issue that may be resolved by digital tools' poses the most significant challenge for micro companies (60.1% for the web survey and 55.4% for the phone survey). The web survey also reveals that amongst the micro companies, 'difficulties in finding suitable solutions due to limited options for localised solutions' scored higher than for other company sizes, with 55.0% as the highest score. When examining the companies' external factors, micro companies scored the highest amongst the company sizes for 'difficulties in finding affordable solutions' and 'lack of opportunities to learn about support programmes of private sector support providers', at more than 50%. Those two answer options in the phone survey were also selected more often by micro companies than small companies. Still, in the phone survey, it should be noted that micro companies scored higher for 'low awareness of adoption benefit due to low usage from customer side', showing a higher desire to spread the effectiveness of digital tool adoption amongst smaller companies.

Table 6.13. Support the Government Should Emphasise to Encourage Digital Tool Adoption by Company Size

Type	Issue	Web Survey				Phone Survey	
		Micro (n=278)	Small (n=1,409)	Medium (n=2,878)	Large (n=1,483)	Micro (n=677)	Small (n=2,422)
Companies' internal factors	Limited human resources with IT knowledge or skills to plan and implement digital tools	138 (49.6%)	878 (62.3%)	1,899 (66.0%)	804 (54.2%)	282 (41.7%)	957 (39.5%)
	Limited human resources to design the operation flow after digital transformation or to integrate digital tools into current operation	132 (47.5%)	860 (61.0%)	1,631 (56.7%)	798 (53.8%)	230 (34.0%)	968 (40.0%)
	Limited human resources with business knowledge to diagnose and identify company's issue that may be resolved by digital tools	167 (60.1%)	670 (47.6%)	1,611 (56.0%)	789 (53.2%)	375 (55.4%)	1210 (50.0%)
	Limited fund to invest in digital tools	141 (50.7%)	771 (54.7%)	1,565 (54.4%)	608 (41.0%)	303 (44.8%)	992 (41.0%)

Type	Issue	Web Survey				Phone Survey	
		Micro (n=278)	Small (n=1,409)	Medium (n=2,878)	Large (n=1,483)	Micro (n=677)	Small (n=2,422)
	Absence of supporting tools to connect or integrate with digital tools	70 (25.2%)	407 (28.9%)	730 (25.4%)	457 (30.8%)	239 (35.3%)	983 (40.6%)
	Inability to communicate the benefit and get employees onboard	63 (22.7%)	310 (22.0%)	674 (23.4%)	389 (26.2%)	283 (41.8%)	874 (36.1%)
	Difficulties in finding suitable solutions due to limited options for localised solutions	153 (55.0%)	709 (50.3%)	1,467 (51.0%)	742 (50.0%)	124 (18.3%)	390 (16.1%)
Companies' external factors	Low awareness of adoption benefit due to low usage from customer side	90 (32.4%)	761 (54.0%)	1,364 (47.4%)	659 (44.4%)	230 (34.0%)	533 (22.0%)
	Difficulties in finding affordable solutions	143 (51.4%)	643 (45.6%)	1,276 (44.3%)	585 (39.4%)	200 (29.5%)	609 (25.1%)
	Lack of opportunities to learn about support programmes of private sector support providers	140 (50.4%)	530 (37.6%)	922 (32.0%)	468 (31.6%)	183 (27.0%)	564 (23.3%)

Type	Issue	Web Survey				Phone Survey	
		Micro (n=278)	Small (n=1,409)	Medium (n=2,878)	Large (n=1,483)	Micro (n=677)	Small (n=2,422)
	Operational inconvenience caused by unstandardised government e-service	45 (16.2%)	436 (30.9%)	905 (31.4%)	509 (34.3%)	38 (5.6%)	253 (10.4%)
	Cybersecurity concerns	41 (14.7%)	348 (24.7%)	975 (33.9%)	444 (29.9%)	191 (28.2%)	573 (23.7%)
	Internet connection instability that affects business continuity	46 (16.5%)	375 (26.6%)	852 (29.6%)	312 (21.0%)	120 (17.7%)	447 (18.5%)
	Support programmes from private sector support providers do not match business needs	34 (12.2%)	297 (21.1%)	861 (29.9%)	373 (25.2%)	129 (19.1%)	463 (19.1%)
Others		3 (1.1%)	3 (0.2%)	21 (0.7%)	11 (0.7%)	0 (0.0%)	0 (0.0%)

IT = information technology.

Notes: The percentage of each row is calculated by dividing the total number of responses for each answer option by the total number of respondents in the corresponding column. (Q30. Which support have you ever received in digital tool adoption? [MULTIPLE CHOICE: choose all options that apply])

Source: Authors.

6.4. Utilisation of Public Sector Support

Table 6.14 displays the types of support surveyed companies have received from the public sector. From the web and phone surveys, the most common forms of support received by companies are 'IT skills seminars or training' and 'consultations on suitable solutions'. 'IT skills seminars or training' scored the highest in the web survey amongst the answer options, and the second highest in the phone survey. In contrast, 'consultations on suitable solutions' scored the highest in the phone survey and the second highest in the web survey. These findings highlight the need for ASEAN companies to enhance their skills for adopting digital tools and their limited ability to identify the most suitable digital tools for their specific contexts. To bridge the gap in business knowledge, the public sector should facilitate connections between companies and solution providers through activities like business matchmaking or providing a list of potential providers (47.0% in the web survey and 16.4% in the phone survey).

On the other hand, the allocation of financial assistance to companies such as 'low-interest loans' and 'incentives' ranks the lowest amongst all forms of support in ASEAN, as evident in the web survey. The phone survey findings reinforce this fact, as none of the micro and small companies surveyed have received 'low-interest loans' or 'incentives' from the public sector. This observation implies that the ASEAN support stakeholders might need to prioritise or improve capacity to address financial gaps in the region. The support stakeholders are responsible for enhancing the availability and accessibility of support schemes to meet ASEAN companies' diverse needs.

The provision of internet networks was also mentioned in 'others' as crucial support received by companies in the region. In today's digital age, robust and reliable infrastructure serves as the foundation for companies' successful digitalisation efforts. Support initiatives must prioritise the expansion and enhancement of internet networks. This responsibility primarily lies with regional and national governments in ASEAN.

Table 6.14. Support from the Public Sector

Type	Support	Web survey (n=591)	Phone survey (n=183)
Knowledge or information provision	IT skills seminar or training	374 (63.3%)	64 (35.0%)
	Consultation on the suitable solutions	291 (49.2%)	154 (84.2%)
	Business matching with solution providers or providing the list of them with companies	278 (47.0%)	30 (16.4%)
	Information on the source of funding for digital tool investment	216 (36.5%)	46 (25.1%)
Financial support	Grant or subsidy for digital tools investment	283 (47.9%)	43 (23.5%)
	Low-interest loan	189 (32.0%)	0 (0.0%)
	Incentive (e.g. tax reduction for digital tool investment or adoption)	189 (32.0%)	0 (0.0%)
Others		0 (0.0%)	0 (0.0%)

ASEAN = Association of Southeast Asian Nations, IT = information technology.
Notes: The table shows the types of support that ASEAN companies have received from the public sector in digital tool adoption. The percentage of each row is calculated by dividing the total number of respondents selecting the answer option in the corresponding row by the total number of respondents having received support from the public sector in Q30. (Q31. If you selected 'support from the public sector (government or public institution)' in Q30, what support have you received? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 6.15 shows the effectiveness of support from the public sector. The web survey reveals positive feedback from companies regarding public sector support, even though the support utilisation of the public sector support scored less than 20% amongst the surveyed companies. A significant majority of companies express that the support received from the public sector either met or exceeded their expectations. As a result of this support, 89.3% of companies successfully implemented digital tools, showcasing the positive impact of public sector assistance in facilitating digitalisation (Chapter 4, Figure 4.25).

Table 6.15. Effectiveness of Support from the Public Sector (Web Survey)

Category	Type of Support	Did Not Meet Expectations	Met Expectations	Exceeded Expectations
Knowledge or information provision	IT skills seminar or training	63 (16.8%)	270 (72.2%)	41 (11.0%)
	Consultation on the suitable solutions	24 (8.2%)	223 (76.6%)	44 (15.1%)
	Business matching with solution providers or providing the list of them with companies	37 (13.3%)	193 (69.4%)	48 (17.3%)
	Information on the source of funding for digital tool investment	38 (17.6%)	140 (64.8%)	38 (17.6%)
Financial support	Grant or subsidy for digital tools investment	56 (19.8%)	177 (62.5%)	50 (17.7%)
	Low-interest loan	37 (19.6%)	116 (61.4%)	36 (19.0%)
	Incentive (e.g. tax reduction for digital tool investment or adoption)	30 (15.9%)	122 (64.6%)	37 (19.6%)
Others		5 (45.5%)	4 (36.4%)	2 (18.2%)

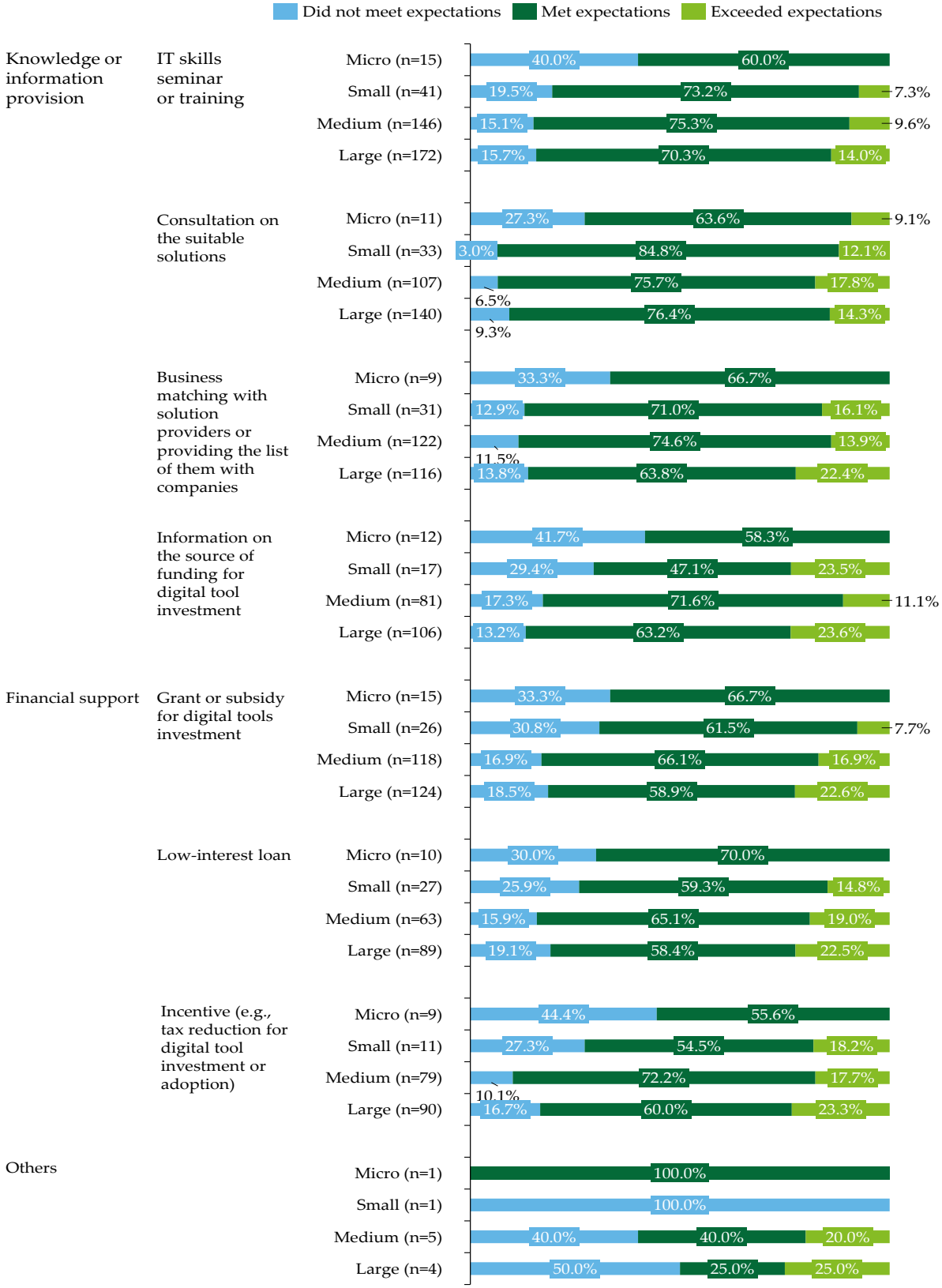
IT = information technology.

Notes: The percentage of each column is calculated by dividing the total number of respondents selecting the answer option in the corresponding column for each type of support by the total number of respondents having received such support from the public sector in Q31. The total number of respondents are: IT skills seminar or training (n=374); consultation on the suitable solutions (n=291); business matching with solution providers or providing the list of them with companies (n=278); information on the source of funding for digital tool investment (n=216); grant or subsidy for digital tools investment (n=283); low-interest loan (n=189); incentive (n=189); and others (n=11). (Q32. Did the support you received as answered in Q31 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option])

Source: Authors.

However, satisfaction levels vary significantly amongst different company sizes. Figure 6.7 shows the effectiveness of support from the public sector by company size.

Figure 6.7. Effectiveness of Support from the Public Sector by Company Size (Web Survey)



IT = information technology.

Note: The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total respondents of the corresponding row company size that selected 'support from the public sector (government or public institution)' in Q30. (Q32. Did the support you received as answered in Q31 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option])

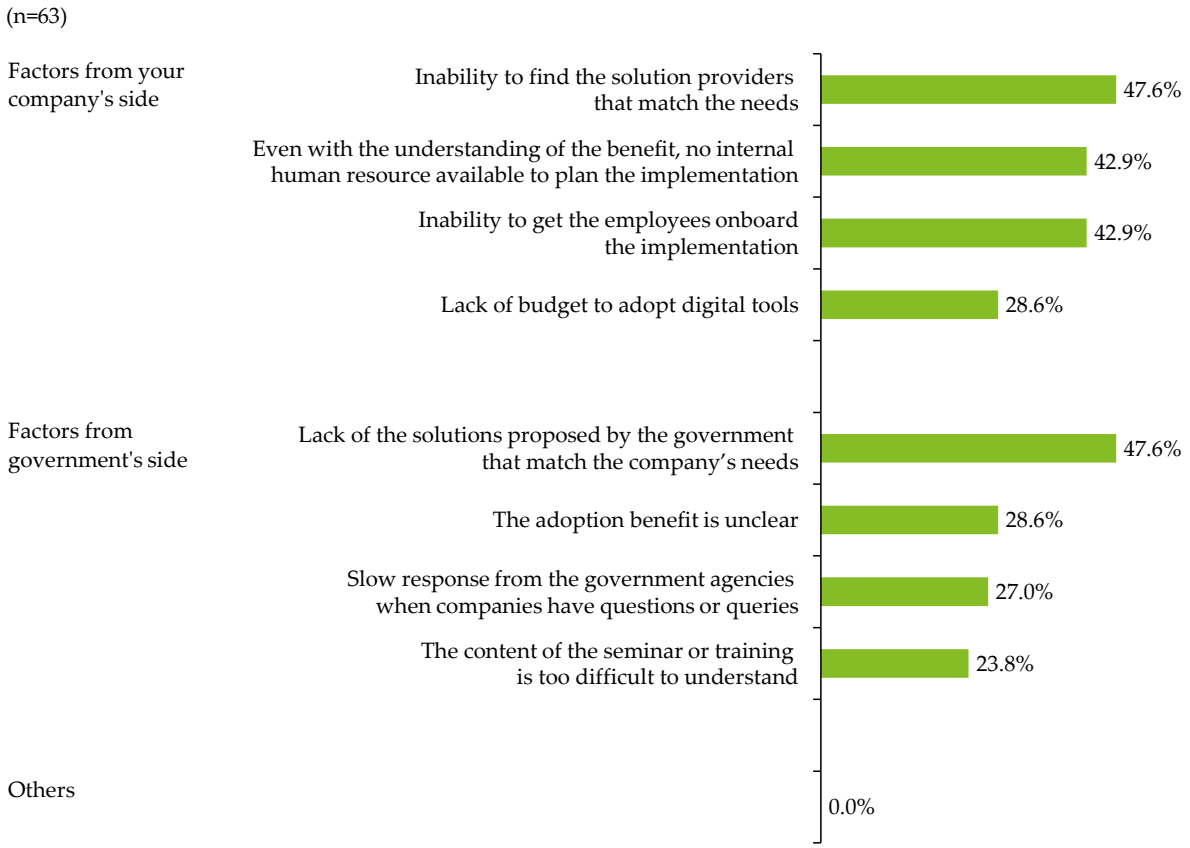
Source: Authors.

As the figure shows, most large and medium-sized companies generally report that their expectations were met or exceeded. In contrast, micro and small companies in the web survey generally face lower satisfaction levels. However, it should be noted that the sample size for those micro and small companies for each answer option is quite limited, especially for 'others', having equal to or less than five responses from all company sizes.

Besides 'others', amongst micro companies, the top three types of support that did not meet their expectations are incentives (44.4%), information on the source of funding for digital tool investment (41.7%), and IT skills seminars or training (40.0%). Similarly, for small companies, the top three types of support that did not meet their expectations are grants or subsidies for digital tools investment (30.8%), information on the source of funding for digital tool investment (29.4%), and incentives (27.3%). These findings indicate that high-quality support should be expanded to benefit a larger number of companies, leading to broader positive impacts. Nevertheless, they suggest that micro and small companies would like more support to address their financial concerns in adopting digital tools. This issue requires increased efforts from governments to develop tailored initiatives that effectively address the financial barriers hindering micro and small companies from embarking on and progressing in their digital journey.

Figure 6.8 shows the reasons for not being able to implement the tools after receiving support from the public sector.

Figure 6.8. Reasons for Not Being Able to Implement the Tools after Receiving Support from the Public Sector (Web Survey)



Notes: The percentage of each bar is calculated by dividing the total number of respondents selecting the answer option in the corresponding row by the total number of respondents who were unable to implement digital tools as answered in Q33. (Q34. What do you think are the reasons why you could not proceed to implementation after receiving the support? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

According to the figure, for companies that were not able to implement digital tools after receiving support, the top reasons cited by companies that received support from the public sector include 'lack of solutions proposed by the government that match the company's needs' (47.6%), 'inability to find solution providers that match their needs' (47.6%), and 'no internal human resource available to plan the implementation' (42.9%). This again implies a major unmet need of ASEAN companies in digital tool localisation or customisation, as well as gaps in ICT skills to move forward in the digital journey. However, it should be noted that the total sample size for this figure is limited to 63.

These factors deserve attention and consideration when the government and other public entities develop support initiatives. Efforts should improve overall awareness and acceptance of digitalisation within the company, ensuring that employees are fully engaged and supportive of the changes. Besides, it is essential to establish efficient and

responsive support mechanisms, including timely customer service, to address any questions or issues during the implementation process promptly.

6.5. Utilisation of Private Sector Support

Table 6.16 shows the types of support that ASEAN companies have received from the private sector. Like the public sector support result, the most common forms of support received by ASEAN companies aim to address gaps mainly in ICT skills and business knowledge, specifically through 'IT skills seminars or training' and 'consultations on suitable solutions' for both the web and phone surveys. 'IT skills seminar or training' scored third highest amongst the answer options in the web survey and the highest in the phone survey, while 'consultation on the suitable solutions' scored the highest in the web survey and second highest in the phone survey. To bridge the gap in business knowledge, not only the public but also the private sector should facilitate connections between companies and solution providers through activities like business matchmaking or providing a list of potential providers. This answer option is ranked as the second and third highest amongst the answer options in the web and phone surveys, respectively.

On the other hand, the allocation of financial assistance to companies such as 'low-interest loans' and 'discounts' ranks relatively low amongst all forms of support in ASEAN, as evident in both surveys. In the phone survey, a mere 0.8% of companies acknowledge receiving a 'grant or subsidy for digital tools investment', and only 2.8% have received a 'low-interest loan'. Like the public sector support result, the ASEAN support stakeholders may need to prioritise or improve capacity to address financial gaps in the region.

Table 6.16. Support from the Private Sector

Type	Support	Web Survey (n=2,981)	Phone Survey (n=1,028)
Knowledge or information provision	IT skills seminar or training	1,656 (55.6%)	677 (65.9%)
	Consultation on the suitable solutions	1,965 (65.9%)	580 (56.4%)
	Business matching with solution providers or providing the list of them with companies	1,688 (56.6%)	506 (49.2%)
	Information on the source of funding for digital tool investment	1,385 (46.5%)	91 (8.9%)
Financial support	Grant or subsidy for digital tools investment	1,045 (35.1%)	8 (0.8%)
	Low-interest loan	810 (27.2%)	29 (2.8%)
	Discounts or any relevant financial assistance programme for adopting digital tools	968 (32.5%)	108 (10.5%)
Others		16 (0.5%)	0 (0.0%)

ASEAN = Association of Southeast Asian Nations, IT = information technology.
Notes: The table shows the types of support that ASEAN companies have received from the private sector in digital tool adoption. The percentage of each row is calculated by dividing the total number of respondents selecting the answer option in the corresponding row by the total number of respondents that have received support from the private sector in Q30. (Q35. If you selected any of 'support from the private sector' in Q30, what support have you received? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 6.17 illustrates the effectiveness of support from the private sector.

Table 6.17. Effectiveness of Support from the Private Sector (Web Survey)

Category	Type of Support	Did Not Meet Expectations	Met Expectations	Exceeded Expectations
Knowledge or information provision	IT skills seminar or training	310 (18.7%)	1,081 (65.3%)	265 (16.0%)
	Consultation on the suitable solutions	346 (17.6%)	1,394 (70.9%)	225 (11.5%)
	Business matching with solution providers or providing the list of them with companies	525 (31.1%)	920 (54.5%)	243 (14.4%)
	Information on the source of funding for digital tool investment	584 (42.2%)	580 (41.9%)	221 (16.0%)
Financial support	Grant or subsidy for digital tools investment	143 (13.7%)	655 (62.7%)	247 (23.6%)
	Low-interest loan	89 (11.0%)	493 (60.9%)	228 (28.1%)
	Discounts or any relevant financial assistant programme for adopting digital tools	115 (11.9%)	622 (64.3%)	231 (23.9%)
Others		5 (31.3%)	8 (50.0%)	3 (18.8%)

IT = information technology.
Notes: The percentage of each column is calculated by dividing the total number of respondents selecting the answer option in the corresponding column for each type of support by the total number of respondents having received such support from the private sector in Q35. (Q36. Did the support you received as answered in Q35 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option])
Source: Authors.

In general, private sector support is well regarded by companies, aligning with the trend observed in public sector support. Most of the support (more than 50%) met or surpassed companies' expectations. Of the companies that reported receiving some type of support in the survey, about 80% received private sector support, but overall satisfaction with private sector support was lower than that of public sector support. For example, some

answer options relating to private sector support show a different trend from public sector support. Table 6.17 shows that 'business matching with solution providers or providing the list of them with companies' and 'information on the source of funding for digital tool investment' reflected dissatisfaction, at more than 30%, while public sector support stood at less than 20% for both.

Figure 6.9 shows the effectiveness of support from the private sector by company size.

Figure 6.9. Effectiveness of Support from the Private Sector by Company Size (Web Survey)

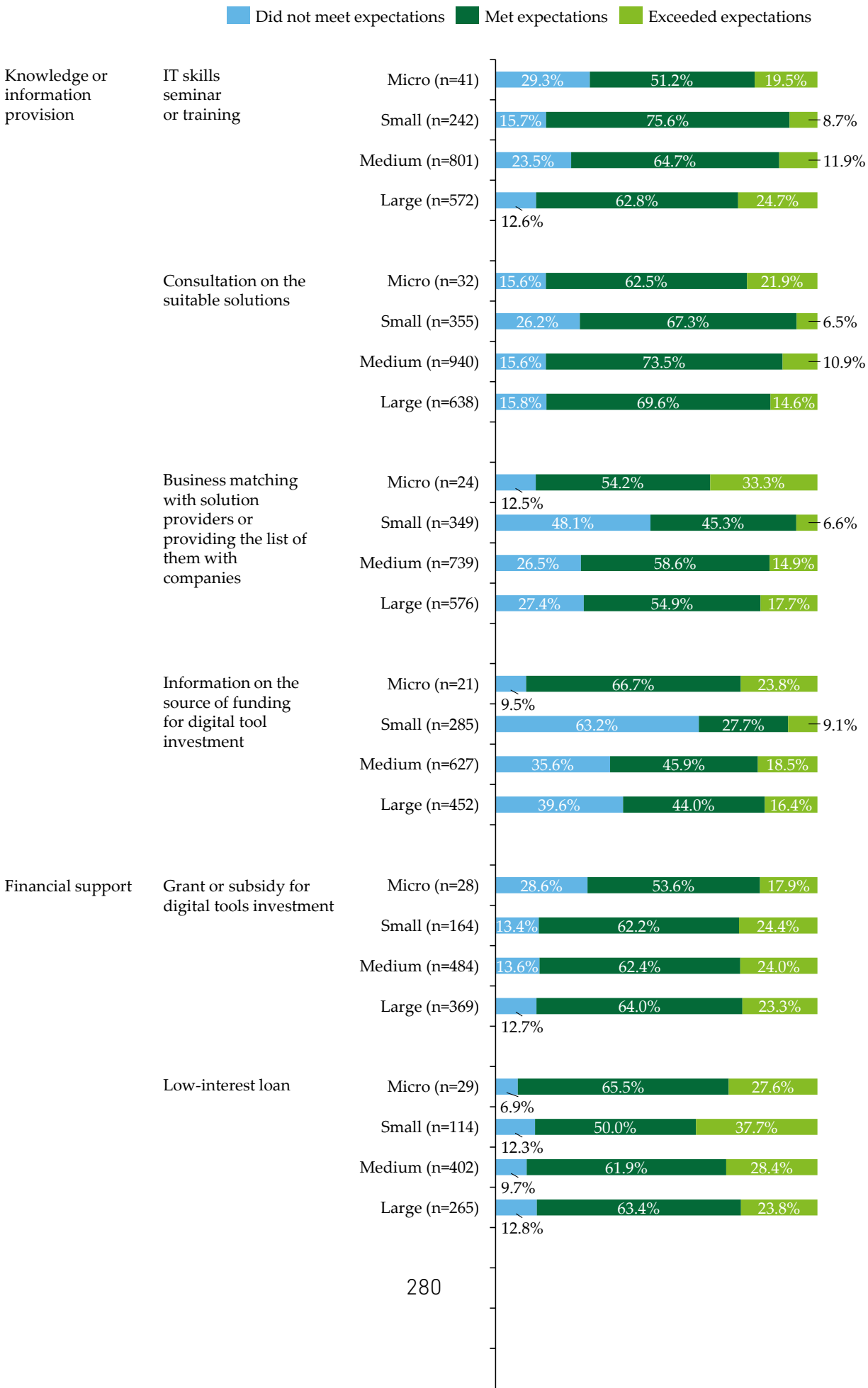
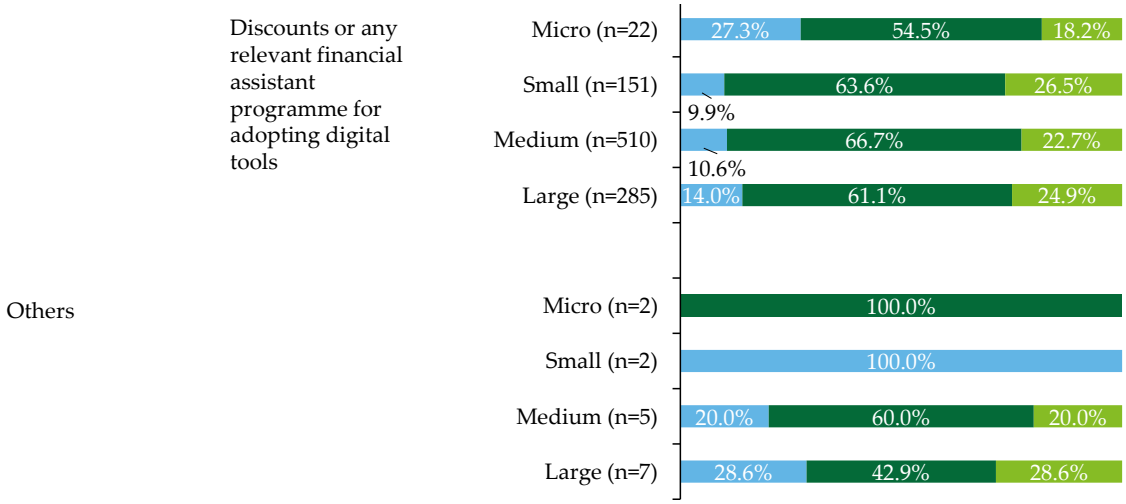


Figure 6.9. *Continued*



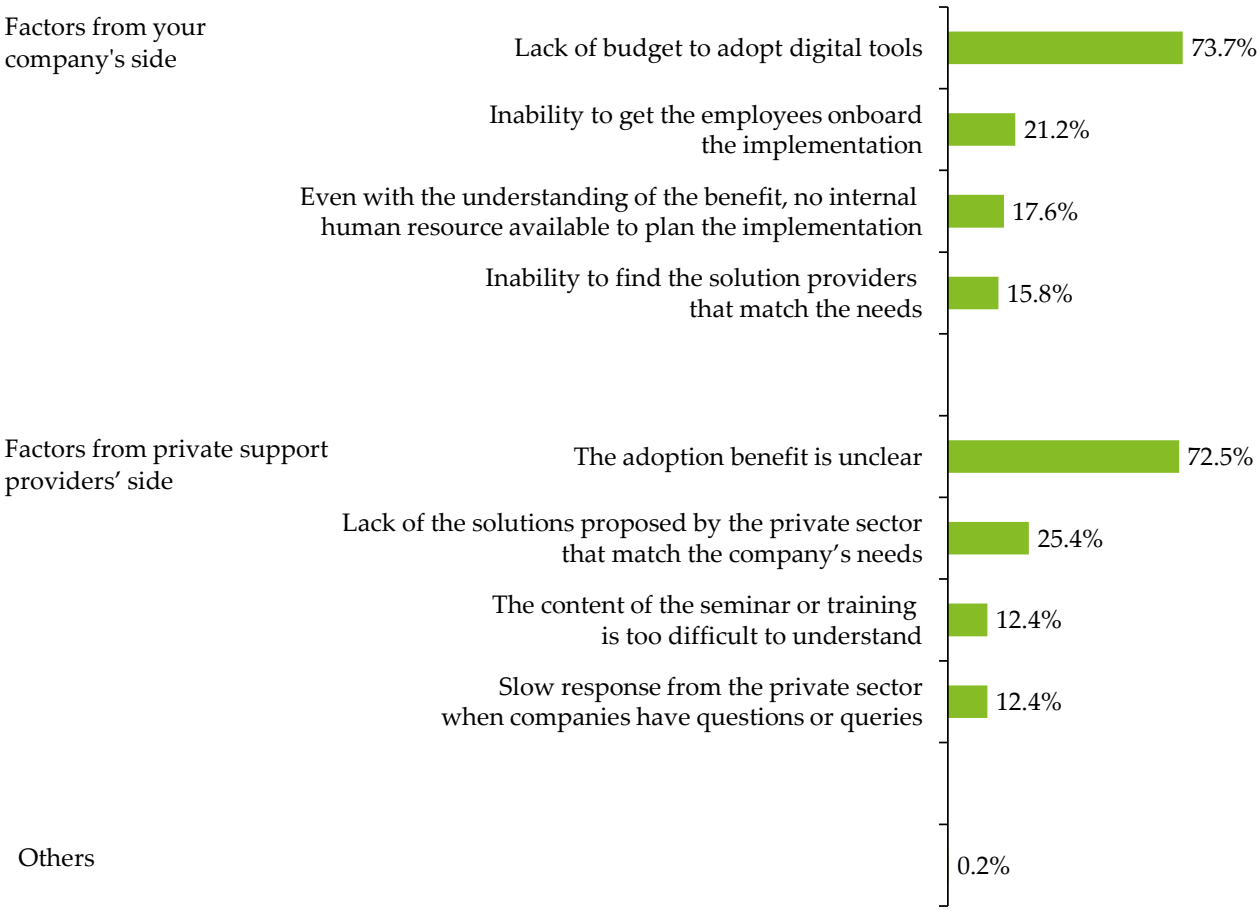
IT = information technology.
Note: The percentage of each bar is calculated by dividing the total number of responses of the corresponding row by the total number of respondents of the corresponding row company size that selected 'support from the private sector' in Q30. (Q36. Did the support you received as answered in Q35 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option])
Source: Authors.

From the perspective of company size, 'information on the source of funding for digital tool investment', which scored the highest for not meeting expectations amongst the answer options, was particularly prevalent amongst small companies (63.2%), followed by large companies (39.6%) and medium-sized companies (35.6%) in the web survey. These findings highlight the need for increased awareness and access to funding sources and financial assistance from the private sector for ASEAN companies. Interestingly, micro companies have not faced the same challenge regarding access to information, as only 9.5% reported dissatisfaction in this regard. It should be noted that the sample size for this answer option from the micro companies is limited to 21. Instead, the main concern amongst micro companies is the need for better 'IT skills seminar and training' (29.3%) , 'grant or subsidy for digital tools investment' (28.3%), and 'discounts or any relevant financial assistant programme for adopting digital tools' (27.3%). They underline the importance of addressing micro and small companies' specific financial needs and business knowledge gaps.

Figure 6.10 shows the reasons for not being able to implement the tools after receiving support from the private sector.

Figure 6.10. Reasons for Not Being Able to Implement the Tools after Receiving Support from the Private Sector (Web Survey)

(n=524)



Notes: The percentage of each bar is calculated by dividing the total number of respondents selecting the answer option in the corresponding row by the total number of respondents who were unable to implement digital tool as answered in Q37. (Q38. What do you think are the reasons why you could not proceed to implementation after receiving the support? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

According to Figure 6.10, the most significant reason for non-implementation after receiving support from the private sector is the 'lack of budget to adopt digital tools' (73.7%). This provides an interesting insight given that the same response option was the lowest of the four answer options under the 'factors from your company's side' category in the public sector support. The results of the private sector support suggest that support should be provided to address the recipients' financial capacity to implement digital tools.

Figure 6.10 shows that 'the adoption benefit is unclear' was the second highest, at 72.5%, amongst the answer options 'factors from private support providers' side' category in the web survey.

Even after receiving support from the private sector, the data show that companies still face financial constraints and uncertainty regarding the benefits of tool adoption. This underscores the importance of further financial assistance from the private sector, possibly in collaboration with the public sector, to bridge the financial gap in adopting digital tools and fostering digitalisation amongst ASEAN companies.

7. Conclusion

This chapter has illustrated the digital divide in ASEAN with data from the web and phone surveys conducted through the study.

The first section provided an overview of digital tool adoption in ASEAN. It revealed that the smaller the company size, the lower the adoption rate of digital tools. Large companies demonstrate high adoption rates across all digital tool categories, highlighting their recognition of the importance of digitalisation for efficiency enhancement and information sharing. On the other hand, small and micro companies continue to lag in terms of digital tool proliferation. These companies face the challenge of leveraging digital tools for operational efficiency and addressing security issues. Small and micro companies must prioritise appropriate measures and strategies in tool implementation. A notable gap in digital tool adoption is observed between medium-sized and small companies. The data obtained from the questionnaire allow us to identify various levels of digitalisation. The desired steps for MSMEs should be categorised into three significant steps: basic, intermediate (lower and higher), and advanced. The digitalisation of MSMEs in ASEAN begins with introducing essential digital tools like devices and basic communication tools, followed by digitising customer interactions and sales processes based on the industry and market environments.

The second section observed the objectives and effectiveness of digital tool implementation amongst the surveyed companies. In terms of objectives, the surveyed companies prioritise increasing profitability, ensuring business continuity, making timely management decisions, and addressing the labour shortage. The overall trend reflected a high number of companies achieving their objectives and experiencing significant benefits (meeting or exceeding expectations) across the surveyed company segments.

Regarding MSMEs' utilisation of public and/or private sector support for digital tool implementation, more than half of the surveyed companies have utilised some type of support in their digital tool implementation, helping to resolve gaps and fulfil needs related to digitalisation. On the other hand, more than 70% of micro companies indicated that they had never received support in both the web and phone surveys. Many companies in agriculture, forestry, and fishing, and manufacturing that indicated that they had received some kind of support had done so from the private sector, with less than 20% of respondents having received public sector support. Micro companies were found to be particularly likely to receive support from local companies. This could be because local companies provide localised support, which is more accessible to the surveyed companies. Localised support could involve a local network accessible to local firms, with

a deep understanding of the needs of local companies, providing services in the local language. When asked about what kind of government programmes would encourage them to implement digital tools, the respondents emphasised initiatives addressing the lack of ICT skills, business knowledge, and financial gaps, which are internal challenges within the companies. In particular, micro companies highlighted their desire to address the lack of limited human resources with business knowledge to diagnose and identify company issues when adopting digital tools.

The chapter has also provided an overview of the difference between public and private sector support. The most commonly used public and private sector support addresses the lack of ICT and business skills and funds. MSMEs tend to access private sector support more than public sector support, but a greater share was more satisfied with public sector support (more than 80% said it met or exceed their expectations, besides 'others') than with private sector support (around 60% were satisfied with all answer options). In terms of company size, smaller companies showed dissatisfaction with both public and private sector support. For companies that were unable to implement digital tools after receiving support, a major unmet need of ASEAN companies is digital tool localisation or customisation, as well as gaps in ICT skills to move forward in the digital journey. Companies that received private sector support appeared to lack funds for adopting the digital tools after receiving such support, implying the need to support the recipients' financial capacity to implement digital tools together with other kinds of support. The analysis suggests that a collaborative approach between the public and private sectors could yield comprehensive support programmes for ASEAN companies, considering the varying capacities and focuses of each type of stakeholder. The survey data showed that public sector support is not as widely accepted as private sector support, but the level of satisfaction for public sector support is demonstrated as favourable. Combining the best of both sectors, public sector support could expand its coverage of recipients by utilising the private sector business network within the local market, resulting in an inclusive and collaborative public–private support ecosystem. The private sector could also leverage public sector enabling policy frameworks and funding opportunities. Such cross-pollination could contribute to addressing issues such as lack of budget or lack of a widespread understanding of the benefits of adopting digital tools, which are highlighted as the top reasons the recipients of private sector support cannot implement digital tools.

Chapter 7

Analysis of Internal Factors of Micro, Small, and Medium-Sized Enterprises Causing the Digital Divide

1. Introduction

This chapter analyses the current status of internal factors – i.e. human resources[1] and finance – of micro, small, and medium-sized enterprises (MSMEs) that are causing the digital divide based on web and phone survey results. The analysis is conducted from multiple perspectives of companies' attributes, including the country, location (i.e. urban and rural), and size to obtain an overview of the digital divide from various angles.

The first section – human resources – analyses the correlation of company ownership type with digital tool implementation. The analysis is also conducted from the perspective of the ultimate decision makers' characteristics, including their age group, highest education level attained, and sex, to investigate if those affect digital tool implementation. It then examines the business and information and communications technology (ICT) skills of middle management and regular employees. The study was conducted to discern if companies have difficulties during specific times of the digital tool implementation process, i.e. information-gathering, adoption, and post-adoption phases.

Another internal factor, finance, was also analysed – if companies are facing financial constraints in implementing digital tools, if they received any financial support from public and private sectors to do so, and their expectation of governments in addressing their internal financial issues and the digital divide.

2. Human Resources

2.1. Capability of Businessowners

Technology adoption decisions amongst MSMEs are closely tied to owners and key decision-makers in managing the business (Ramayah et al., 2009). In the web survey, most companies (89.0%) are managed by their owners. This pattern is particularly prevalent in micro and small companies, with 98.9% of micro and 93.0% of small companies managed by their owners. The phone survey showed a similar pattern, with 100% of micro and 99.8% of small companies managed by their owners.

[1] Human resources refer to businessowners' business capability as well as the business and information and communications technology (ICT) skills of middle management and regular employees in considering, implementing, and utilising digital tools.

Table 7.1 shows companies that have implemented at least one type of digital tool by company ownership type. The average implementation rates for the web and phone surveys show no significant difference between owner- and non-owner-managed companies. According to the web survey, regarding micro and small companies, owner-managed companies have 20% and 10% higher implementation rates than non-owner-managed companies in procurement and logistics, respectively. The phone survey showed various gaps in the scores of each category, but the sample size of the non-owner-managed companies was only four.

From the web survey, the majority of companies in the Association for Southeast Asian Nations (ASEAN) region have ultimate decision-makers falling into two age groups: 42–57 years (53.5%) and 26–41 years (25.7%). This trend holds true across all four company sizes. However, micro and small companies have a higher percentage of ultimate decision-makers in the younger age group (i.e. 26–41 years) than do medium-sized and large companies. Specifically, 52.9% of micro and 36.8% of small companies have younger decision-makers. The phone survey found that this age group dominates 36.5% of micro and 26.4% of small companies. In addition, 6.1% of micro companies in the web survey are led by ultimate decision-makers aged 25 years or younger, much higher than the ASEAN average (1.4%).

Table 7.1. Companies Implementing Digital Tools by Ownership Type

Tool Category	Web Survey (All Companies)		Web Survey (Micro and Small Companies)		Phone Survey (Micro and Small Companies)	
	Managed by Owners (n = 5,380)	Not Managed by Owners (n = 668)	Managed by Owners (n = 1,586)	Not Managed by Owners (n = 101)	Managed by Owners (n = 3,095)	Not Managed by Owners (n = 4)
Intra-Company Management	5,285 (98.2%)	658 (98.5%)	1,532 (96.6%)	96 (95.0%)	2,699 (87.2%)	4 (100.0%)
Procurement	4,993 (92.8%)	583 (87.3%)	1,382 (87.1%)	64 (63.4%)	2,549 (82.4%)	3 (75.0%)
Logistics	3,899 (72.5%)	499 (74.7%)	796 (50.2%)	39 (38.6%)	2,155 (69.6%)	4 (100.0%)
Sales and Marketing	5,204 (96.7%)	633 (94.8%)	1,484 (93.6%)	84 (83.2%)	1,845 (59.6%)	2 (50.0%)
Overall Company Operation	3,217 (59.8%)	435 (65.1%)	614 (38.7%)	37 (36.6%)	1,725 (55.7%)	1 (25.0%)
Other Advanced Tools	2,555 (47.5%)	358 (53.6%)	560 (35.3%)	42 (41.6%)	1,593 (51.5%)	1 (25.0%)
Average	77.9%	79.0%	66.9%	59.7%	67.7%	62.5%

Note: The percentage for each row is calculated by dividing the number of respondents selecting at least one tool in the corresponding tool category for each of the following stages: 'Already implemented (pre-pandemic period, before 2020)', 'Already implemented (during pandemic restriction period, Jan 2020–Dec 2021)', 'Already implemented (post-pandemic restriction period, Jan 2022–now)' by the relevant total population (n) in each column. (Q23: Which stage of consideration is your company in for each of the tools?)
Source: Authors.

Table 7.2. Age Group of Company's Ultimate Decision-Makers

Age	Web Survey					Phone Survey		
	Total (n = 6,048)	Micro (n = 278)	Small (n = 1,409)	Medium (n = 2,878)	Large (n = 1,483)	Subtotal (n = 3,099)	Micro (n = 677)	Small (n = 2,422)
25 years or younger years	86 (1.4%)	17 (6.1%)	14 (1.0%)	34 (1.2%)	21 (1.4%)	16 (0.5%)	3 (0.4%)	13 (0.5%)
26–41 years	1,556 (25.7%)	147 (52.9%)	519 (36.8%)	621 (21.6%)	269 (18.1%)	886 (28.6%)	247 (36.5%)	639 (26.4%)
42–57 years	3,236 (53.5%)	91 (32.7%)	692 (49.1%)	1,641 (57.0%)	812 (54.8%)	1,524 (49.2%)	325 (48.0%)	1,199 (49.5%)
58–76 years	1,122 (18.6%)	22 (7.9%)	181 (12.8%)	554 (19.2%)	365 (24.6%)	653 (21.1%)	100 (14.8%)	553 (22.8%)
77 years and over	48 (0.8%)	1 (0.4%)	3 (0.2%)	28 (1.0%)	16 (1.1%)	20 (0.6%)	2 (0.3%)	18 (0.7%)

Note: The percentage for each row is calculated by dividing the number of respondents choosing the corresponding age group by the relevant total population (n) in each column. (Q18: What age group does your company's ultimate decision maker belong to?)
Source: Authors.

Table 7.3 shows the percentage of companies that have implemented at least one type of digital tool by ultimate decision-makers' age group. As observed from the web survey, companies led by ultimate decision-makers in the 42–57 and 58–76-year age groups have high average rates of implementing at least one digital tool across six categories, at 78.9% and 88.0%, respectively. Conversely, companies with ultimate decision-makers aged 26–41 years rank last, with an average digital tool implementation rate of 68.4%. Companies with ultimate decision-makers aged 25 years or younger (84.5%) and 77 years and older (89.9%) show significant implementation rates. Still, these results may not be entirely representative due to limited sample sizes. Zooming into micro and small companies, the web survey yielded similar insights, as companies with ultimate decision-makers aged 42–57 years and 58–76 years also have high implementation rates at 67.6% and 83.6%, respectively.

The phone survey conducted reveals a different angle. Notably, companies with decision-makers aged 26–41 years exhibit the highest average digital tool implementation rate at 75.7%, followed by companies with decision-makers aged 42–57 years at 72.6%. The implementation rates appear lower for the older age groups – 58–76 years and 77 years and older. This finding aligns with several research studies that indicated micro and small companies with older ultimate decision-makers tend to have lower levels of digitalisation than those with younger decision-makers. For instance, a report by Deloitte (2018) highlighted that older businessowners (i.e. over age 55 years) often face challenges in adopting digital technologies due to factors such as limited digital skills, fear of technology disruption, and a preference for traditional business practices, which can result in their companies' lower digital engagement.

Although variations exist in the patterns of digital tool implementation across the six age groups in the web and phone surveys, one common finding is the performance of micro and small companies led by decision-makers aged 42–57 years, as these consistently exhibit high digital tool implementation rates. A possible justification is that decision-makers aged 42–57 years have a good balance between adaptability and stability; they are open to embracing new technologies and approaches while possessing the maturity and experience required to implement and to manage digital initiatives within their organisations.

Table 7.3. Companies Implementing at Least One Type of Digital Tool by Ultimate Decision-Makers' Age Group

	Web Survey (All Companies)					Web Survey (Micro and Small Companies)					Phone Survey (Micro and Small Companies)				
Tool	≤25	26–41	42–57	58–76	≥77	≤25	26–41	42–57	58–76	≥77	≤25	26–41	42–57	58–76	≥77
Intra-Company Management	77 (89.5%)	1,513 (97.2%)	3,188 (98.5%)	1,118 (99.6%)	47 (97.9%)	27 (87.1%)	636 (95.5%)	763 (97.4%)	199 (98.0%)	3 (75.0%)	12 (75.0%)	862 (97.3%)	1,434 (94.1%)	392 (60.0%)	3 (15.0%)
Procurement	72 (83.7%)	1,387 (89.1%)	2,988 (92.3%)	1,082 (96.4%)	47 (97.9%)	22 (71.0%)	560 (84.1%)	672 (85.8%)	189 (93.1%)	3 (75.0%)	3 (18.8%)	819 (92.4%)	1,354 (88.8%)	373 (57.1%)	3 (15.0%)
Logistics	72 (83.7%)	798 (51.3%)	2,431 (75.1%)	1,052 (93.8%)	45 (93.8%)	23 (74.2%)	221 (33.2%)	409 (52.2%)	179 (88.2%)	3 (75.0%)	4 (25.0%)	716 (80.8%)	1,120 (73.5%)	316 (48.4%)	3 (15.0%)
Sales and Marketing	77 (89.5%)	1,469 (94.4%)	3,137 (96.9%)	1,108 (98.8%)	46 (95.8%)	27 (87.1%)	611 (91.7%)	731 (93.4%)	196 (96.6%)	3 (75.0%)	0 (0.0%)	580 (65.5%)	989 (64.9%)	275 (42.1%)	3 (15.0%)
Overall Company Operation	71 (82.6%)	599 (38.5%)	1,976 (61.1%)	963 (85.8%)	43 (89.6%)	21 (67.7%)	155 (23.3%)	318 (40.6%)	154 (75.9%)	3 (75.0%)	0 (0.0%)	540 (60.9%)	912 (59.8%)	271 (41.5%)	3 (15.0%)
Other Advanced Tools	67 (77.9%)	620 (39.8%)	1,597 (49.4%)	598 (53.3%)	31 (64.6%)	22 (71.0%)	192 (28.8%)	285 (36.4%)	101 (49.8%)	2 (50.0%)	0 (0.0%)	505 (57.0%)	829 (54.4%)	257 (39.4%)	3 (15.0%)
Average	84.5%	68.4%	78.9%	88.0%	89.9%	76.3%	59.4%	67.6%	83.6%	70.8%	19.8%	75.7%	72.6%	48.1%	15.0%

Notes: The percentage for each row is calculated by dividing the number of respondents selecting at least one tool in the corresponding tool category for each of the following stages: 'Already implemented (pre-pandemic period, before 2020)', 'Already implemented (during pandemic restriction period, Jan 2020–Dec 2021)', 'Already implemented (post-pandemic restriction period, Jan 2022–now)' by the relevant total population (n) in each column. (Q23: Which stage of consideration is your company in for each of the tools?)
Source: Authors.

Regarding ultimate decision-makers' levels of education, findings from the web survey showed that the majority are led by ultimate decision-makers who have attained post-secondary (e.g. university) (46.5%) or graduate or higher degrees (e.g. master's, doctoral, or post-doctoral) (25.3%) (Table 7.4). This educational trend is consistent across all company sizes. However, while medium-sized and large companies have a higher concentration of decision-makers with advanced degrees, micro and small companies tend to have a larger percentage of decision-makers with lower levels of education. For instance, a higher proportion of medium-sized (25.3%) and large (38.0%) companies have leaders with graduate degrees or higher education, compared to micro (14.4%) and small (14.1%) companies. Similar patterns emerged from the phone survey. Larger companies may require decision-makers with higher education and technical expertise to manage their bigger and more complex operations.

Table 7.4. Highest Education Level of Company's Ultimate Decision-Makers

Education Level	Web Survey					Phone Survey		
	Total (n = 6,048)	Micro (n = 278)	Small (n = 1,409)	Medium (n = 2,878)	Large (n = 1,483)	Total (n = 3,099)	Micro (n = 677)	Small (n = 2,422)
None	10 (0.2%)	1 (0.4%)	0 (0.0%)	2 (0.1%)	7 (0.5%)	34 (1.1%)	11 (1.6%)	23 (0.9%)
Elementary School or Earlier	39 (0.6%)	1 (0.4%)	19 (1.3%)	17 (0.6%)	2 (0.1%)	20 (0.6%)	4 (0.6%)	16 (0.7%)
Middle School	132 (2.2%)	14 (5.0%)	27 (1.9%)	51 (1.8%)	40 (2.7%)	426 (13.7%)	82 (12.1%)	344 (14.2%)
High School	456 (7.5%)	79 (28.4%)	156 (11.1%)	156 (5.4%)	65 (4.4%)	615 (19.8%)	137 (20.2%)	478 (19.7%)
Vocational School	1,068 (17.7%)	60 (21.6%)	428 (30.4%)	455 (15.8%)	125 (8.4%)	115 (3.7%)	43 (6.4%)	72 (3.0%)
Post-Secondary Education Institution	2,814 (46.5%)	83 (29.9%)	581 (41.2%)	1,470 (51.1%)	680 (45.9%)	1,201 (38.8%)	254 (37.5%)	947 (39.1%)
Graduate School or Higher	1,529 (25.3%)	40 (14.4%)	198 (14.1%)	727 (25.3%)	564 (38.0%)	688 (22.2%)	146 (21.6%)	542 (22.4%)

Notes: The percentage for each row is calculated by dividing the number of respondents choosing the corresponding age group by the relevant total population (n) in each column. (Q20: What is the highest level of education of your company's ultimate decision maker?)
Source: Authors.

Overall, the web survey revealed that companies led by ultimate decision-makers with higher levels of education – specifically from graduate schools – achieve higher average digital tool implementation rates (89.7%) (Table 7.5). Yet companies led by decision-makers attaining elementary school or lower education levels demonstrate a digital tool implementation rate of 94.4%. This rate may not represent all companies in this category due to the limited sample size, however.

Similar patterns emerged in the web and phone surveys for micro and small companies. In the web survey, companies led by decision-makers with post-secondary education have a 75.2% digital tool implementation rate, while those with decision-makers at the graduate school or higher education level reached 81.0%. These figures are lower than the ASEAN average because micro and small companies – even with decision-makers at the same education levels – may face limitations in terms of finance and human resources compared to larger companies. The phone survey presented a similar trend, where companies led by decision-makers with post-secondary education levels attain a 70.4% implementation rate, and those led by decision-makers with a graduate school or higher education level achieve a 64.0% implementation rate. However, in the web survey, micro and small companies led by decision-makers attaining elementary school or lower education levels exhibit an exceptional average digital tool implementation rate of 91.7%. Conversely, in the phone survey, they scored 20.0%, but the limited sample should be noted.

These results suggest a general trend that the formal education level of ultimate decision-makers influences the digitalisation of micro and small companies, with higher education levels being associated with better implementation rates due to decision-makers' knowledge. Therefore, it is important for ASEAN and stakeholders to provide additional support to companies with decision-makers at lower education levels. This support can help them acquire the necessary knowledge and skills to lead their companies towards successful digitalisation efforts.

Meanwhile, it is important to recognise that companies with decision-makers having lower formal education levels still achieve positive outcomes in digital tool implementation. This can be attributed to decision-makers who have acquired necessary knowledge and skills through avenues outside of formal education, such as work experience, additional training, or relevant support staff. These companies may have also received external assistance or guidance to pursue digital tools effectively.

By acknowledging diverse pathways in acquiring digital expertise, it becomes evident that formal education alone does not determine the success of digitalisation efforts. The focus should thus be on providing comprehensive support and resources to micro and small companies, regardless of the education levels of their decision-makers. This can include access to training programmes, mentorship opportunities, technological resources, and other assistance forms enabling MSMEs to navigate the digital landscape successfully.

Table 7.5, Companies Implementing Digital Tools by Ultimate Decision-Makers' Highest Education Level

Segment	Education	Intra-Company Management	Procurement	Logistics	Sales and Marketing	Overall Company Operation	Other Advanced Tools	Aver Age
Web Survey (All Com-panies)	None (n = 10)	7 (70.0%)	8 (80.0%)	7 (70.0%)	6 (60.0%)	7 (70.0%)	8 (80.0%)	71.7 %
	Elementary School or Lower (n = 39)	38 (97.4%)	37 (94.9%)	36 (92.3%)	38 (97.4%)	36 (92.3%)	36 (92.3%)	94.4 %
	Middle School (n = 132)	117 (88.6%)	87 (65.9%)	70 (53.0%)	108 (81.8%)	66 (50.0%)	75 (56.8%)	66.0 %
	High School (n = 456)	442 (96.9%)	346 (75.9%)	192 (42.1%)	416 (91.2%)	151 (33.1%)	148 (32.5%)	62.0 %
	Vocational School (n = 1,068)	1,047 (98.0%)	979 (91.7%)	444 (41.6%)	1,030 (96.4%)	236 (22.1%)	176 (16.5%)	61.0 %
	Post-Secondary Education Institution (n = 2,814)	2,772 (98.5%)	2,640 (93.8%)	2,312 (82.2%)	2,731 (97.1%)	1,889 (67.1%)	1,352 (48.0%)	81.1 %
	Graduate School or Higher (n = 1,529)	1,520 (99.4%)	1,479 (96.7%)	1,337 (87.4%)	1,508 (98.6%)	1,267 (82.9%)	1,118 (73.1%)	89.7 %
Web Survey (Micro and Small- Com-panies)	None (n = 1)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0.0%
	Elementary School or Lower (n = 20)	19 (95.0%)	18 (90.0%)	18 (90.0%)	19 (95.0%)	18 (90.0%)	18 (90.0%)	91.7 %

Segment	Education	Intra-Company Management	Procurement	Logistics	Sales and Marketing	Overall Company Operation	Other Advanced Tools	Aver Age
	Middle School (n = 41)	29 (70.7%)	11 (26.8%)	6 (14.6%)	22 (53.7%)	4 (9.8%)	10 (24.4%)	33.3 %
	High School (n = 235)	221 (94.0%)	166 (70.6%)	66 (28.1%)	203 (86.4%)	47 (20.0%)	52 (22.1%)	53.5 %
	Vocational School (n = 488)	474 (97.1%)	439 (90.0%)	120 (24.6%)	466 (95.5%)	58 (11.9%)	73 (15.0%)	55.7 %
	Post-Secondary Education Institution (n = 664)	652 (98.2%)	594 (89.5%)	462 (69.6%)	632 (95.2%)	366 (55.1%)	291 (43.8%)	75.2 %
	Graduate School or Higher (n = 238)	233 (97.9%)	218 (91.6%)	163 (68.5%)	226 (95.0%)	158 (66.4%)	158 (66.4%)	81.0 %
Phone Survey (Micro and Small Com-panies)	None (n = 34)	32 (94.1%)	32 (94.1%)	32 (94.1%)	3 (8.8%)	1 (2.9%)	1 (2.9%)	49.5 %
	Elementary School or Earlier (n = 20)	4 (20.0%)	4 (20.0%)	4 (20.0%)	4 (20.0%)	4 (20.0%)	4 (20.0%)	20.0 %
	Middle School (n = 426)	248 (58.2%)	248 (58.2%)	247 (58.0%)	248 (58.2%)	247 (58.0%)	248 (58.2%)	58.1 %
	High School (n = 615)	517 (84.1%)	512 (83.3%)	475 (77.2%)	470 (76.4%)	470 (76.4%)	465 (75.6%)	78.8 %
	Vocational School (n = 115)	115 (100.0%)	91 (79.1%)	93 (80.9%)	24 (20.9%)	14 (12.2%)	8 (7.0%)	50.0 %

Segment	Education	Intra-Company Management	Procurement	Logistics	Sales and Marketing	Overall Company Operation	Other Advanced Tools	Aver Age
	Post-Secondary Education Institution (n = 1,201)	1,126 (93.8%)	1,058 (88.1%)	799 (66.5%)	754 (62.8%)	711 (59.2%)	625 (52.0%)	70.4 %
	Graduate School or Higher (n = 688)	661 (96.1%)	607 (88.2%)	509 (74.0%)	344 (50.0%)	279 (40.6%)	243 (35.3%)	64.0 %

Notes: The percentage for each row is calculated by dividing the number of respondents selecting at least one tool in the corresponding tool category for each of the following stages: 'Already implemented (pre-pandemic period, before 2020)', 'Already implemented (during pandemic restriction period, Jan 2020–Dec 2021)', 'Already implemented (post-pandemic restriction period, Jan 2022–now)' by the relevant total population (n) in each row. (Q23: Which stage of consideration is your company in for each of the tools?)
Source: Authors.

A significant gender gap exists in the leadership roles of companies, with males representing a majority (72.9%) (Table 7.6). This trend persists regardless of company size and was consistently observed in the web and phone surveys. In the web survey, 71.6% of micro and 67.4% of small companies have male ultimate decision-makers, respectively. Similarly, according to the phone survey, 62.5% of micro and 62.1% of small companies are led by males. Although an International Finance Corporation study indicated that women own 50% of micro and 59% of small and medium-sized companies in East Asia and the Pacific, other research studies and discussions have demonstrated that gender disparities in leadership positions are prevalent in various regions, including ASEAN, where male representation tends to be higher.[2] For instance, a UN Women's study (2022) revealed that women's share of managerial positions across ASEAN countries remains below parity.

Over the past 2 decades, the percentage of women managers in South-East Asia has only increased by 2%, from 39% in 2000 to 41% in 2020. Furthermore, women's representation in middle and senior management is even lower, at 26%. Several key barriers to women's entrepreneurship exist, including limited access to markets, lack of access to finance (with formal banks in Asia and the Pacific often ill-equipped to meet the needs of women entrepreneurs), limited information, lack of relevant education and skills training, discriminatory laws and regulations, and an unfriendly business environment for women (ADB and The Asia Foundation, 2018). In South-East Asia, women entrepreneurs have reported around 7% less access to business-oriented networks compared to men.

[2] SME Finance Forum, MSME Finance Gap, https://www.smefinanceforum.org/data-sites/msme-finance-gap

Table 7.6. Company's Ultimate Decision-Maker by Sex

Sex	Web Survey					Phone Survey		
	Total (n = 6,048)	Micro (n = 278)	Small (n = 1,409)	Medium (n = 2,878)	Large (n = 1,483)	Subtotal (n = 3,099)	Micro (n = 677)	Small (n = 2,422)
Male	4,408 (72.9%)	199 (71.6%)	949 (67.4%)	2,043 (71.0%)	1,217 (82.1%)	1,926 (62.1%)	423 (62.5%)	1,503 (62.1%)
Female	663 (11.0%)	70 (25.2%)	211 (15.0%)	258 (9.0%)	124 (8.4%)	318 (10.3%)	93 (13.7%)	225 (9.3%)
Rather not specify	977 (16.2%)	9 (3.2%)	249 (17.7%)	577 (20.0%)	142 (9.6%)	855 (27.6%)	161 (23.8%)	694 (28.7%)

Notes: The percentage for each row is calculated by dividing the number of respondents choosing the corresponding age group by the relevant total population (n) in each column. (Q19: What is the gender of your company's ultimate decision maker?)
Source: Authors.

There is a slight difference in the average percentage of companies that have implemented at least one digital tool between male decision-makers' companies (77.6%) and female decision-makers' companies (72.2%) according to the web survey (Table 7.7). Similarly, in micro and small companies, those with male ultimate decision-makers (65.5%) slightly surpass the digital tool implementation rate of those led by females (62.4%). However, the phone survey results revealed different patterns. In micro and small companies led by female decision-makers, the average implementation rate (83.4%) exceeds that of companies led by males (71.5%). The rates are also higher across all tool categories. These variations suggest that various internal and external factors may influence the digitalisation of companies, and the sex of ultimate decision-makers may not be the sole determinant.

Table 7.7. Companies Implementing Digital Tools by Sex of Company's Ultimate Decision-Maker

Tool	Web Survey (All Companies)			Web Survey (Micro and Small Companies)			Phone Survey (Micro and Small companies)		
	Male (n = 4,408)	Female (n = 663)	Rather not Specify (n = 977)	Male (n = 657)	Female (n = 281)	Rather not Specify (n = 166)	Male (n = 1,883)	Female (n = 313)	Rather not Specify (n = 847)
Intra-Company Management	4,337 (98.4%)	635 (95.8%)	971 (99.4%)	1,112 (96.9%)	261 (92.9%)	255 (98.8%)	1,763 (91.5%)	314 (98.7%)	626 (73.2%)
Procurement	4,087 (92.7%)	543 (81.9%)	946 (96.8%)	1,003 (87.4%)	204 (72.6%)	239 (92.6%)	1,648 (85.6%)	297 (93.4%)	607 (71.0%)
Logistics	3,259 (73.9%)	419 (63.2%)	720 (73.7%)	572 (49.8%)	134 (47.7%)	129 (50.0%)	1,333 (69.2%)	236 (74.2%)	590 (69.0%)
Sales and Marketing	4,259 (96.6%)	608 (91.7%)	970 (99.3%)	1068 (93.0%)	246 (87.5%)	254 (98.4%)	1,262 (65.5%)	256 (80.5%)	329 (38.5%)
Overall Company Operation	2,731 (62.0%)	355 (53.5%)	566 (57.9%)	446 (38.9%)	103 (36.7%)	102 (39.5%)	1,182 (61.4%)	253 (79.6%)	291 (34.0%)
Other Advanced Tools	1,862 (42.2%)	313 (47.2%)	738 (75.5%)	328 (28.6%)	104 (37.0%)	170 (65.9%)	1,077 (55.9%)	236 (74.2%)	281 (32.9%)
Average	77.6%	72.2%	83.8%	65.8%	62.4%	74.2%	71.5%	83.4%	53.1%

Notes: The percentage for each row is calculated by dividing the number of respondents selecting at least one tool in the corresponding tool category for each of the following stages: 'Already implemented (pre-pandemic period, before 2020)', 'Already implemented (during pandemic restriction period, Jan 2020–Dec 2021)', 'Already implemented (post-pandemic restriction period, Jan 2022–now)' by the relevant total population (n) in each column. (Q23: Which stage of consideration is your company in for each of the tools?)
Source: Authors.

2.2. Middle Management and Regular Employees

This section delves into the specific issues identified from the survey about the need for more skills in employees. The section consists of two sub-sections: business skills and ICT skills.

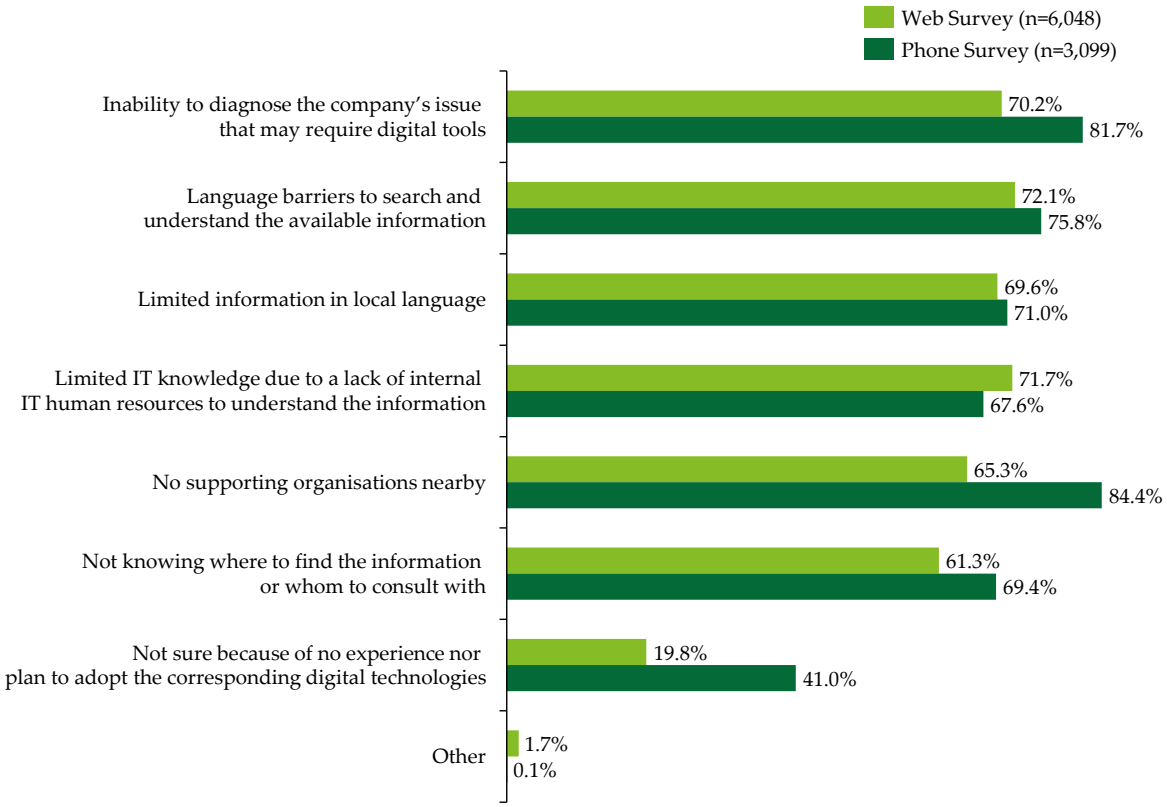
2.2.1. Business Skills

Challenges arising from the lack of employees' business skills primarily occur during a company's information-gathering phase on digital tool implementation. Figure 7.1 shows the percentage of respondents that identified each option as the cause of difficulties in the information-gathering phase. The web survey revealed that 70.2% of the respondents identified the 'inability to diagnose the company's issue that may require digital tools' as a problem during this phase. Similarly, 61.3% perceive 'not knowing where to find the information or whom to consult with' as another issue rooted in a business skills gap. The lack of business skills creates a significant bottleneck before implementing digital tools, as companies cannot identify the necessary digital tools needed to solve their issues nor do they know whom to consult about this.

These trends were also observed in the phone survey results. The 'inability to diagnose the company's issue that may require digital tools' scored 81.7% amongst respondents, ranking second after 'no supporting organisation nearby'. 'Not knowing where to find the information or whom to consult with' was the fifth most common issue noted (69.4%).

It is often considered that middle management will play a central role in making changes towards digitalisation, based on a deep understanding of the company and its business, with accomplished business skills. Indeed, adopting modern technology is essential for structural change in ASEAN industries, as is increasing the expertise of middle management employees who can lead the change for ASEAN companies (ERIA, 2019).

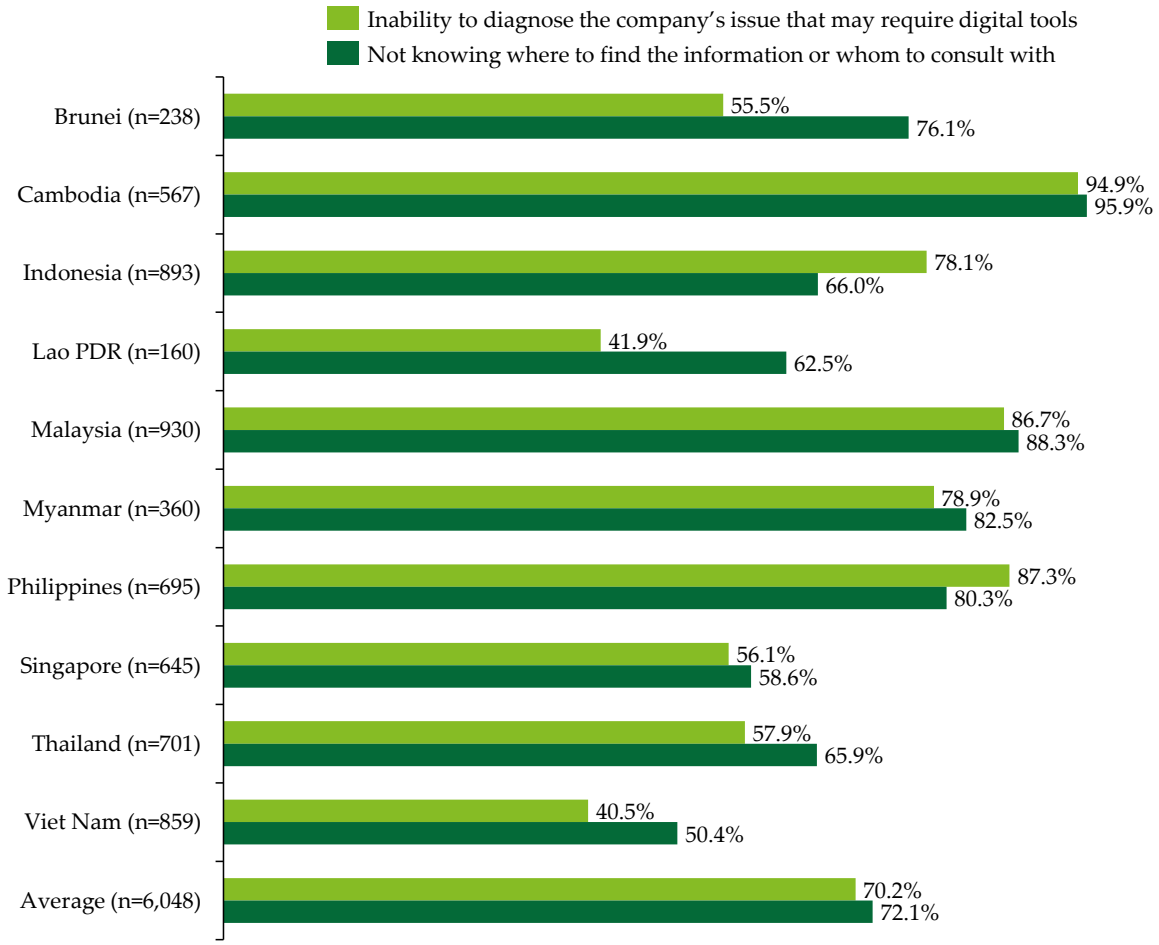
Figure 7.1. Causes of Difficulties in the Information-Gathering Phase



IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of respondents of the corresponding bar by the total questionnaire respondents. (Q27: What are the causes of difficulties in information-gathering phase?)
Source: Authors.

Figure 7.2 shows the percentage of companies facing limited business skills in the information-gathering phase by country. Companies in Cambodia show a significant result, as 94.9% of respondents chose 'inability to diagnose the company's issue that may require digital tools,' and 95.9% chose 'not knowing where to find the information or whom to consult with' during information-gathering on digital tools. Both figures greatly exceed the ASEAN average. Companies in Myanmar and the Philippines, which are relatively economically underdeveloped within ASEAN, and Indonesia and Malaysia, which are expected to achieve further digitalisation and economic development, are also experiencing these issues.

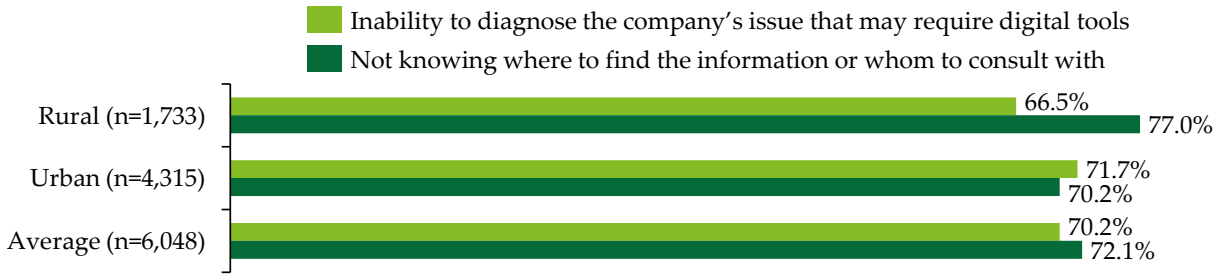
Figure 7.2. Respondents Facing Limited Business Skills in Information-Gathering Phase by Country (Web Survey)



Lao PDR = Lao People's Democratic Republic.
Notes: The percentage of each bar is calculated by dividing the total number of respondents of 'Inability to diagnose the company's issue that may require digital tools' and 'Not knowing where to find the information or whom to consult with' by the total questionnaire respondents in each bar. (Q27. What are the causes of difficulties in information-gathering phase? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Figure 7.3 shows the percentage of companies facing limited business skills in the information-gathering phase by location. A higher proportion of urban companies identify an 'inability to diagnose the company's issue that may require digital tools' as a problem. In contrast, more rural companies cite 'not knowing where to find the information or whom to consult with.' Urban companies, generally more advanced in digitalisation and growth, are better endowed with consultation facilities. However, rural companies may encounter restricted access to these services.

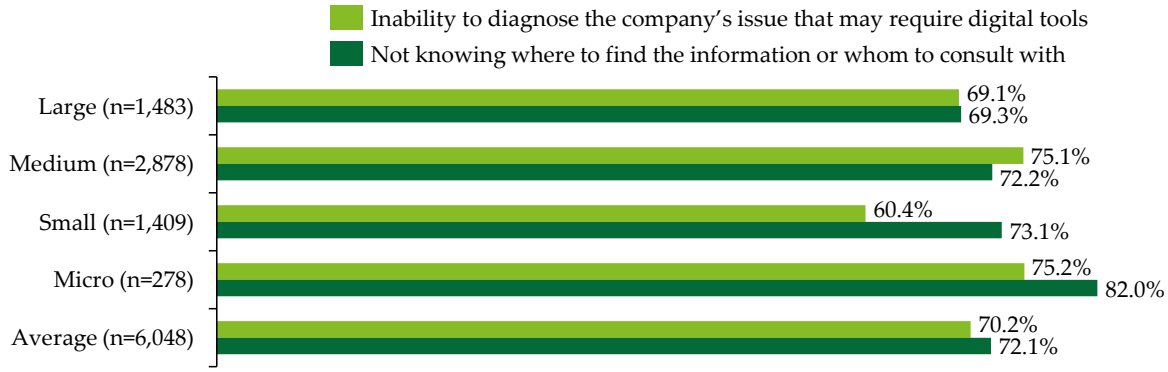
Figure 7.3. Respondents Facing Limited Business Skills in the Information-Gathering Phase by Location (Web Survey)



Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Inability to diagnose the company's issue that may require digital tools' and 'Not knowing where to find the information or whom to consult with' by the total questionnaire respondents in each bar. (Q27: What are the causes of difficulties in information-gathering phase?)
Source: Authors.

Figure 7.4 displays the percentage of companies facing limited business skills in the information-gathering phase, categorised by company size. Similar trends as those observed in company location are evident. A higher proportion of medium-sized and large companies perceive an 'inability to diagnose the company's issue that may require digital tools' as a challenge, at 75.1% and 69.1%, respectively. In contrast, small companies exhibit the opposite trend. Of particular concern is that micro companies demonstrate high responses for both the 'inability to diagnose the company's issue that may require digital tools' and 'not knowing where to find the information or whom to consult with', indicating a lack of necessary business skills and consultation resources. This raises concerns about their potential exclusion from economic development and digitalisation efforts.

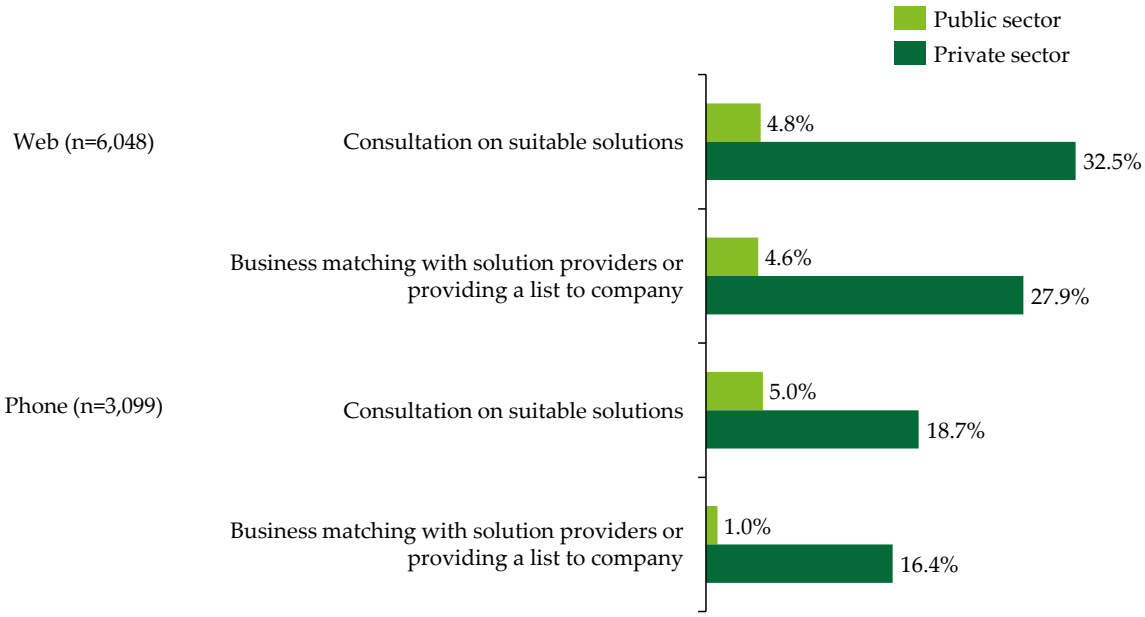
Figure 7.4. Respondents Facing Limited Business Skills in the Information-Gathering Phase by Company Size (Web Survey)



Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Inability to diagnose the company's issue that may require digital tools' and 'Not knowing where to find the information or whom to consult with' by the total questionnaire respondents in each bar. (Q27: What are the causes of difficulties in information-gathering phase?)
Source: Authors.

Figure 7.5 shows the percentage of respondents who received business skills-related support from the public or private sector. Support for their improvement is mostly received from the private sector. Based on the web survey, the proportion of companies receiving 'consultation on suitable solutions' and 'business matching with solution providers or providing a list to company' from the public sector is just 4.8% and 4.6%, respectively, while the proportion receiving similar support from the private sector rises to 32.5% and 27.9%, respectively. This support is directly linked to sales activities of ICT solution companies, indicating a focus by the private sector. A similar trend was observed in the phone survey but with lower figures for both the public and private sectors.

Figure 7.5. Respondents Receiving Business Skills-Related Support

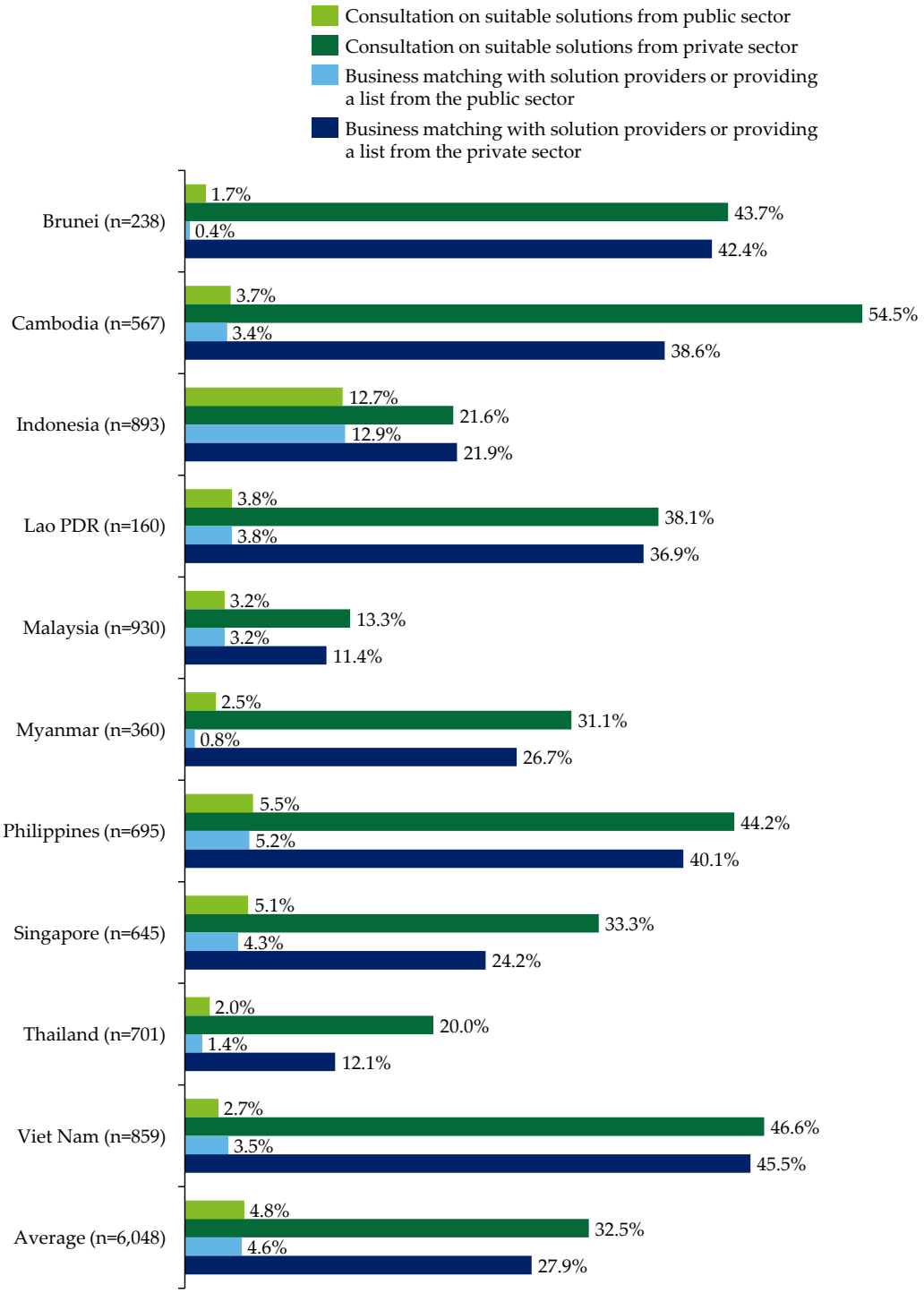


Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Consultation on suitable solutions' or 'Business matching with solution providers or providing a list to company' by the total questionnaire respondents in each bar. (Q31: If you selected 'support from the public sector (government or public institution)' in Q30, what support have you received? [MULTIPLE CHOICE: choose all options that apply], Q35: If you selected any of 'support from the private sector' in Q30, what support have you received? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Figure 7.6 shows the percentage of respondents that received business knowledge-related support from the public or private sector by country. In Indonesia, the percentage of companies receiving 'consultation on suitable solutions' and 'business matching with solution providers or providing a list to company' from the public sector is relatively high at 12.7% and 12.9%, suggesting a government commitment to digitalisation. The proportion of companies receiving similar support from the private sector is high in Brunei Darussalam, Cambodia, the Lao People's Democratic Republic (Lao PDR), the Philippines, and Viet Nam. This suggests that investment and sales are focussed on countries expected to undergo future development.

Figure 7.6. Respondents Receiving Business Skills-Related Support by Country

(Web Survey)



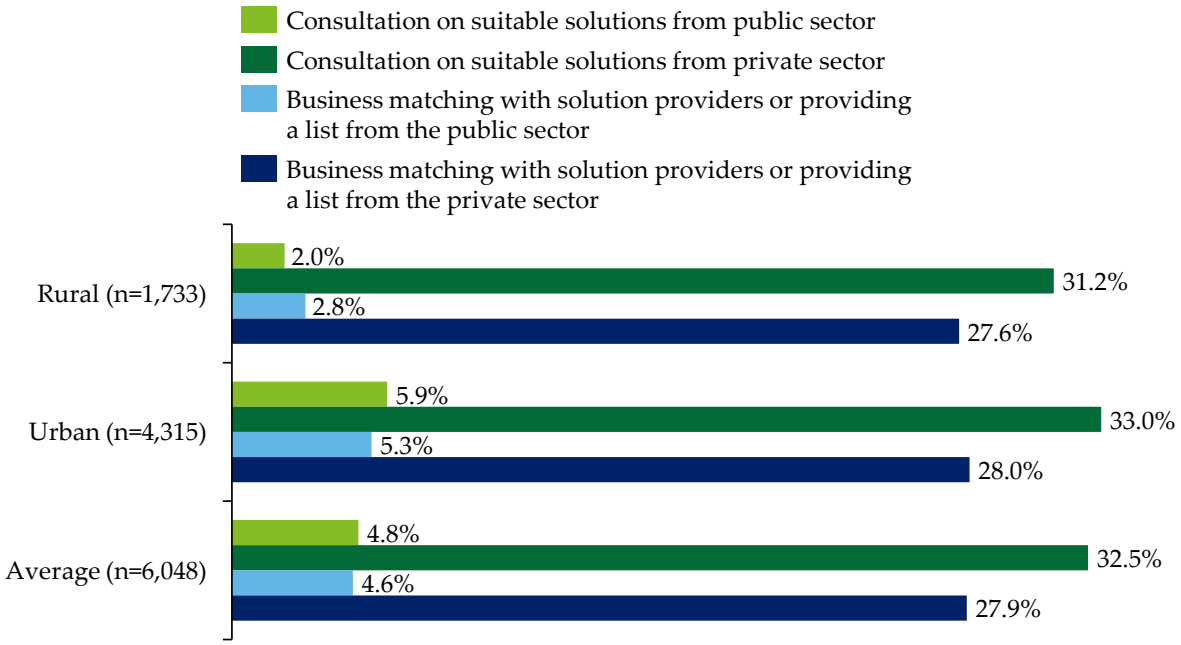
Lao PDR = Lao People's Democratic Republic.

Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Consultation on suitable solutions' or 'Business matching with solution providers or providing a list to company' by the total questionnaire respondents in each bar. (Q31: If you selected 'support from the public sector (government or public institution)' in Q30, what support have you received? Q35: If you selected any of 'support from the private sector' in Q30, what support have you received?)

Source: Authors.

Figure 7.7 shows the percentage of respondents that received business skills-related support from the public or private sector by location. Regardless of the provider or content of support, companies in urban areas received a higher proportion of help. The access to support significantly differs based on the location of companies, creating a digital divide.

Figure 7.7. Respondents Receiving Business Skills-Related Support by Location
(Web Survey)

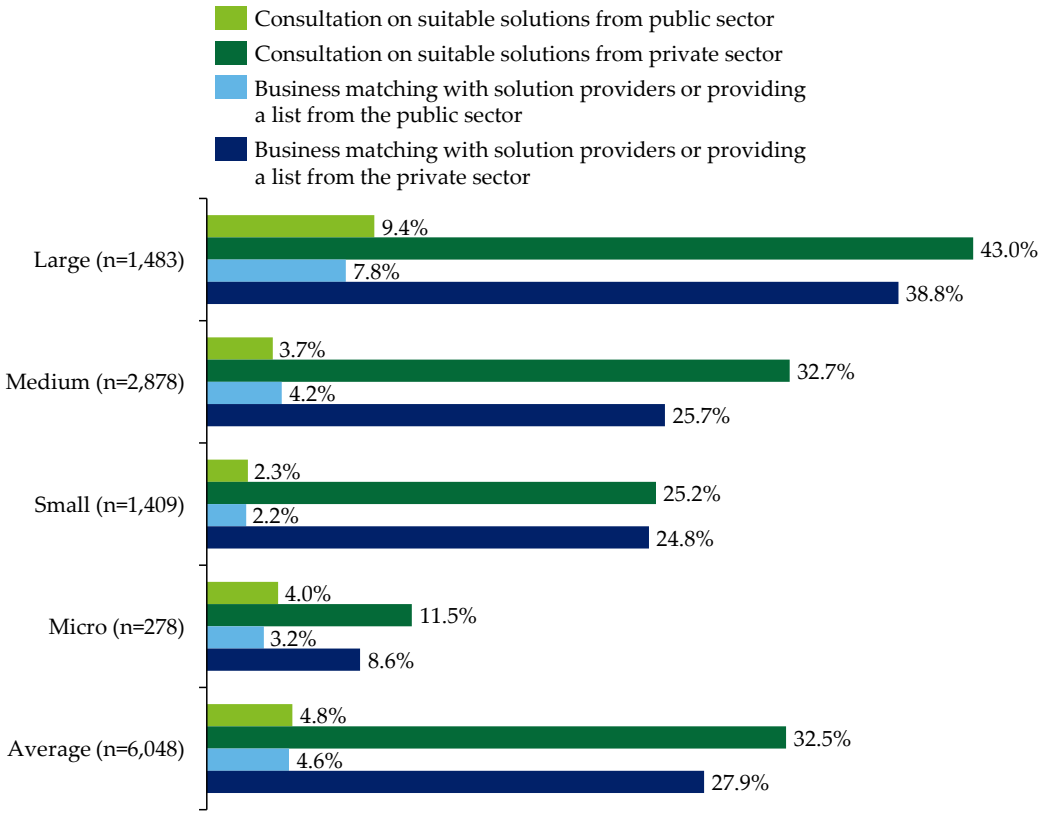


Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Consultation on suitable solutions' or 'Business matching with solution providers or providing a list' by the total questionnaire respondents in each bar. (Q31: If you selected 'support from the public sector (government or public institution)' in Q30, what support have you received? Q35: If you selected any of 'support from the private sector' in Q30, what support have you received?)
Source: Authors.

Figure 7.8 shows the percentage of respondents that received business skills-related support from the public or private sector by company size. Regardless of the provider or content of support, large companies have a higher proportion of receiving support. Similar to the company location, a significant difference in access to support exists between large companies and MSMEs, which can be considered a factor causing the digital divide.

Figure 7.8. Respondents Receiving Business Skills-Related Support by Company Size

(Web Survey)



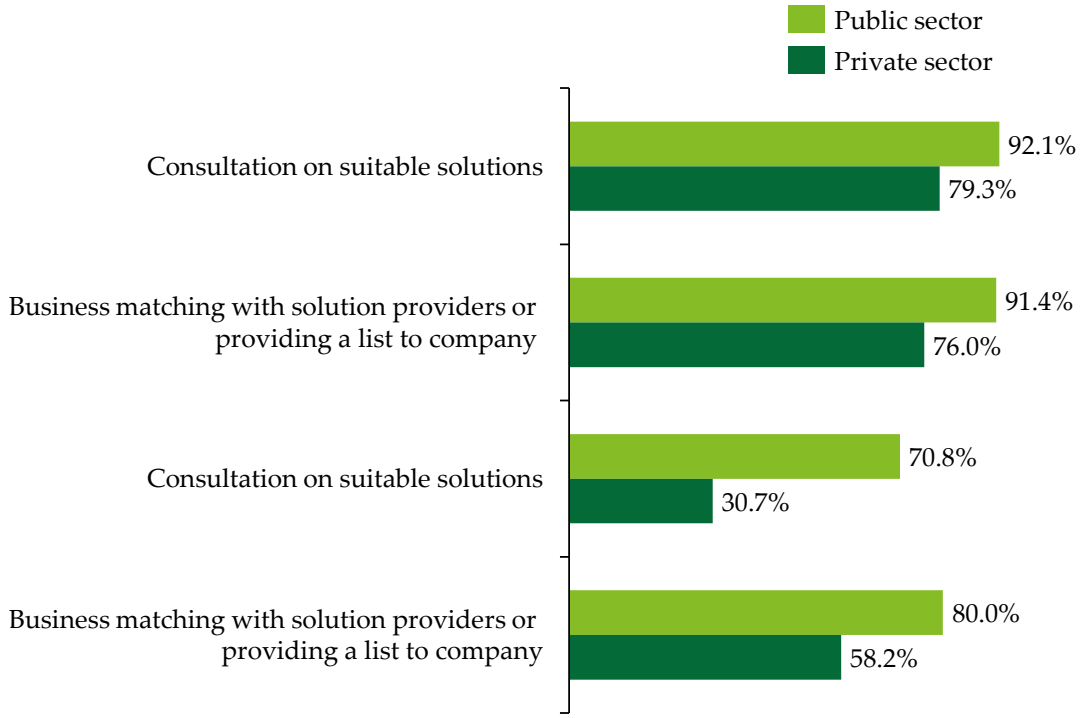
Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Consultation on suitable solutions' or 'Business matching with solution providers or providing a list' by the total questionnaire respondents in each bar. (Q31: If you selected 'support from the public sector (government or public institution)' in Q30, what support have you received? Q35: If you selected any of 'support from the private sector' in Q30, what support have you received?)
Source: Authors.

Amongst companies receiving such support, the proportion of companies implementing digital tools is higher for companies receiving support from the public sector. While support from the private sector also includes certain sales aspects, the support provided by the public sector provides essential information to companies.

Figure 7.9 shows the percentage of respondents that could adopt digital tools due to receiving business skills-related support from the public or private sector. The respondents who were able to introduce digital tools with financial support are high in both cases, with around 90% for companies that received support from the public sector and around 80% for companies that received similar support from the private sector. From this fact, business skills-related support from the public is a highly effective measure. A similar trend was observed in the phone survey but with lower figures for both the public and private sectors. This may be because the phone survey respondents

are MSMEs, upon which other constraints, such as financial restrictions, may fall.

Figure 7.9. Respondents Adopting Digital Tools after Receiving Business Skills-Related Support

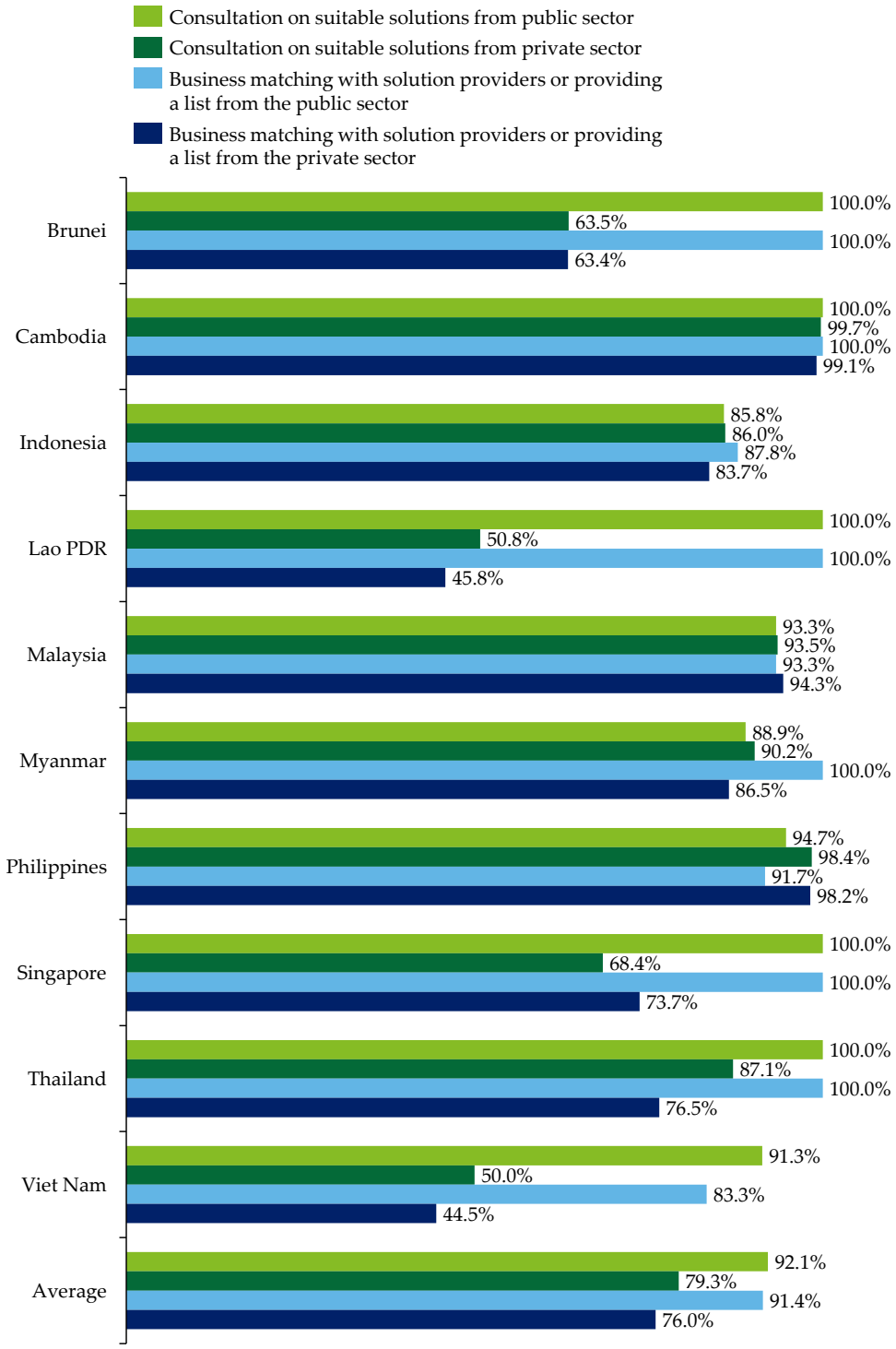


Notes: The percentage of each bar is calculated by dividing the total number of respondents that answered 'Yes' by the total number of respondents of the questionnaire by each bar. The population of each bar is different, so the limited sample should be noted. (Q33: Were you able to adopt the tools as a result of the support? Q37: Were you able to adopt the tools as a result of the support?)
Source: Authors.

Figure 7.10 shows the percentage of respondents that could adopt digital tools due to receiving financial support from the public or private sector by country. The rate of digital tool adoption by companies receiving support from the public sector is consistently high. On the other hand, the proportion of companies that could implement them due to receiving support from the private sector varies significantly by country. Particularly in Brunei Darussalam, the Lao PDR, and Viet Nam – where the proportion of companies receiving support from the private sector is high – the ratio of companies that could implement them is low. The private sector may be unable to provide appropriate support that meets the actual needs of these companies, or companies may not be able to implement proper tools due to other factors, such as financing.

Figure 7.10. Respondents Adopting Digital Tools Who Received Business Skills-Related Support by Country

(Web Survey)



Lao PDR = Lao People's Democratic Republic.

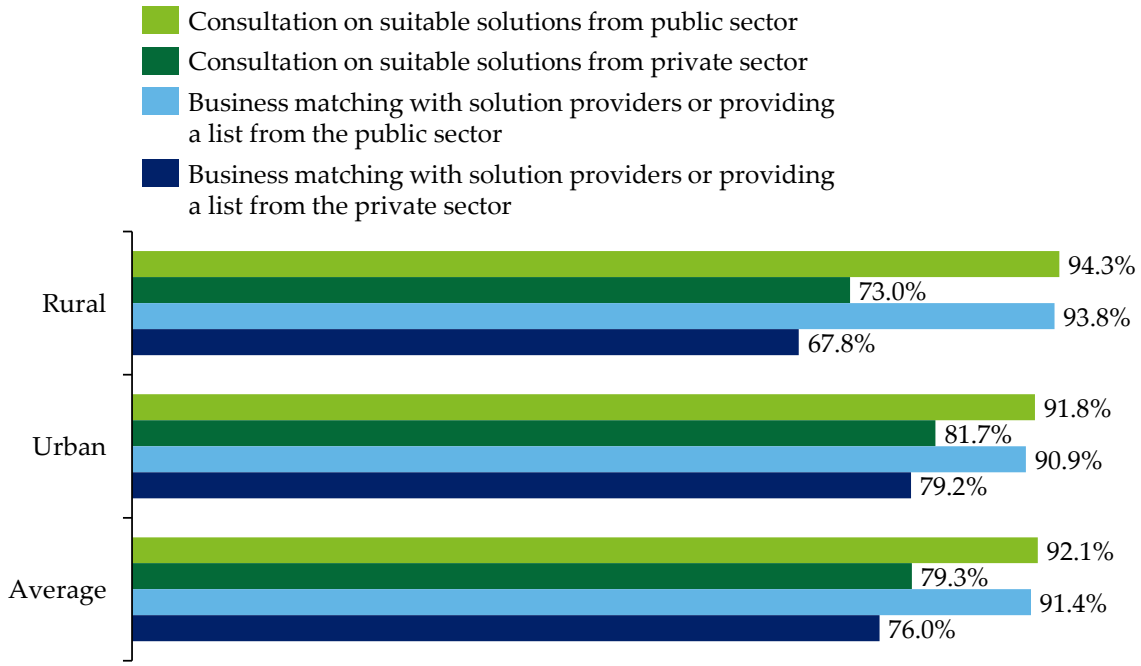
Notes: The percentage of each bar is calculated by dividing the total number of respondents that answered 'Yes' by the total questionnaire respondents in each bar. The population of each bar is different, so the limited sample should be noted. (Q33: Were you able to adopt the tools as a result of the support? Q37: Were you able to adopt the tools as a result of the support?)

Source: Authors.

Figure 7.11 shows the percentage of respondents that could adopt digital tools due to receiving financial support from the public or private sector by location. The proportion of companies that could implement digital tools because of public sector support is high in urban and rural areas. The same proportion rises for companies located in urban areas in terms of support from the private sector. Companies located in rural areas may not be receiving appropriate support, not only in terms of access but also in content or may not be able to implement the right tools due to other factors, such as financing.

Figure 7.11. Respondents Adopting Digital Tools after Receiving Business Skills-Related Support by Location

(Web Survey)

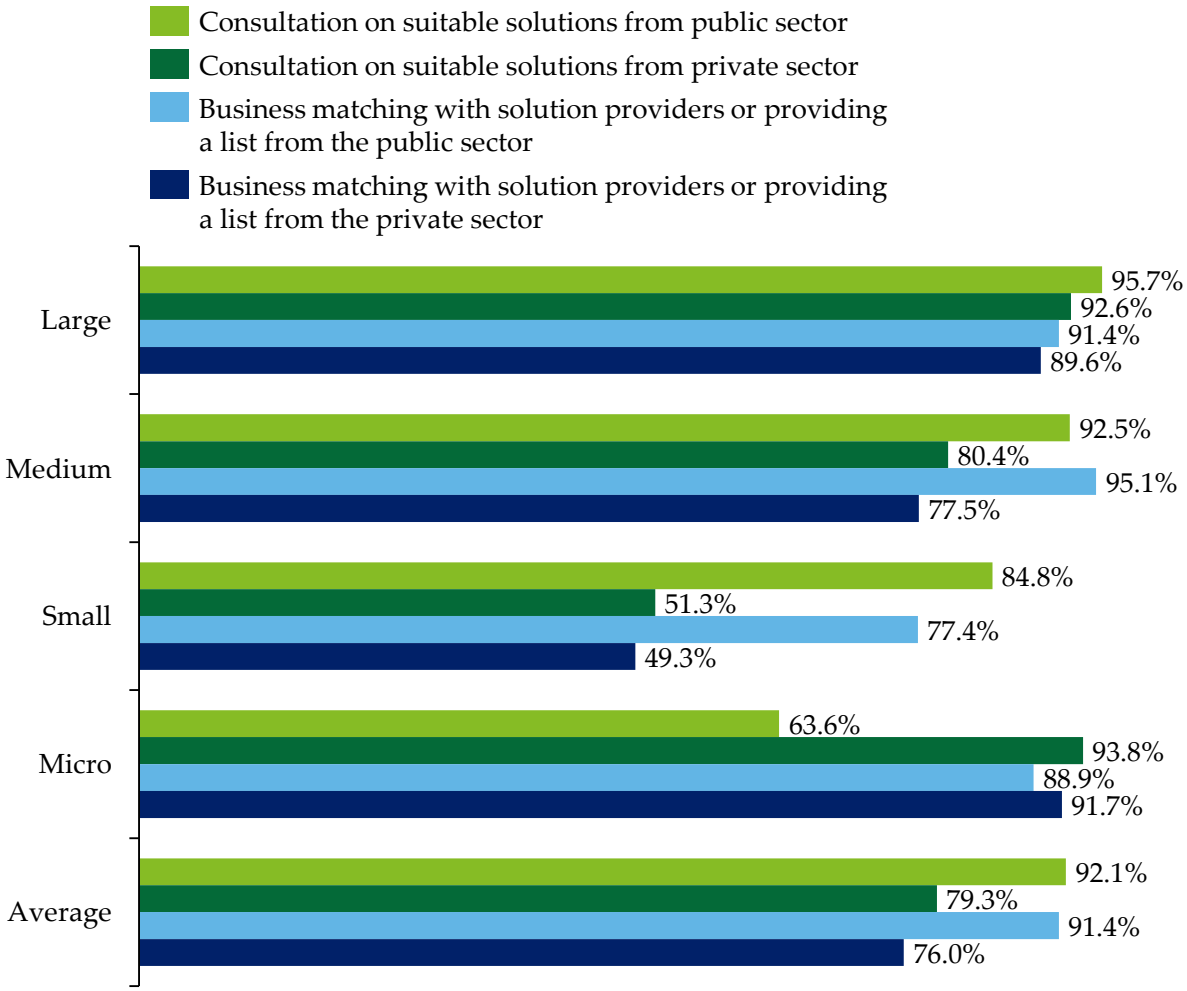


Notes: The percentage of each bar is calculated by dividing the total number of respondents that answered 'Yes' by the total number of respondents to the questionnaire by each bar. The population of each bar is different, so the limited sample should be noted. (Q33: Were you able to adopt the tools as a result of the support? Q37: Were you able to adopt the tools as a result of the support?)
Source: Authors.

Figure 7.12 shows the percentage of respondents that could adopt digital tools due to receiving financial support from the public or private sector by company size. Even amongst companies that received support from the public sector, there is a difference in the proportion that could implement them. It is high amongst medium-sized and large companies but relatively low amongst micro and small companies, which are likely unable to implement due to factors such as their financing.

Figure 7.12. Respondents Adopting Digital Tools after Receiving Business Skills-Related Support by Company Size

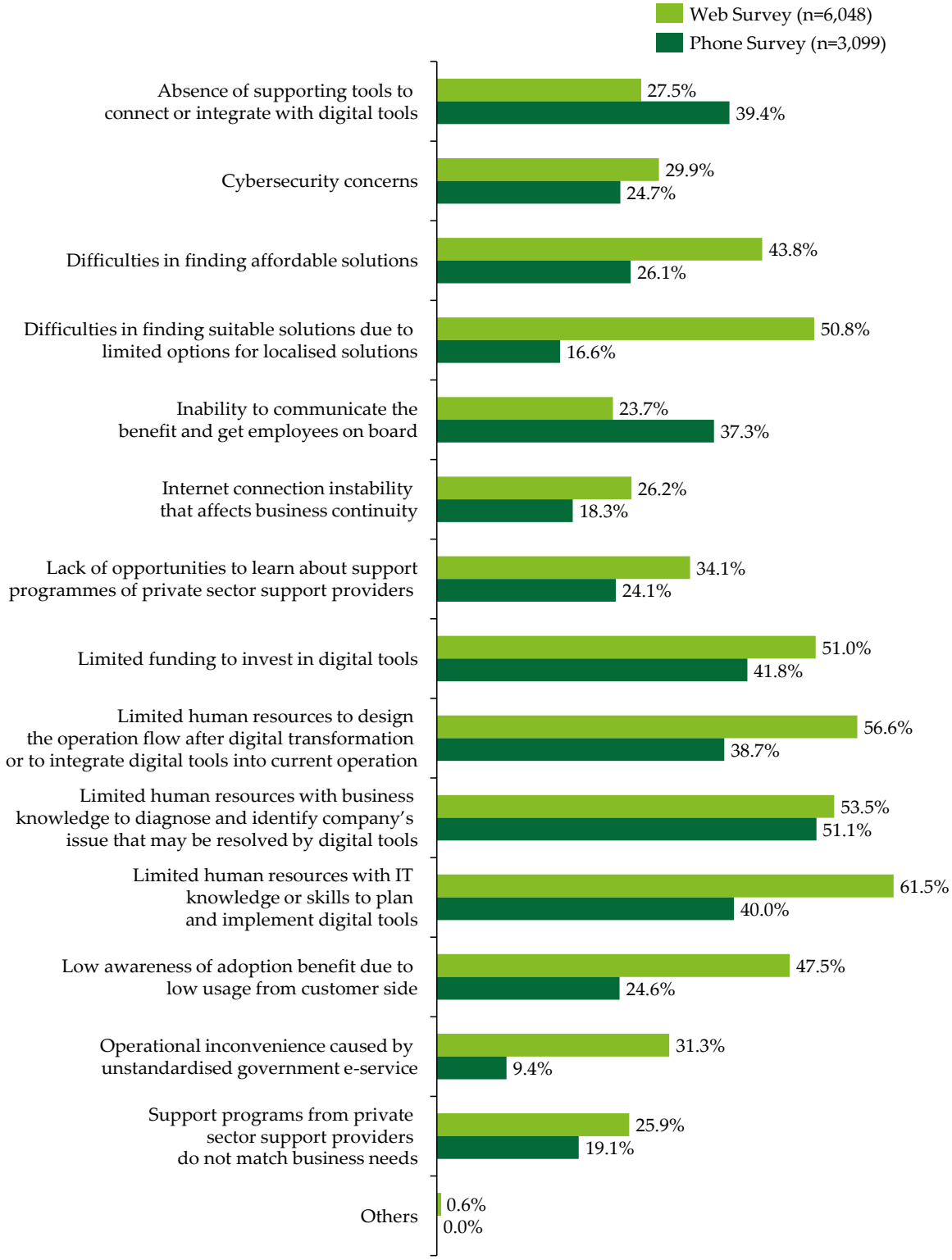
(Web Survey)



Notes: The percentage of each bar is calculated by dividing the total number of respondents who answered 'Yes' by the total questionnaire respondents in each bar. The population of each bar is different, so the limited sample should be noted. (Q33: Were you able to adopt the tools as a result of the support? Q37: Were you able to adopt the tools as a result of the support?)
Source: Authors.

The web survey showed that over one-half of respondents expect governments to address challenges arising from the business skills gap, with 56.6% citing 'limited human resources to design operation flows after digital transformation or to integrate', and 53.5% citing 'limited human resources with the business skill to diagnose and identify company's issues that can be resolved by digital tools' (Figure 7.13). These figures are only second to those indicating a lack ICT skills for digital tool implementation. The phone survey result showed a similar trend.

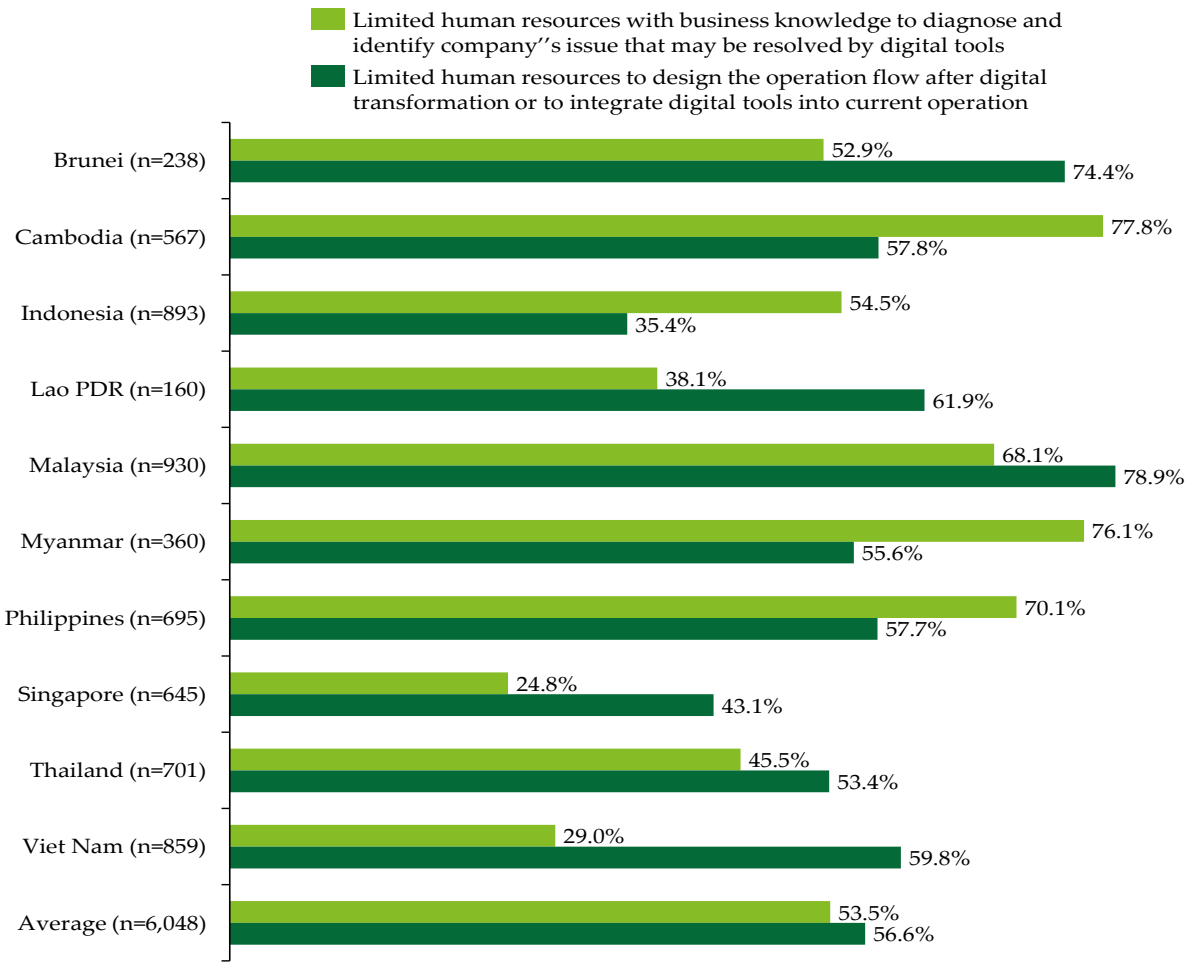
Figure 7.13. Issues That Governments Should Emphasise to Encourage Digital Adoption



IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of respondents of the corresponding bar by the total questionnaire respondents. (Q39: Which issues of ASEAN companies do you think the government should emphasise to encourage digital adoption?)
Source: Authors.

In the web survey, companies from Cambodia and Myanmar, 77.8% and 76.1%, respectively, cited 'limited human resources with business knowledge to diagnose and identify company's issue that may be resolved by digital tools', suggesting that many companies are seeking to address the lack of business knowledge required at digital tool introduction (Figure 7.14). The proportion of companies expecting governments to resolve 'limited human resources to design the operation flow after digital transformation or to integrate digital tools into current operation' is high in Brunei Darussalam and Malaysia, suggesting that the skills required vary with the digitalisation stage of companies in each country.

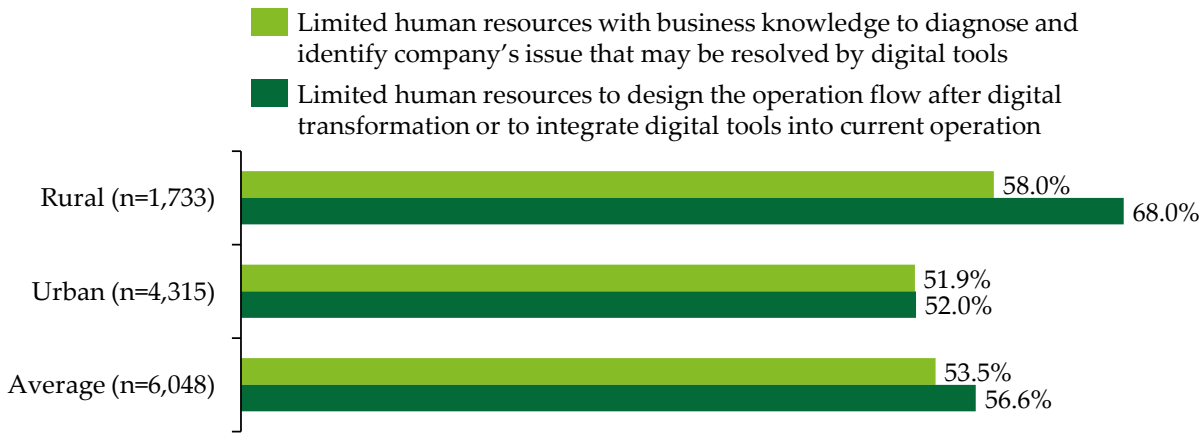
Figure 7.14. Respondents Expecting Governments to Emphasise Business Skills-Related Issues by Country (Web Survey)



Lao PDR = Lao People's Democratic Republic.
Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Limited human resources with business knowledge to diagnose and identify company's issue that may be resolved by digital tools' and 'Limited human resources to design the operation flow after digital transformation or to integrate digital tools into current operation' by the total questionnaire respondents in each bar. (Q39: Which issues of ASEAN companies do you think governments should emphasise to encourage digital adoption?)
Source: Authors.

Figure 7.15 shows the percentage of respondents that answered business skills-related issues as those that governments should emphasise to encourage digital tool adoption by company location. The proportion of companies citing both 'limited human resources with the business skill to diagnose and identify company's issue that may be resolved by digital tools' and 'limited human resources to design the operation flow after digital transformation or to integrate digital tools into current operation' as issues that they expect governments to resolve is higher amongst companies located in rural areas. This can be interpreted as seeking help from governments due to their lack of skills and limited access to current support.

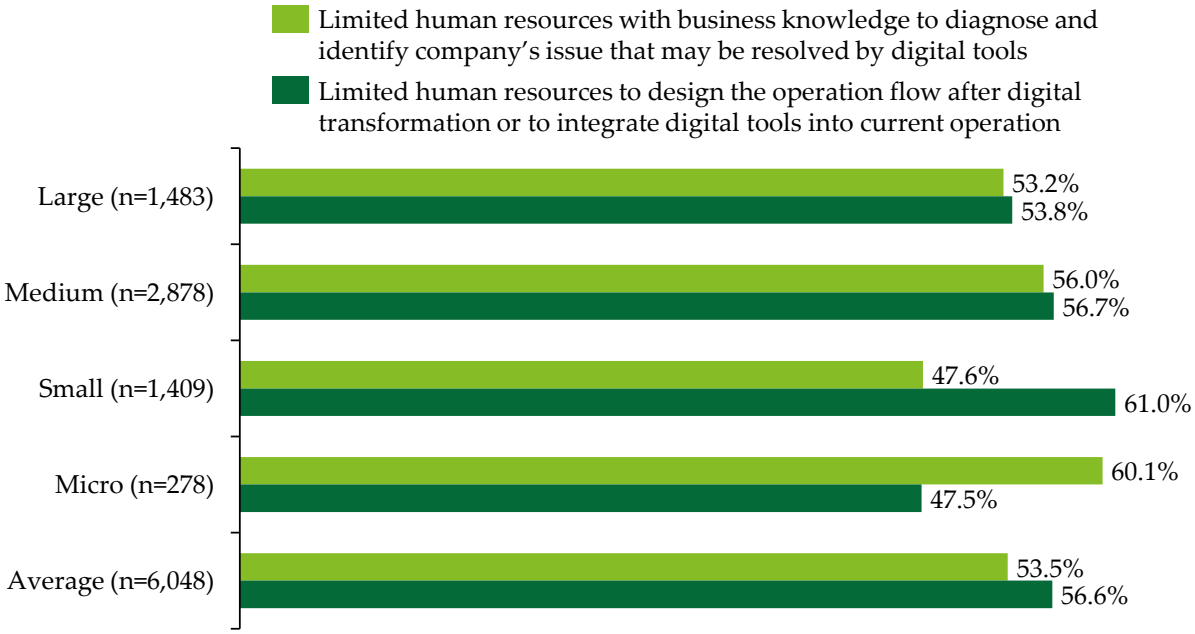
Figure 7.15. Respondents Expecting Governments to Emphasise Business Skills-Related Issues by Location
(Web Survey)



Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Limited human resources with business knowledge to diagnose and identify company's issue that may be resolved by digital tools' and 'Limited human resources to design the operation flow after digital transformation or to integrate digital tools into current operation' by the total questionnaire respondents in each bar. (Q39: Which issues of ASEAN companies do you think governments should emphasise to encourage digital adoption?)
Source: Authors.

Figure 7.16 shows the percentage of respondents that cite business knowledge-related issues as those that governments should emphasise to encourage digital adoption by company size. Small and medium-sized companies expect governments to address 'limited human resources to design the operation flow after digital transformation or to integrate digital tools into current operation'. In contrast, more micro companies expect governments to address 'limited human resources with business knowledge to diagnose and identify company's issue that may be resolved by digital tools'.

Figure 7.16. Respondents Expecting Governments to Emphasise Business Skills-Related Issues by Company Size
(Web Survey)



Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Limited human resources with business knowledge to diagnose and identify company's issue that may be resolved by digital tools' and 'Limited human resources to design the operation flow after digital transformation or to integrate digital tools into current operation' by the total questionnaire respondents in each bar. (Q39: Which issues of ASEAN companies do you think governments should emphasise to encourage digital adoption?)
Source: Authors.

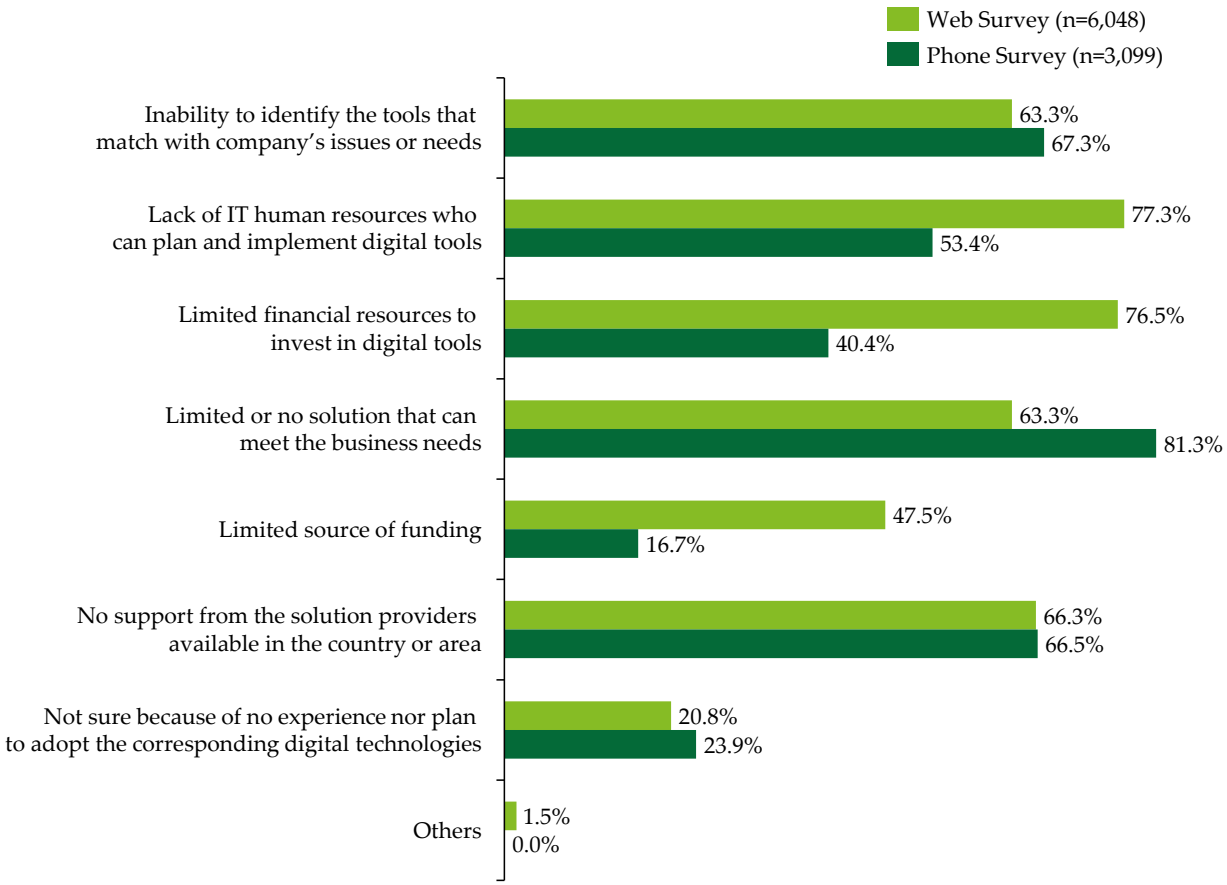
In conclusion, the lack of business skills in companies is an issue that governments should address to rectify the digital divide. As mentioned earlier in this section, business skills, including those related to digitalisation, are necessary for middle management, but these are lacking across the ASEAN region. Specific business skills and notably deficient levels vary by segment, indicating that appropriate training and support tailored to the needs of each segment should be provided.

2.2.2. Information and Communications Technology Skills

Figure 7.17 shows the percentage of respondents that acknowledged each option as a cause of difficulties in the digital tool adoption phase. Based on the web survey, 77.3% of the respondents identified a 'lack of [information technology] human resources who can plan and implement digital tools' as a challenge when introducing digital tools. This was the most common issue faced during implementation. Phone survey results showed that 53.4% of companies have this problem. Here, companies more commonly cited primary challenges, such as 'limited or no solution that can meet the business needs'

and an 'inability to identify tools that match with company's issues or needs' during the implementation phase. Still, these problems likely relate to a gap in ICT skills.

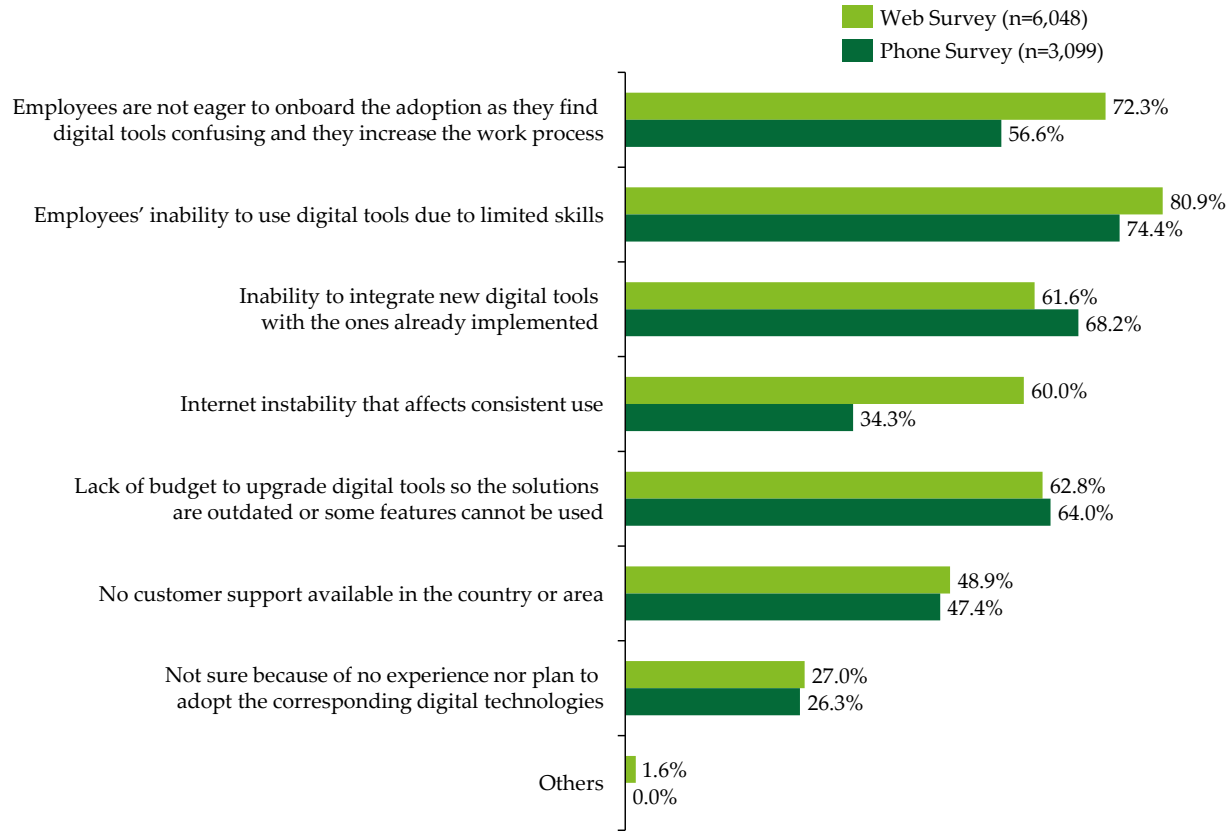
Figure 7.17. Difficulties in the Digital Tool Adoption Phase



IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of respondents of the corresponding bar by the total questionnaire respondents. (Q28: What are the causes of difficulties in adoption phase?)
Source: Authors.

Figure 7.18 shows the percentage of respondents that acknowledged each option as a cause of difficulties in the post-adoption phase. After implementing digital tools, both surveys reported that employees struggle to use them due to their limited skills (80.9% for the web survey and 74.4% for the phone survey). This is the most common post-implementation issue. Additionally, 72.3% of companies from the web survey stated that their employees are reluctant to adopt digital tools, as they find them confusing and increase their workloads. The ICT skill gap partially contributes to these problems. Indeed, many ASEAN firms have difficulties finding workers with the right skills that they desire (OECD, 2021)

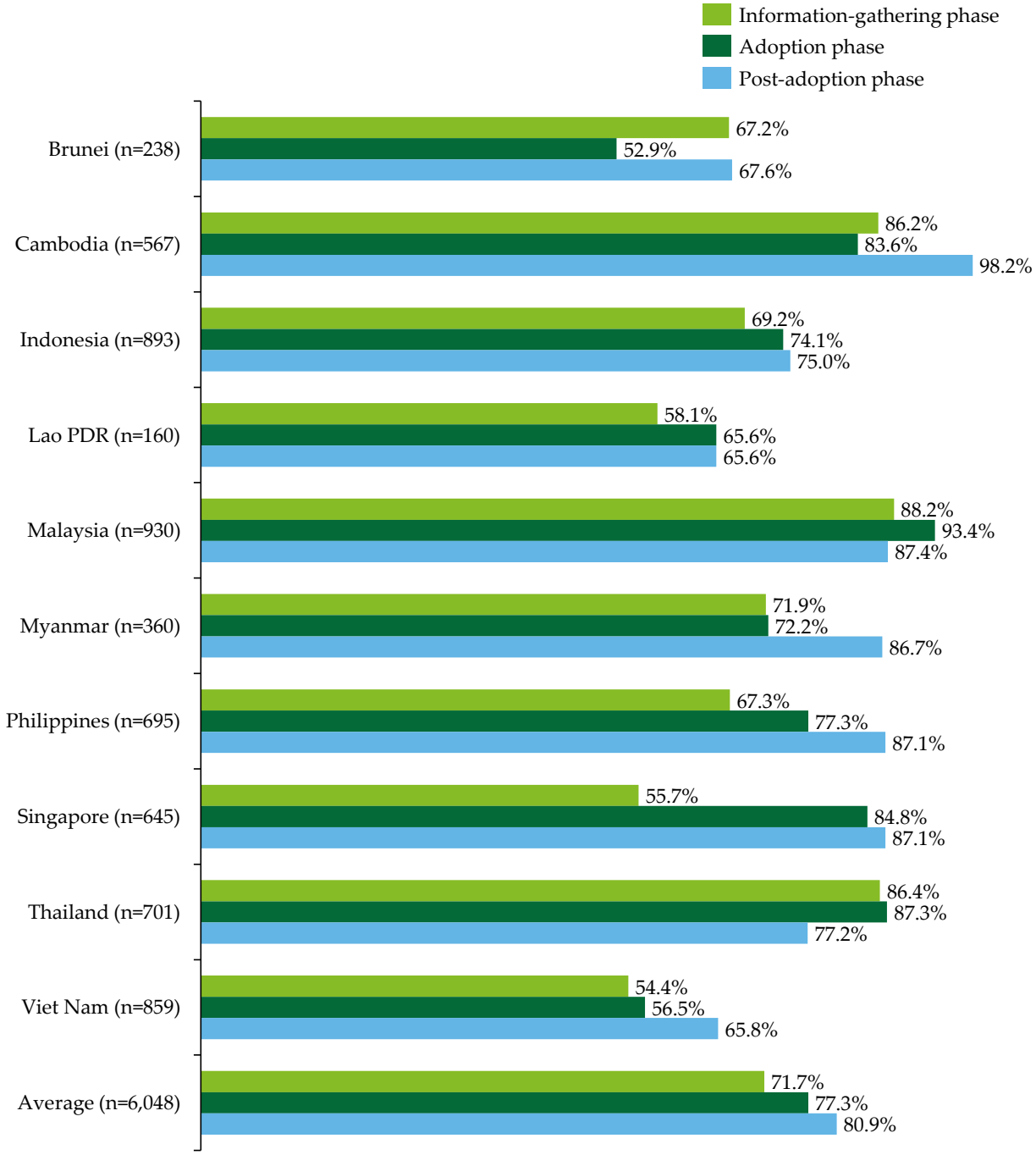
Figure 7.18. Difficulties in Post-Adoption Phase



Notes: The percentage of each bar is calculated by dividing the total number of respondents of the corresponding bar by the total questionnaire respondents. (Q29: What are the difficulties in the post-adoption phase?)
Source: Authors.

Figure 7.19 shows the percentage of respondents with limited ICT knowledge as a cause of difficulties in information-gathering, adoption, and post-adoption phases. Malaysian companies are the most impacted by this, with 88.2% of these respondents citing the challenge of 'limited IT knowledge due to a lack of internal IT human resources to understand the information' before introducing digital tools. Singapore shows a relatively lower rate, with 55.7%. Interestingly, Singaporean companies facing issues from an ICT skills gap significantly increase during and post-implementation phases. Compared to other countries, their ranks also rise. About 84.8% of Singaporean companies cite the lack of ICT human resources during implementation, ranking third throughout ASEAN. In addition, 87.1% of Singaporean companies cite struggles with employees' limited skills post-implementation. Thus, each stage requires different ICT skills, and the skills deficit impeding digitalisation varies by country.

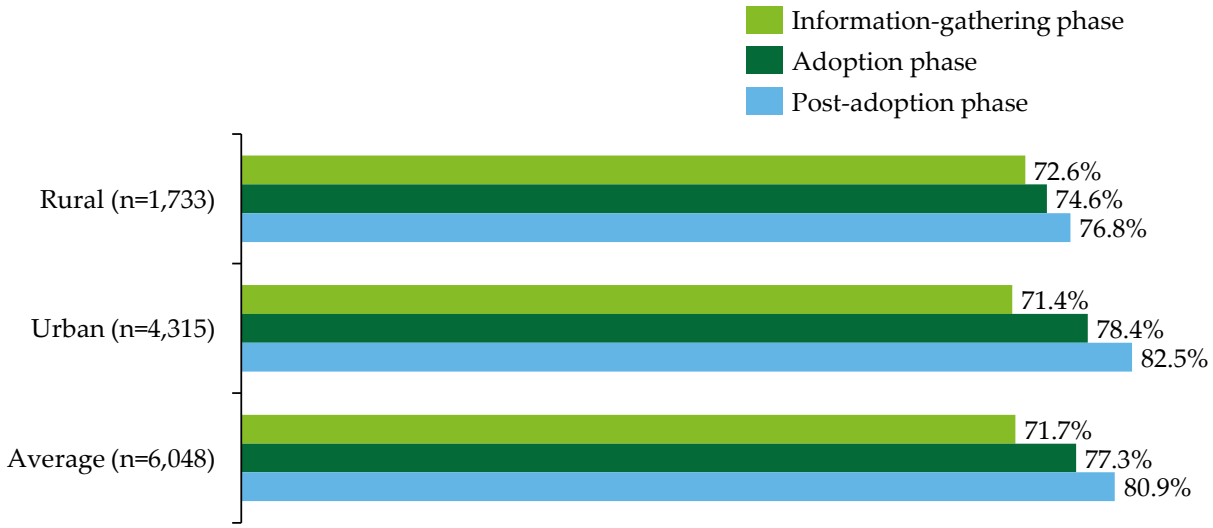
Figure 7.19. Respondents Facing Limited Information and Communications Technology Knowledge in Each Phase of Digital Tool Implementation by Country
(Web Survey)



IT = information technology, Lao PDR = Lao People's Democratic Republic.
Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Limited IT knowledge due to a lack of internal IT human resources to understand the information', 'Lack of IT human resources who can plan and implement digital tools', and 'Employees' inability to use digital tools due to limited skills' by the total questionnaire respondents in each bar. (Q27: What are the causes of difficulties in the information-gathering phase? Q28: What are the causes of difficulties in the adoption phase? Q29: What are the causes of difficulties in the post-adoption phase?)
Source: Authors.

Figure 7.20 shows the percentage of respondents finding limited ICT knowledge a cause of difficulties in the information-gathering, adoption, and post-adoption phases by location. Companies in rural areas have higher scores in regard to the pre-implementation issue of 'limited IT knowledge due to a lack of internal IT human resources to understand the information.' In contrast, companies in urban areas struggled more with a 'lack of IT human resources who can plan and implement digital tools' during implementation and 'employees' inability to use digital tools due to limited skills' post-implementation. Therefore, while both areas face an ICT skills gap, the specific lacking skills vary.

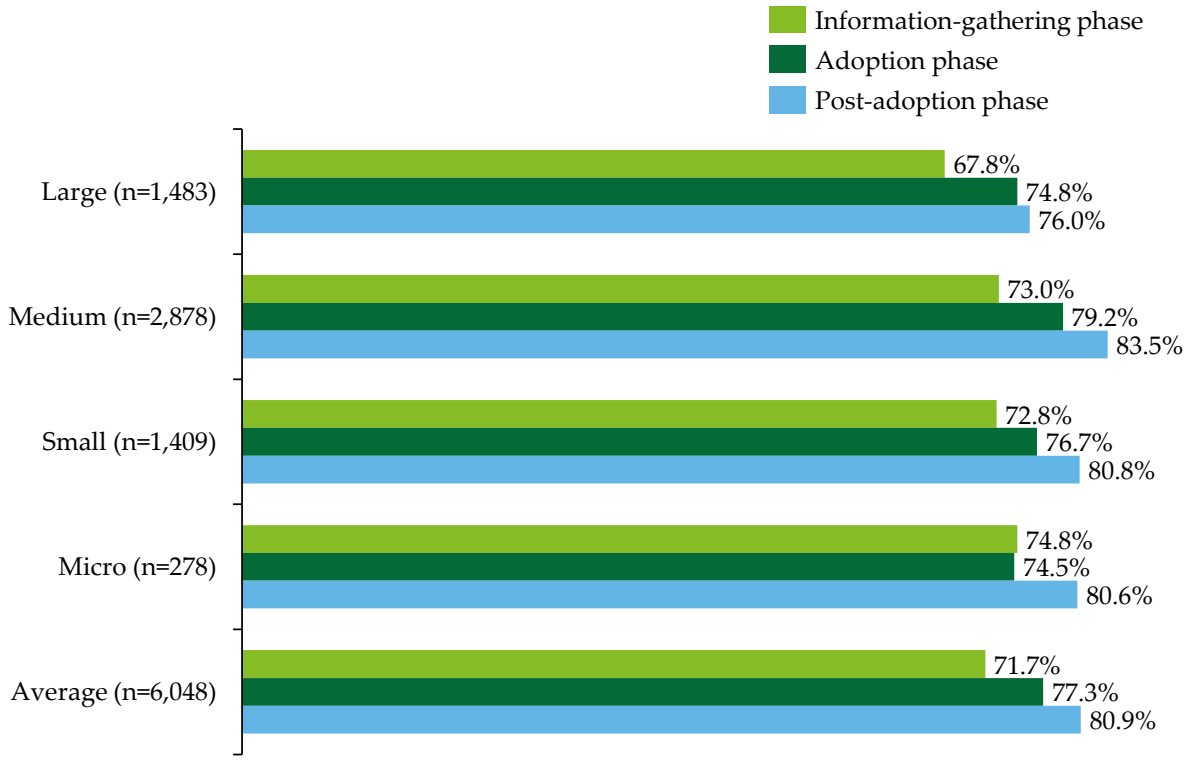
Figure 7.20. Respondents Facing Limited Information and Communications Technology Knowledge in Each Phase of Digital Tool Implementation by Location
(Web Survey)



IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Limited IT knowledge due to a lack of internal IT human resources to understand the information', 'Lack of IT human resources who can plan and implement digital tools', and 'Employees' inability to use digital tools due to limited skills' by the total questionnaire respondents in each bar. (Q27: What are the causes of difficulties in the information-gathering phase? Q28: What are the causes of difficulties in the adoption phase? Q29: What are the causes of difficulties in the post-adoption phase?)
Source: Authors.

Figure 7.21 shows the percentage of respondents citing limited ICT knowledge as a cause of difficulties in the information-gathering, adoption, and post-adoption phases by company size. When viewed by firm size, small and medium-sized companies face more issues from an ICT skills gap during the adoption and post-adoption phases, while large companies have a slightly lower tendency. This suggests that small and medium-sized companies struggle with ICT skills-related challenges, while large companies are likely to resolve such issues. Although many micro companies face challenges in the information-gathering phase, the tools that they implement should be relatively simple, requiring less advanced ICT skills. Thus, fewer of these companies report these challenges in the adoption and post-adoption phases compared to small and medium-sized companies.

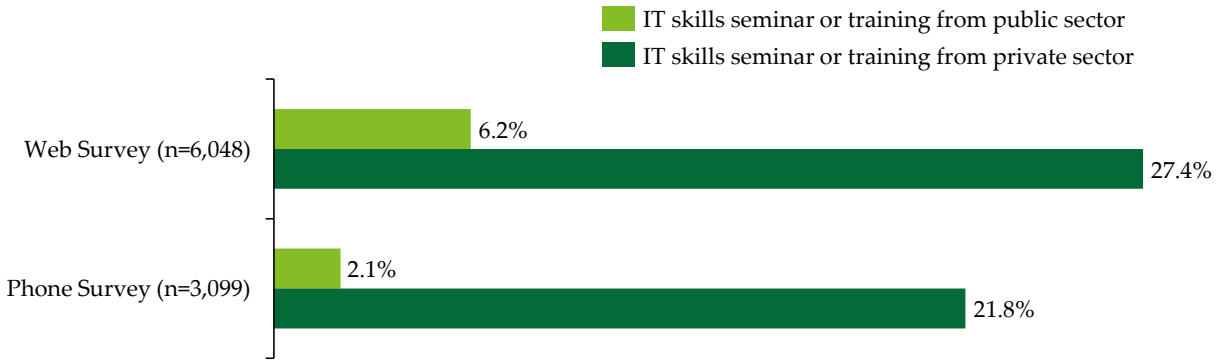
Figure 7.21. Respondents Facing Limited Information Technology Knowledge in Each Phase of Digital Tool Implementation by Company Size
(Web Survey)



IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Limited IT knowledge due to a lack of internal IT human resources to understand the information', 'Lack of IT human resources who can plan and implement digital tools', and 'Employees' inability to use digital tools due to limited skills' by the total questionnaire respondents in each bar. (Q27: What are the causes of difficulties in the information-gathering phase? Q28: What are the causes of difficulties in the adoption phase? Q29: What are the causes of difficulties in the post-adoption phase?)
Source: Authors.

Figure 7.22 shows the percentage of respondents that received ICT skills seminars or training from the public or private sector. While many companies face challenges due to a lack of ICT skills, very few in the web-surveyed companies have participated in 'IT skills seminars or training' provided by the public sector – only 6.2% across the region. In addition, the percentage of companies participating in 'IT skills seminars or training' organised by the private sector is relatively higher at 27.4% in the web survey. The phone survey showed the same trend but with lower numbers. It is possible that some companies have limited internet access and may not be able to access information on support.

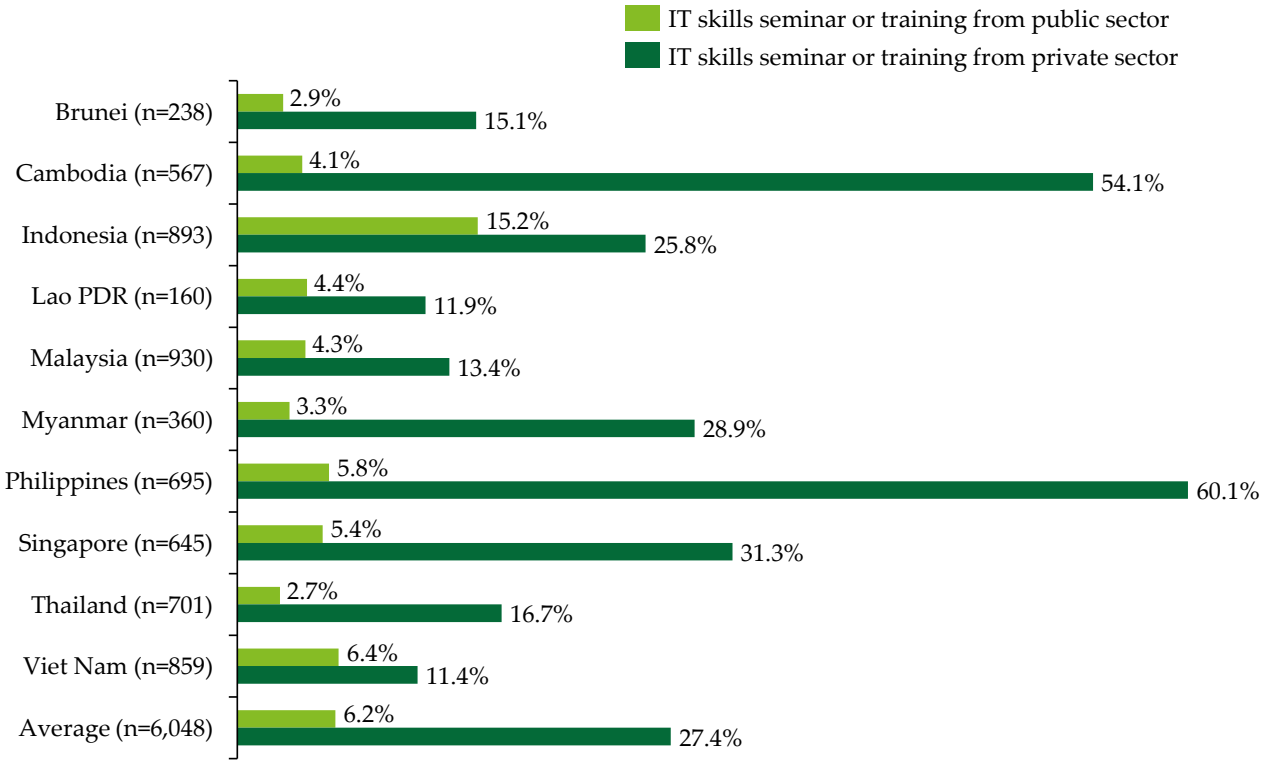
Figure 7.22. Respondents Receiving Information and Communications Technology Skills Seminars or Training



IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'IT skills seminar or training' by the total questionnaire respondents by each bar. (Q31: If you selected 'support from the public sector (government or public institution)' in Q30, what support have you received? Q35: If you selected any of 'support from the private sector' in Q30, what support have you received?)
Source: Authors.

Figure 7.23 shows the percentage of respondents that have received ICT skills seminars or training from the public or private sector by country. Generally, the support of the private sector was received the most amongst MSMEs in ASEAN. When looking at individual countries, the percentage of companies that have participated in 'IT skills seminars or training' provided by the public sector is high in Indonesia – 15.2%. This figure implies the impact of the government's focus on digitalisation efforts.

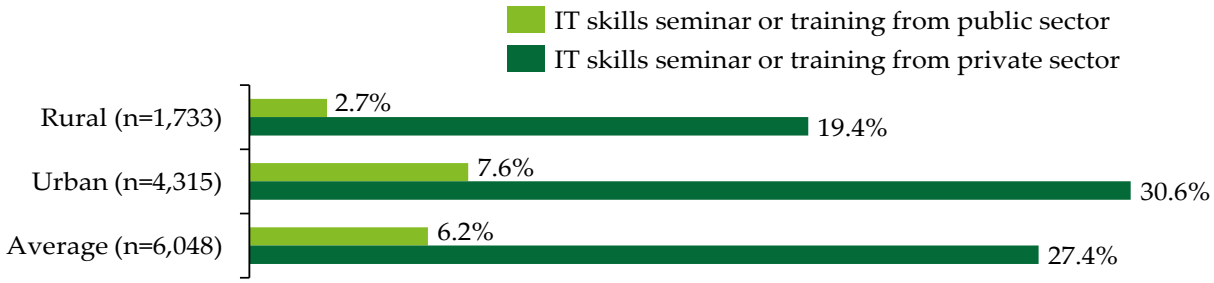
Figure 7.23. Respondents Receiving Information and Communications Technology Skills Seminar or Training by Country
(Web Survey)



IT = information technology, Lao PDR = Lao People's Democratic Republic.
Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'IT skills seminar or training' by the total questionnaire respondents by each bar. (Q31: If you selected 'support from the public sector ' in Q30, what support have you received? Q35: If you selected any of 'support from the private sector' in Q30, what support have you received?)
Source: Authors.

Figure 7.24 shows the percentage of respondents that received ICT skills seminars or training from the public or private sector by location. Notably, there is a gap of more than 10% for support from the private sector. This suggests a discrepancy between urban- and rural-based companies in access to digital-related training between companies.

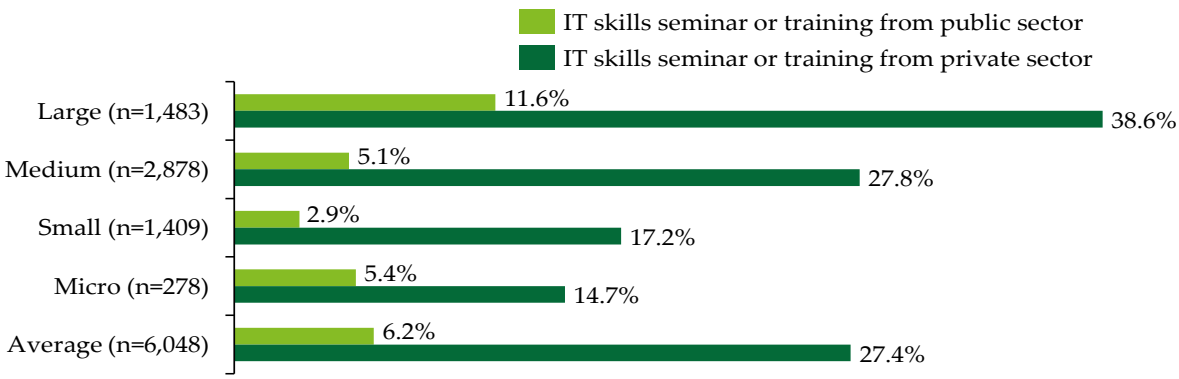
Figure 7.24. Respondents Receiving Information and Communications Technology Skills Seminar or Training by Location
(Web Survey)



IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'IT skills seminar or training' by the total questionnaire respondents by each bar. (Q31: If you selected 'support from the public sector ' in Q30, what support have you received? Q35: If you selected any of 'support from the private sector' in Q30, what support have you received?)
Source: Authors.

Figure 7.25 shows the percentage of respondents that received ICT skills seminars or training from the public or private sector by company size. The percentage of large companies that have received 'IT skills seminars or training' from the public and private sectors are high at 11.6% and 38.6%, respectively. Meanwhile, the numbers from MSMEs are low. This suggests a discrepancy like the location of the companies between large companies and MSMEs.

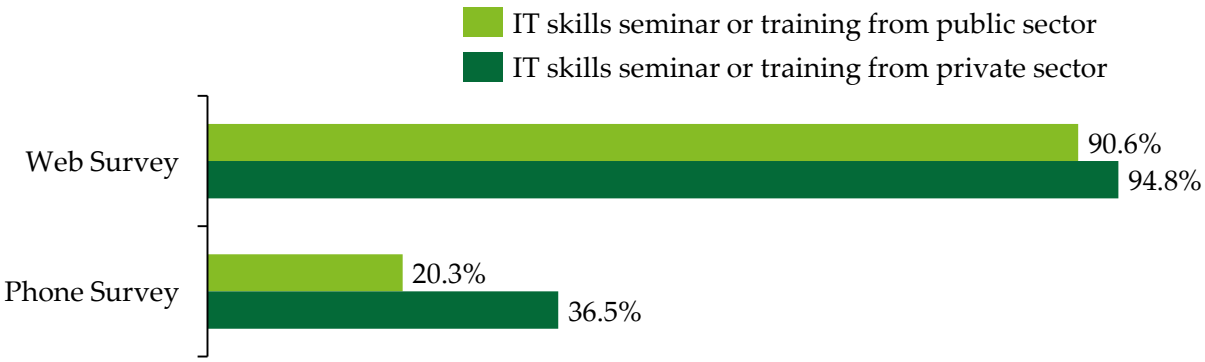
Figure 7.25. Respondents Receiving Information Technology Skills Seminar or Training by Company Size
(Web Survey)



IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'IT skills seminar or training' by the total questionnaire respondents by each bar. (Q31: If you selected 'support from the public sector' in Q30, what support have you received? Q35: If you selected any of 'support from the private sector' in Q30, what support have you received?)
Source: Authors.

Figure 7.26 shows the percentage of respondents that could adopt digital tools due to receiving ICT skills seminars or training from the public or private sector. The web survey revealed that the companies that have been able to implement digital tools after receiving 'IT skills seminars or training' is high for both the public and private sectors – 92.6% and 94.0%, respectively. Although less than 10.0% of web-surveyed companies received support from the public sector, it can be said that this is an effective measure. In the phone survey, these figures were significantly lower, falling to less than 40.0%. The phone survey respondents are MSMEs and may have other challenges, such as budget and manpower resources.

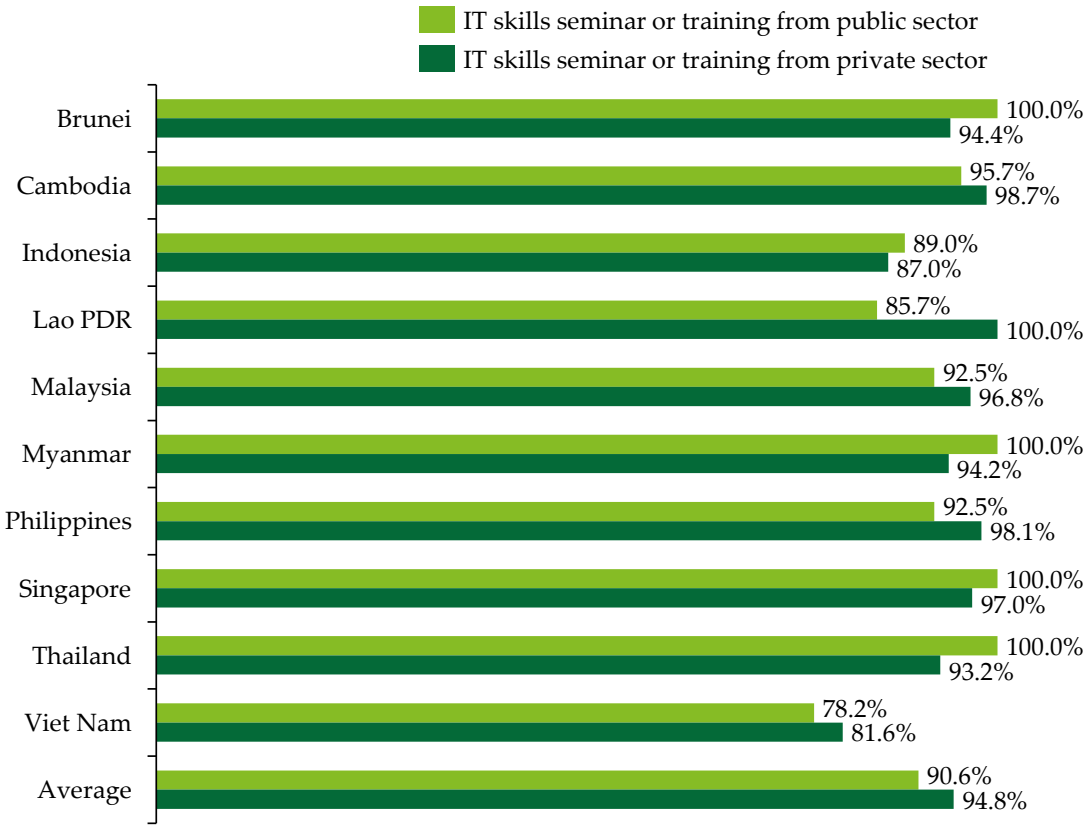
Figure 7.26. Respondents Adopting Digital Tools after Receiving Information and Communications Technology Skills Seminar or Training



IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of respondents that answered 'Yes' by the total questionnaire respondents in each bar. The population of each bar is different, so the limited sample should be noted. (Q33: Were you able to adopt the tools as a result of the support? Q37: Were you able to adopt the tools as a result of the support?)
Source: Authors.

Figure 7.27 shows the percentage of respondents that could adopt digital tools due to receiving ICT skills seminars or training from the public or private sector by country. Amongst the companies that received 'IT skills seminars or training' from the public sector, the percentage that could implement digital tools is high in all countries, reaching 100% in several. The lowest score is observed in Viet Nam with 78.2%. In Viet Nam, the number for the private sector support result is also the lowest at 81.6%, suggesting that there may be problems with the quality of support or issues that cannot be resolved by seminars or training alone.

Figure 7.27. Respondents Adopting Digital Tools after Receiving Information and Communications Technology Skills Seminar or Training by Country
(Web Survey)

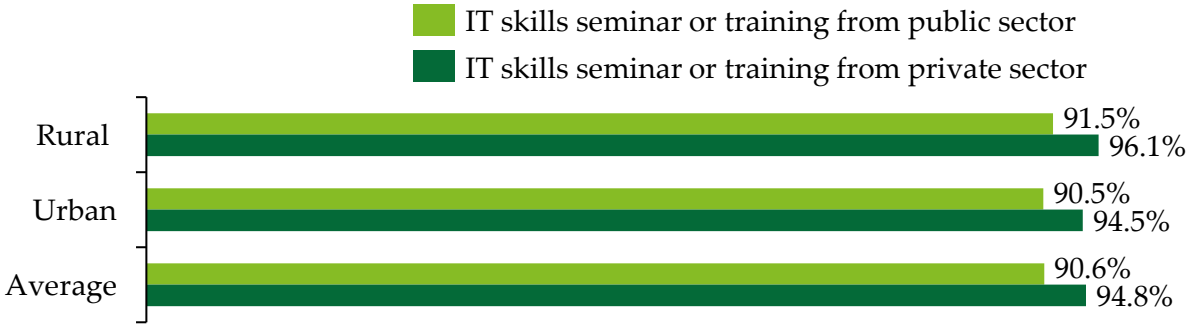


IT = information technology, Lao PDR = Lao People's Democratic Republic.
Notes: The percentage of each bar is calculated by dividing the total number of respondents that answered 'Yes' by the total questionnaire respondents in each bar. The population of each bar is different, so the limited sample should be noted. (Q33: Were you able to adopt the tools as a result of the support? Q37: Were you able to adopt the tools as a result of the support?)
Source: Authors.

Figure 7.28 shows the percentage of respondents that could adopt digital tools due to receiving ICT skills seminars or training from the public or private sector by location. The percentages of companies that were able to implement digital tools after receiving 'IT skills seminars or training' from both the public and private sectors are high in both urban and rural areas, exceeding 90.0%. Although the percentage of companies in urban areas that have received such training from the private sector is more than 10 percentage points higher, it is believed that there is not a significant difference regarding the effect of the support.

Figure 7.28. Respondents Adopting Digital Tools after Receiving Information and Communications Technology Skills Seminar or Training by Location

(Web Survey)



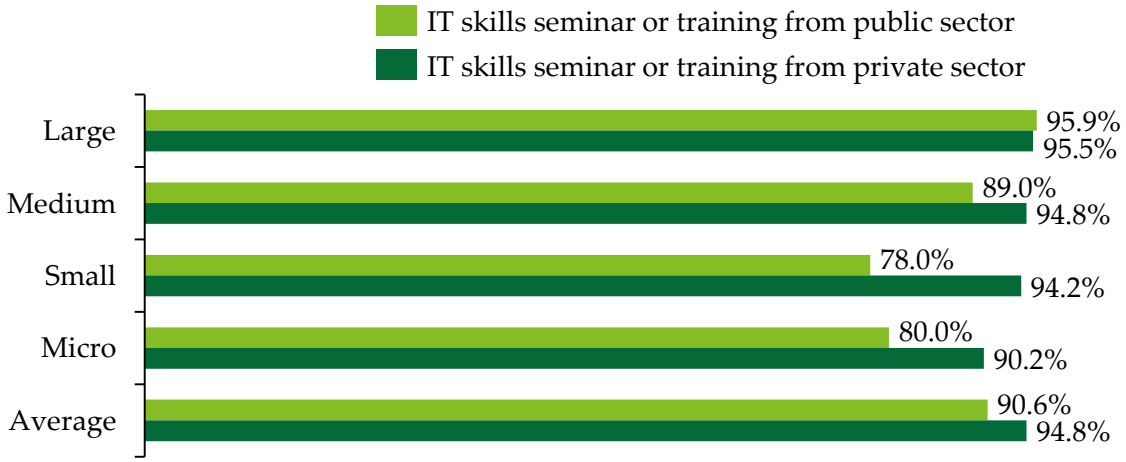
IT = information technology.

Notes: The percentage of each bar is calculated by dividing the total number of respondents that answered 'Yes' by the total number of respondents to the questionnaire by each bar. The population of each bar is different, so the limited sample should be noted. (Q33: Were you able to adopt the tools as a result of the support? Q37: Were you able to adopt the tools as a result of the support?)

Source: Authors.

When looking at the firm size, the percentage of large companies that have been able to implement digital tools after receiving 'IT skills seminars or training' from the public sector is high at 95.9%. In comparison, micro and small companies only reach around 80.0%, a nearly 20.0% difference. The differences between the scores of the private sector efforts is almost the same range. This suggests that training provided by the public sector may need improvement to meet the unique challenges of micro and small businesses.

Figure 7.29. Respondents Adopting Digital Tools after Receiving Information and Communications Technology Skills Seminar or Training by Company Size (Web Survey)

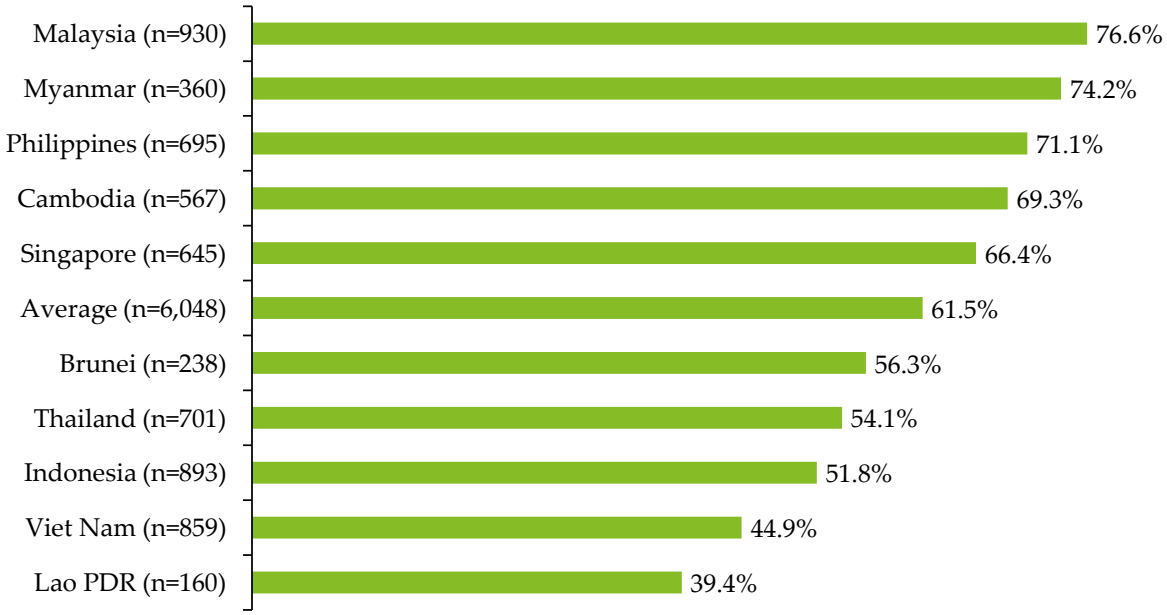


IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of respondents that answered 'Yes' by the total questionnaire respondents in each bar. The population of each bar is different, so the limited sample should be noted. (Q33: Were you able to adopt the tools as a result of the support? Q37: Were you able to adopt the tools as a result of the support?)
Source: Authors.

As Figure 7.13 shows, 61.5% of respondents from the web survey cite 'limited human resources with IT knowledge or skills to plan and implement digital tools' as the issue on which they expect governments to focus. This has the highest rate amongst the answer options. The phone survey showed a similar trend at 40.0%, ranking it third out of all the issues. However, it is still noticeable that more companies seek help with business skills challenges and budgetary issues.

The percentage of companies expecting governments to focus on this issue varies by country. Figure 7.30 shows the percentage of respondents that selected 'limited human resources with IT knowledge or skills to plan and implement digital tools' as an issue that governments should emphasise to encourage digital adoption by country. Some countries with certain economic levels, such as Indonesia and Thailand, scored this low, at 51.8% and 54.1%, respectively. This may suggest that they have plenty of training programmes to fill the ICT skills gap, and that private companies, such as consulting firms, provide support when needed.

Figure 7.30. Respondents Expecting Governments to Emphasise Limited Human Resources with Inforation and Communications Technology Knowledge or Skills to Plan and to Implement Digital Tools by Country
(Web Survey)



IT = information technology, Lao PDR = Lao People's Democratic Republic.
Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Limited human resources with IT knowledge or skills to plan and implement digital tools' by the total questionnaire respondents in each bar. (Q39: Which issues of ASEAN companies do you think governments should emphasise to encourage digital adoption?)
Source: Authors.

Figures 7.31 and 7.32 show the percentage of respondents that selected 'limited human resources with IT knowledge or skills to plan and implement digital tools' as an issue that governments should emphasise to encourage digital adoption by location and company size, respectively. By the location and size of the companies, access to and quality of training and services to fill the ICT skills gap are reflected. The difference according to the size of the companies is even more prominent, with large companies citing this at 49.6%, while small and medium-sized companies cite this at more than 60.0%.

Figure 7.31. Respondents Expecting Governments to Emphasise Limited Human Resources with Information and Communications Technology Knowledge or Skills to Plan and to Implement Digital Tools by Location (Web Survey)

IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Limited human resources with IT knowledge or skills to plan and implement digital tools' by the total questionnaire respondents in each bar. (Q39: Which issues of ASEAN companies do you think governments should emphasise to encourage digital adoption?)
Source: Authors.

Figure 7.32. Respondents Expecting Governments to Emphasise Limited Human Resources with Information and Communications Technology Knowledge or Skills to Plan and to Implement Digital Tools by Company Size (Web Survey)

IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Limited human resources with IT knowledge or skills to plan and implement digital tools' by the total questionnaire respondents in each bar. (Q39: Which issues of ASEAN companies do you think governments should emphasise to encourage digital adoption?)
Source: Authors.

In conclusion, the shortage of ICT skills in companies is one of the highest-priority issues for ASEAN to address in closing the digital divide. Focussing on supporting companies in rural areas and MSMEs is crucial, where access to training and support to acquire ICT skills is limited. Additionally, it is essential to prioritise ICT training and education for regular employees and students to foster the growth of more digitalised companies. Specific skills and skills levels that require improvement vary across different segments, so it is necessary to provide appropriate training and support that cater to the specific needs of each segment.

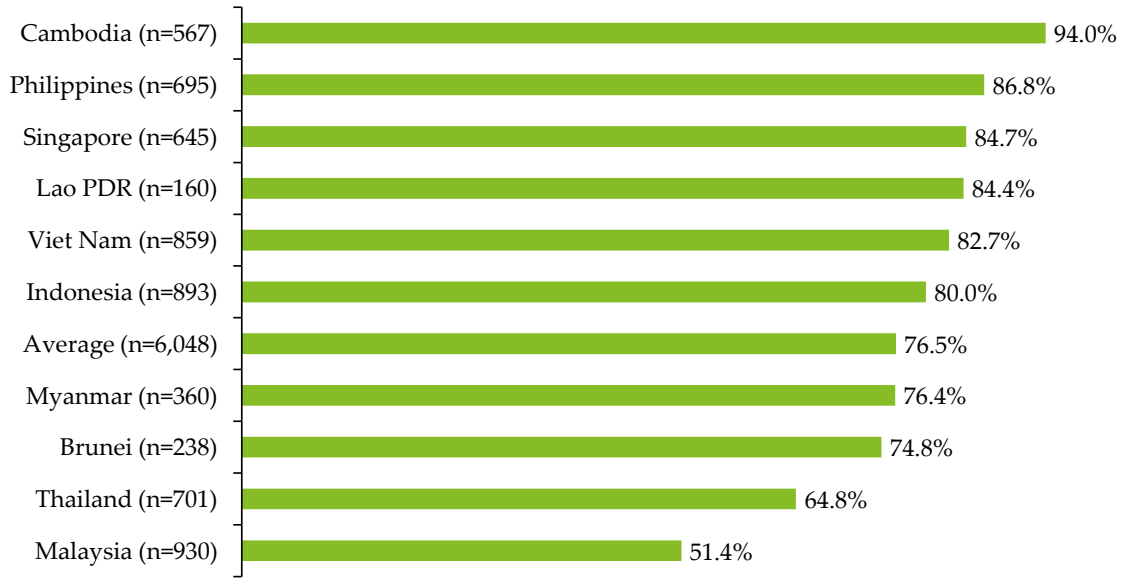
3. Finance

This section analyses which and to what extent ASEAN businesses face financial challenges and how these are causing the digital divide. As Figure 7.17 illustrates, in the adoption of digital tools phase, the web survey revealed that the highest-ranked challenge in implementing digital tools is the 'lack of IT human resources who can plan and implement digital tools,' with a score of 77.3%, followed by 'limited financial resources to invest in digital tools' at 76.5%. The phone survey produced different results, with 40.4% of companies perceiving 'limited financial resources to invest in digital tools' as the biggest challenge, which is a lower score compared to other issues related to human resources. This suggests that less digitised companies that participated in the phone survey are more likely to struggle with determining what to implement and to face other challenges related to human resources.

Figure 7.33 shows the percentage of respondents that answered 'limited financial resources to invest in digital tools' as a cause of difficulties in the digital tool adoption phase by country. Cambodian companies cite this the most, at 94.0% of companies. Conversely, fewer companies identified this problem in Malaysia and Thailand, which are known for lower MSME finance gaps.[3] With the country's advanced economic levels, the proportion of companies in Singapore facing this issue exceeds the ASEAN average, implying that a nation's economic level does not necessarily align with this issue. This may be related to some companies that have advanced in digitalisation, requiring more sophisticated digital tools with higher costs.

[3] *Ibid.*

Figure 7.33. Respondents Facing Limited Financial Resources by Country (Web Survey)



Lao PDR = Lao People's Democratic Republic.
Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Limited financial resources to invest in digital tools' by the total questionnaire respondents in each bar. (Q28: What are the causes of difficulties in the adoption phase?)
Source: Authors.

Figure 7.34 shows the percentage of respondents that answered 'limited financial resources to invest in digital tools' as a cause of difficulties in the adoption phase by location. About 80.1% of urban and 67.6% of rural companies identified 'limited financial resources to invest in digital tools' as a challenge. The higher level of digital tools demanded by urban companies and the associated costs could account for this trend.

Figure 7.34. Respondents Facing Limited Financial Resources by Location (Web Survey)

Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Limited financial resources to invest in digital tools' by the total questionnaire respondents in each bar. (Q28: What are the causes of difficulties in adoption phase?)
Source: Authors.

Figure 7.35 shows the percentage of respondents that answered 'limited financial resources to invest in digital tools' as a cause of difficulties in the adoption phase by

company size. It is a more prevalent issue amongst small companies, with 78.6% of respondents acknowledging this challenge.

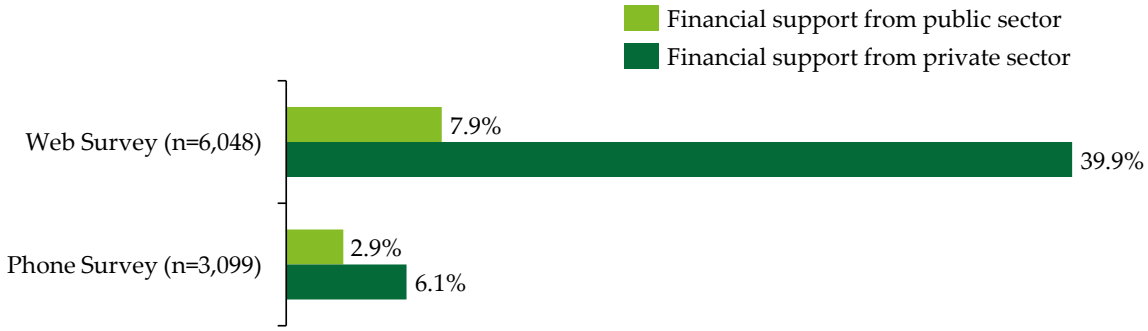
Figure 7.35. Respondents Facing Limited Financial Resources by Company Size (Web Survey)

Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Limited financial resources to invest in digital tools' by the total questionnaire respondents in each bar. (Q28: What are the causes of difficulties in the adoption phase?)
Source: Authors.

As Figure 7.18 shows, in the post-adoption of digital tools phase, 62.8% of respondents from the web survey and 64.0% from the phone survey reported a 'lack of budget to upgrade digital tools, so the solutions are outdated or some features cannot be used' as an issue. Its relatively lower score than in the adoption phase suggests that the primary bottleneck lies in budget constraints during the adoption stage.

Figure 7.36 shows the percentage of respondents that received any kind of financial support from the public or private sector. Only some received direct or indirect financial support from the public sector – less than 10%. There is more financial assistance from the private sector, with about 40% of companies receiving this support. Looking at the phone survey, both values are less than 10%. Respondents to the phone survey that do not have access to the internet also have limited access to support information to help them cross the digital divide.

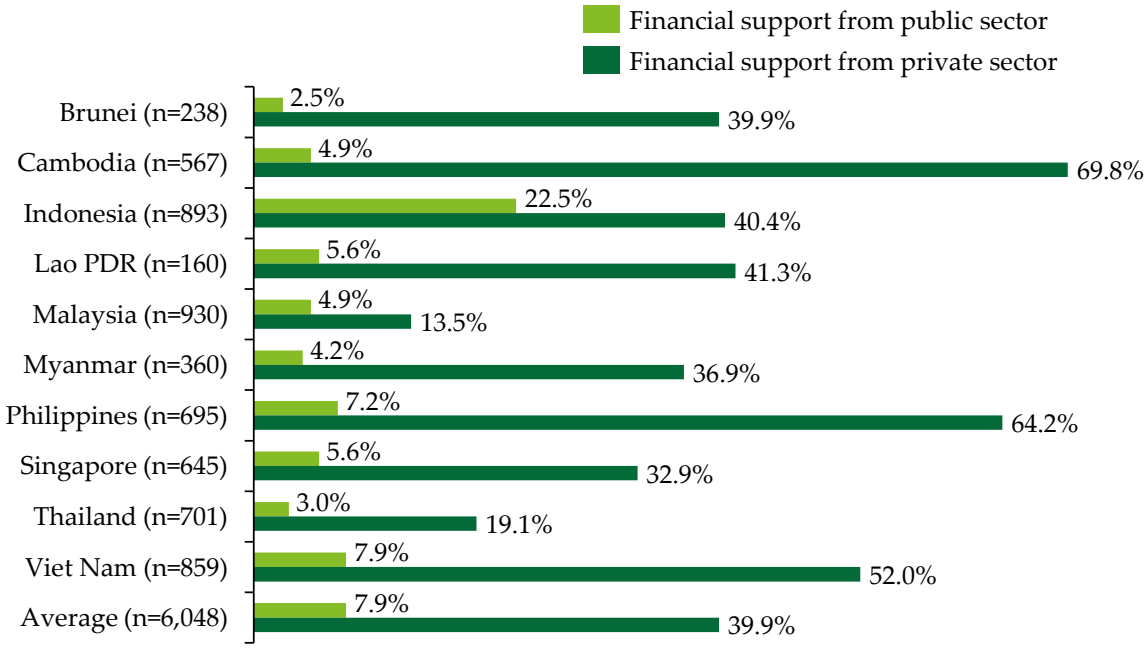
Figure 7.36. Respondents Receiving Financial Support



Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Information on the source of funding for digital tool investment', 'Grant or subsidy for digital tool investment', 'Low-interest loan', or 'Discounts or any relevant financial assistance programme for adopting digital tools' by the total questionnaire respondents in each bar. (Q31: If you selected 'support from the public sector ' in Q30, what support have you received? Q35: If you selected any of 'support from the private sector' in Q30, what support have you received?)
Source: Authors.

Figure 7.37 shows the percentage of respondents that have received financial support from the public or private sector by country. The proportion of companies receiving financial support from the public sector is high in Indonesia, exceeding 20%, reflecting the government's focussed efforts. In Cambodia, the Philippines, and Viet Nam, the proportion of respondents that received financial support from the private sector is high, suggesting active private sector investment in countries with high economic growth. In contrast, in high-income countries such as Singapore and Brunei Darussalam, the proportion of companies that received some form of financial support from the public sector is below the ASEAN average, indicating that the economic level of a country and the support from the public sector are not necessarily consistent. Singapore's result may be attributed to the fact that many companies possess sufficient internal budgets, and government support is often not required.

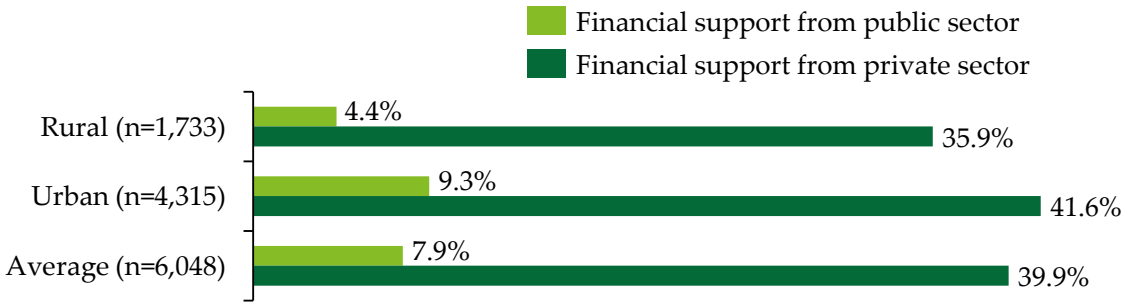
Figure 7.37. Respondents Receiving Financial Support by Country (Web Survey)



Lao PDR = Lao People's Democratic Republic.
Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Information on the source of funding for digital tool investment', 'Grant or subsidy for digital tool investment', 'Low-interest loan', or 'Discounts or any relevant financial assistance programme for adopting digital tools' by the total questionnaire respondents in each bar. (Q31: If you selected 'support from the public sector' in Q30, what support have you received? Q35: If you selected any of 'support from the private sector' in Q30, what support have you received?)
Source: Authors.

Figure 7.38 shows the percentage of respondents that have received financial support from the public or private sector by location. The difference between the rates of public and private sectors is high in urban and rural areas, at more than 30%. This suggests that the public sector's efforts are required to achieve an inclusive financial ecosystem to cover regional MSMEs.

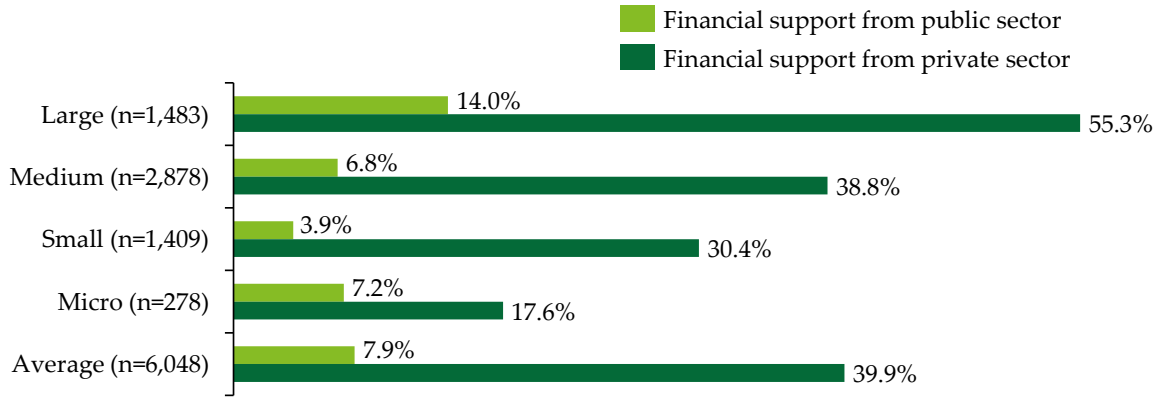
Figure 7.38. Respondents Receiving Financial Support by Location (Web Survey)



Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Information on the source of funding for digital tool investment', 'Grant or subsidy for digital tool investment', 'Low-interest loan', or 'Discounts or any relevant financial assistance programme for adopting digital tools' by the total questionnaire respondents in each bar. (Q31: If you selected 'support from the public sector (government or public institution)' in Q30, what support have you received? Q35: If you selected any of 'support from the private sector' in Q30, what support have you received?)
Source: Authors.

Figure 7.39 shows the percentage of respondents that have received support from the public or private sector by company size. Large companies scored the highest both for support from the public and private sectors, suggesting that they are able to access financial sources; smaller companies find them out of reach, so a better financial ecosystem is desired to cover MSMEs regionally.

Figure 7.39. Respondents Receiving Financial Support by Company Size (Web Survey)



Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Information on the source of funding for digital tool investment', 'Grant or subsidy for digital tool investment', 'Low-interest loan', or 'Discounts or any relevant financial assistance programme for adopting digital tools' by the total questionnaire respondents in each bar. (Q31: If you selected 'support from the public sector' in Q30, what support have you received? Q35: If you selected any of 'support from the private sector' in Q30, what support have you received?)
Source: Authors.

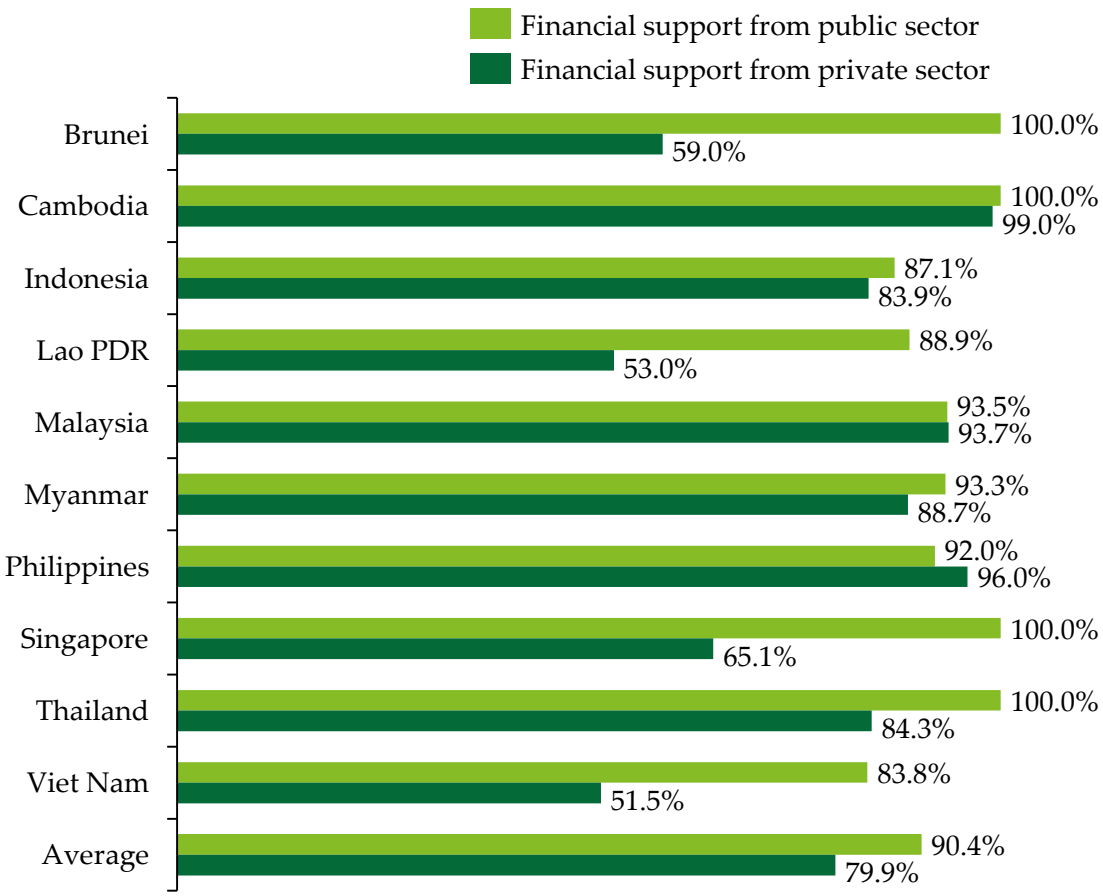
Figure 7.40 shows the percentage of respondents that could adopt digital tools due to receiving financial support from the public or private sector. Although support utilisation rate from the public sector is not high compared with that of private sector support, both the web and phone surveys cited more than 90.0%. Meanwhile, private sector support scored lower than public sector support. This implies that public sector support assists MSMEs to implement digital tools more effectively, and these efforts should be enhanced.

Figure 7.40. Respondents Adopting Digital Tools after Receiving Financial Support

Notes: The percentage of each bar is calculated by dividing the total number of respondents that answered 'Yes' by the total questionnaire respondents in each bar. The population of each bar is different, so the limited sample should be noted. (Q33: Were you able to adopt the tools as a result of the support? Q37: Were you able to adopt the tools as a result of the support?)
Source: Authors.

Figure 7.41 shows the percentage of respondents that could adopt digital tools due to receiving financial support from the public or private sector by country. Public sector support works well for MSMEs to implement digital tools, with a 100% rate in multiple countries. On the other hand, private sector support was lower by country, with Lao PDR and Viet Nam significantly below the ASEAN average.

Figure 7.41. Respondents Adopting Digital Tools after Receiving Financial Support by Country (Web Survey)

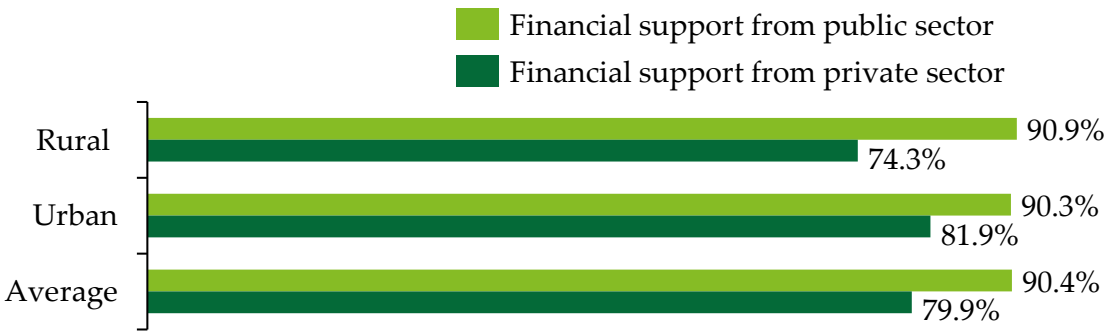


Lao PDR = Lao People's Democratic Republic.
Notes: The percentage of each bar is calculated by dividing the total number of respondents that answered 'Yes' by the total questionnaire respondents in each bar. The population of each bar is different, so the limited sample should be noted. (Q33: Were you able to adopt the tools as a result of the support? Q37: Were you able to adopt the tools as a result of the support?
Source: Authors.

Figure 7.42 shows the percentage of respondents that could adopt digital tools due to receiving financial support from the public or private sector by location. Public sector support is well noted in urban and rural areas, exceeding 90%, but private sector support is low. Considering that fewer companies in rural areas received some form of financial support from the private sector, the data imply that companies in rural areas are

disadvantaged regarding the quantity and quality of accessible financial support from the private sector compared to companies in urban areas.

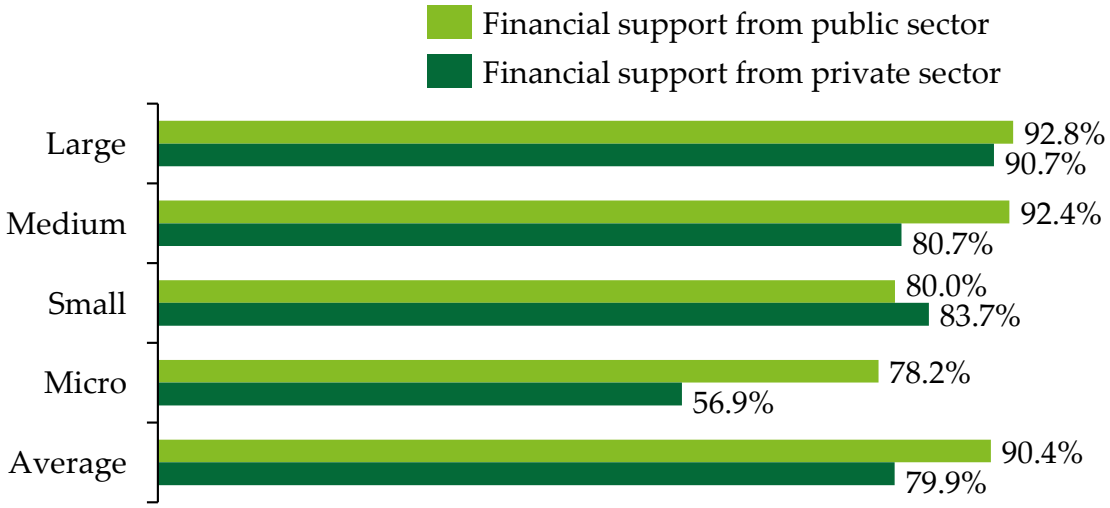
Figure 7.42. Respondents Adopting Digital Tools after Receiving Financial Support by Location
(Web Survey)



Notes: The percentage of each bar is calculated by dividing the total number of respondents that answered 'Yes' by the total questionnaire respondents in each bar. The population of each bar is different, so the limited sample should be noted. (Q33: Were you able to adopt the tools as a result of the support? Q37: Were you able to adopt the tools as a result of the support?)
Source: Authors.

Figure 7.43 shows the percentage of respondents that could adopt digital tools due to receiving financial support from the public or private sector by company size. Public and private sector support are the highest for large companies. Micro companies score the lowest regarding successful implementation after receiving support from both the public and private sectors. Less than 60% of micro companies adopted tools after receiving private support.

Figure 7.43. Respondents Adopting Digital Tools after Receiving Financial Support by Company Size
(Web Survey)

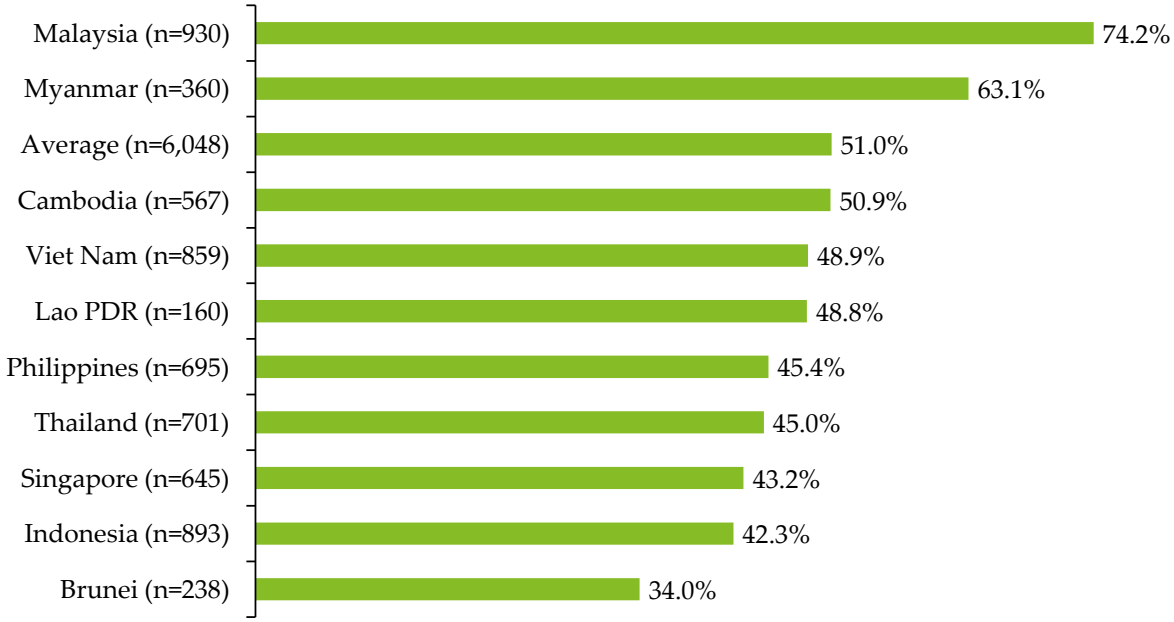


Notes: The percentage of each bar is calculated by dividing the total number of respondents that answered 'Yes' by the total questionnaire respondents in each bar. The population of each bar is different, so the limited sample should be noted. (Q33: Were you able to adopt the tools as a result of the support? Q37: Were you able to adopt the tools as a result of the support?)
Source: Authors.

Both the web and phone surveys showed that one of the issues on which companies expect governments to focus is 'limited funding to invest in digital tools' (51.0% of the web survey and 41.8% of the phone survey). These numbers are the third and first highest, respectively. Figure 7.44 shows the percentage of respondents that answered 'limited funding to invest in digital tools' as an issue that governments should emphasise to encourage digital adoption by country. The scores amongst countries differ significantly, however. In economically advanced Singapore and Brunei Darussalam, the scores are relatively low at 43.2% and 34.0%, respectively. Scores are high in Malaysia, Myanmar, and Cambodia, at 74.2%, 63.1%, and 50.9%, respectively.

Figure 7.44. Respondents Expecting Governments to Emphasise Limited Funding by Country

(Web Survey)



Lao PDR = Lao People's Democratic Republic.

Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Limited funding to invest in digital tools' by the total questionnaire respondents in each bar. (Q39: Which issues of ASEAN companies do you think governments should emphasise to encourage digital adoption?)

Source: Authors.

A company's location and size reflect the access to and quality of financial support. Figures 7.45 and 7.46 show the percentage of respondents that answered 'limited funding to invest in digital tools' as an issue that governments should emphasise to encourage digital adoption by location and company size, respectively. Looking at Figure 7.45, rural companies score higher than urban. The difference by company size is even more pronounced, with large companies at 41.0%, while MSMEs companies barely exceed 50.0%.

Figure 7.45. Respondents Expecting Governments to Emphasise Limited Funding by Location (Web Survey)

Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Limited funding to invest in digital tools' by the total questionnaire respondents in each bar. (Q39: Which issues of ASEAN companies do you think governments should emphasise to encourage digital adoption?)
Source: Authors.

Figure 7.46. Respondents Expecting Governments to Emphasise Limited Funding by Company Size (Web Survey)

Notes: The percentage of each bar is calculated by dividing the total number of respondents that selected 'Limited funding to invest in digital tools' by the total questionnaire respondents in each bar. (Q39: Which issues of ASEAN companies do you think governments should emphasise to encourage digital adoption?)
Source: Authors.

In conclusion, the financial gap stands out as a priority issue within the ASEAN region, ranking second after lack of human resources. The lack of financial resources for MSMEs is widespread, but it is crucial to highlight the need for improved inclusive financial access for rural and smaller companies. When considering support programmes, a disparity between those from the public and private sectors becomes evident, as current schemes fall short in reaching MSMEs through public support. However, it is recognised that with public sector support is a more effective way of implementing digital tools for MSMEs than with private sector support. This result implies that ASEAN should focus on developing a more inclusive financial ecosystem within the region, ensuring it caters to a wide range of MSMEs with sufficient financial resources to bridge the digital divide in the ASEAN region.

4. Conclusion

The analysis reports an overall lack of human resources in encouraging digital tools implementation in the ASEAN region. Regarding the business capability of businessowners, the data do not show a significant impact on ownership type. However, the data show businessowners' characteristics correlate with the implementation of digital tools. One common finding is the performance of micro and small companies led by decision-makers aged 42–57 years, as they consistently exhibit high implementation rates of digital tools. They likely strike a good balance between adaptability and stability, as they are open to embracing new technologies and approaches while possessing the maturity and experience required to implement and to manage digital initiatives within their organisations.

When analysing businessowners' education levels, the data suggest a general trend that the education level of ultimate decision-makers does influence the digitalisation of micro and small companies. Those having businessowners with higher education levels demonstrate a higher implementation rate of digital tools. This result suggests that it is crucial for stakeholders to provide additional support to companies with decision-makers with lower education levels to help them acquire the necessary knowledge and skills to lead their companies towards successful digitalisation efforts. Meanwhile, it is important to recognise that companies with decision-makers having lower education levels can still achieve positive outcomes in digital tools implementation. Indeed, the data show that businessowners with low education levels also have relatively high implementation rates of digital tools. This can be attributed to decision-makers who have acquired necessary knowledge and skills through avenues outside of formal education. They may have also received external assistance or guidance to pursue digital tools effectively.

By acknowledging the diverse pathways to acquiring digital expertise, it becomes evident that formal education alone does not determine the success of digitalisation efforts. The focus should thus be on providing comprehensive support and resources to MSMEs, regardless of the education levels of their decision-makers. This can include access to training programmes, mentorship opportunities, technological resources, and other assistance forms enabling MSMEs to navigate the digital landscape successfully.

The last characteristic of businessowners analysed – sex – does not clearly correlate with digital tools implementation. This shows that various companies' internal and external factors may influence their digitalisation, and the sex of their ultimate decision-makers may not be the sole determinant.

Regarding middle management and regular employees in digital tools implementation, the lack of business and ICT skills makes implementing digital tools difficult. Poor business skills, such as the inability to diagnose an issue that may require digital tools to address and not knowing where to find the information or whom to consult with, were

generally observed in the surveys, regardless of a company's attributes. Amongst micro companies, both difficulties – especially not knowing where to find the information or whom to consult with – were noted more than for other company sizes. These results raise concerns about potential exclusion from economic development and digitalisation efforts.

Private sector support relevant to the lack of business skills was received by companies, but public sector support does not have a wide reach. Smaller companies have the lowest proportion of receiving support. Indeed, a significant difference in access to support exists between large companies and MSMEs, which can be considered a factor causing the digital divide. However, although public sector support is not wide, data show that such business skills-related support is highly effective. The surveys showed that over half of the respondents expect governments to address challenges related to the business skills gap, citing limited human resources to design operation flows after digital transformation or to integrate, and limited human resources with business skills to diagnose and to identify company issues that can be resolved with digital solutions. These figures are only second to those indicating a lack of ICT skills for digital tool implementation. This trend is more significant in rural areas, which can be interpreted as desiring help from governments due to their lack of skills and limited access to current support.

Lack of ICT skills amongst the surveyed companies' human resources is generally observed as the factor causing the pronounced digital divide throughout all digital tool implementation stages: information-gathering, adoption, and post-adoption phases. Those issues are generally shared amongst all countries, regardless of location and company size. While many surveyed companies lack ICT skills, the web and phone surveys revealed that very few have participated in the public sector's ICT skills seminars or training. The percentage of companies participating in those organised by the private sector is higher but still less than 30%. Some may be unable to access information on support due to limited internet access or other factors.

A relatively higher proportion of Indonesian companies have received such support, but still less than 20%. Rural companies have less access than urban ones to digital-related training. Large companies have better access than MSMEs.

The shortage of ICT skills in companies is one of the highest-priority issues to close the digital divide. Focussing on supporting companies in rural areas and MSMEs is crucial, where access to training and support to acquire ICT skills is limited. Additionally, it will be essential to prioritise ICT training and education for regular employees and students to foster the growth of more digitalised companies. Therefore, it is necessary to provide appropriate training and support that cater to the specific needs of each segment.

MSMEs' financial issues are also identified as one of the factors hindering digitalisation, together with the lack of human resources. A significant lack of financial resources is

detected especially in the post-adoption phase, suggesting that the companies are struggling to maintain those tools after the implementation. This trend is shared by all company sizes, but urban companies show a higher rate than rural companies. This can be due to the associated costs of implementing digital tools. While many companies face such challenges, only 10% receive direct or indirect financial support from the public sector. There is relatively more financial assistance available from the private sector, with about 40% of companies receiving some support. Looking at the phone survey, it is notable that both values are less than 10%. Respondents to the phone survey who may not have access to the internet have limited access to financial support information to help them cross the digital divide, which may further widen the digital divide.

The proportion of companies receiving financial support from the public sector is relatively high in Indonesia, exceeding 20%. In contrast, in high-income countries such as Singapore and Brunei Darussalam, the proportion is below the ASEAN average, indicating that the economic level of a country and support from the public sector are not necessarily consistent. Singapore's result may be attributed to the fact that many companies possess sufficient internal budgets.

Regarding company size, the data show that a better financial ecosystem is desired to cover MSMEs regionally. Although support utilisation from the public sector is not high compared with private sector support, the data show a high contribution in implementing digital tools after such public support, while after private support scores lower. This implies that public sector support assists MSMEs to implement digital tools effectively, and the efforts should be enhanced. It should be noted that micro companies score the lowest regarding successful implementation after receiving public and private sector support. Financial support from governments is expected, reflecting the higher need for financial assistance to go digital. Malaysia and Myanmar are leading this demand.

In conclusion, the financial gap stands out as one of the top priority issues within the ASEAN region, ranking second after lack of human resources in the region's quest to adopt digital tools. The lack of financial resources for MSMEs is widespread, but it is crucial to highlight the need for improved inclusive financial access, especially for rural and smaller companies. When considering support programmes, a disparity between the public and private sectors becomes evident, as the current schemes fall short in reaching MSMEs through public sector support. However, public sector support is more effective for implementing digital tools for MSMEs than is private sector support. This result implies that ASEAN should focus on developing a more inclusive financial ecosystem within the region, ensuring it caters to a wide range of MSMEs with sufficient financial resources to bridge the digital divide in the ASEAN region.

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Chapter 8

Analysis of External Factors of Micro, Small, and Medium-Sized Enterprises Causing the Digital Divide

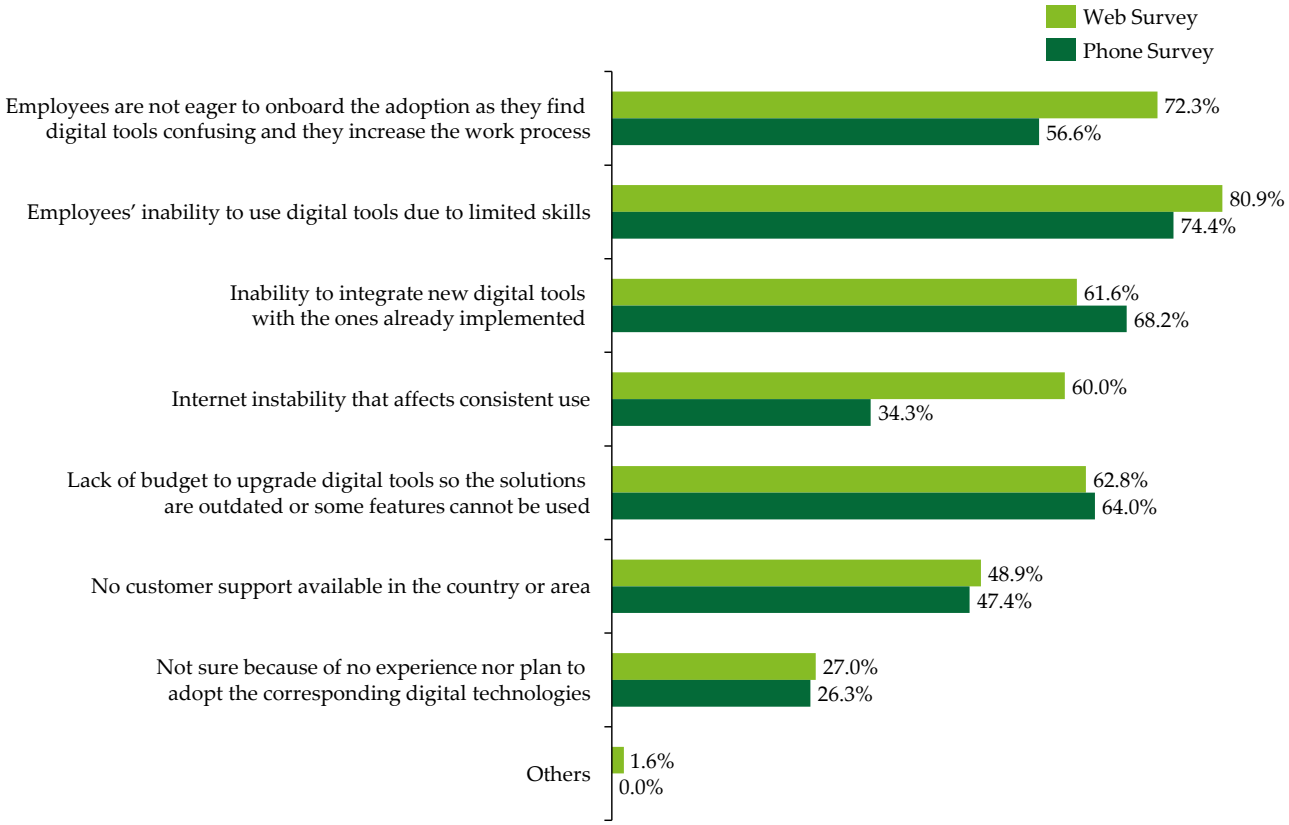
1. Introduction

This chapter analyses external factors of micro, small, and medium-sized enterprises (MSMEs) that are causing the digital divide in the Association of Southeast Asian Nations (ASEAN) region and at what level. These external factors refer to infrastructure, the regional market (e.g. language barriers and lack of localised digital tools), cyberattacks, e-government, microenvironment, and macroenvironment. The analysis is conducted from multiple perspectives of company attributes, including country, location (i.e. urban and rural), and size. It also examines the utilisation of support programmes provided by the public and private sectors to address the factors causing the digital divide and the initiatives to remedy this that companies expect from governments.

2. Infrastructure

Figure 8.1 shows the percentage of respondents that noted each option as a cause of difficulties in the post-adoption phase of digital tools. About 60.0% in the web survey and 34.3% in the phone survey perceived 'internet instability that affects consistent use' as a cause.

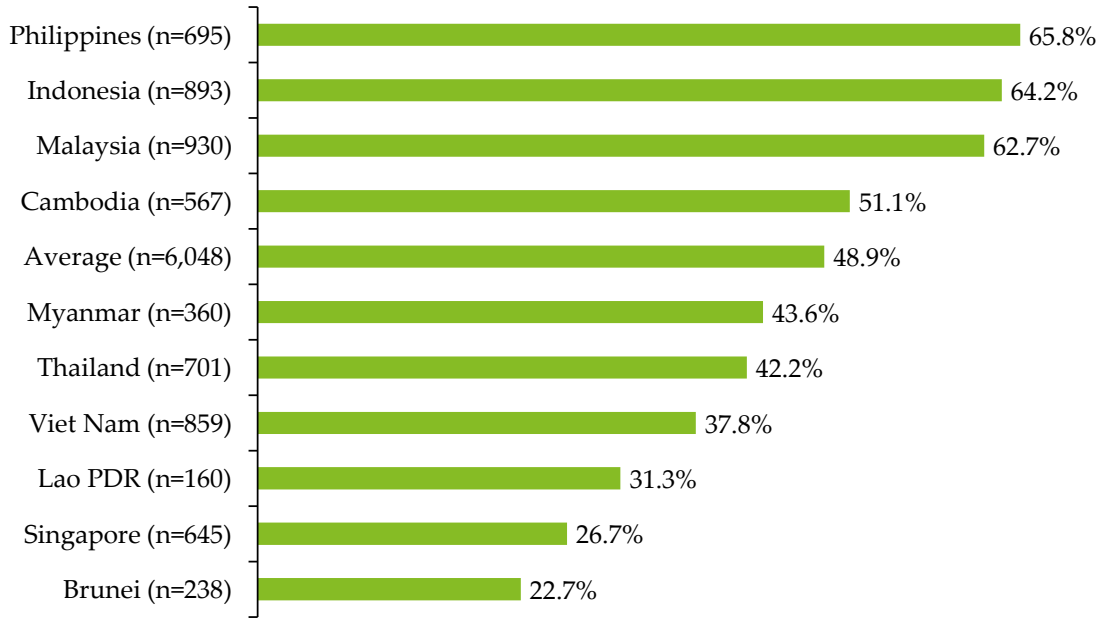
Figure 8.1. Causes of Difficulties in the Post-Adoption Phase



Note: The percentage of each bar is calculated by dividing the total number of respondents of the corresponding bar by the total respondents of the questionnaire. (Q29: What are the causes of difficulties in the post-adoption phase?)
Source: Authors.

Figure 8.2 displays the percentage of respondents that identified 'internet instability that affects consistent use' as a cause of difficulties in the post-adoption phase, categorised by country. The proportion of companies experiencing this challenge varies; the Philippines and Malaysia, which have achieved relatively higher economic growth, and Indonesia, a middle-income country with notable recent economic development driven by digitalisation, score this highly at 65.8%, 64.2%, and 62.7%, respectively. Conversely, countries with advanced economic levels, like Singapore and Brunei Darussalam, score this lower. In Malaysia and Indonesia, where digitalisation has progressed amongst certain companies and communication volume has increased, it is speculated that the lack of adequate infrastructure contributes to a higher proportion of companies citing this in contrast to countries like Cambodia and Myanmar.

Figure 8.2. Respondents Facing Internet Instability by Country (Web Survey)



Lao PDR = Lao People's Democratic Republic.
Note: The percentage of each bar is calculated by dividing the total number of respondents of 'Internet instability that affects consistent use' by the total questionnaire respondents by each bar. (Q29: What are the causes of difficulties in the post-adoption phase?)
Source: Authors.

Figure 8.3 shows the percentage of respondents that answered 'internet instability that affects consistent use' as a cause of difficulties in the post-adoption phase by location. In urban areas, 47.7% of companies perceive this as a cause of difficulties, while in rural areas, this figure rises to 51.8%.

Figure 8.3. Respondents Facing Internet Instability by Location (Web Survey)

Note: The percentage of each bar is calculated by dividing the total number of respondents of 'Internet instability that affects consistent use' by the total questionnaire respondents by each bar. (Q29: What are the causes of difficulties in the post-adoption phase?)
Source: Authors.

Figure 8.4 shows the percentage of respondents that cited 'internet instability that affects consistent use' as a cause of difficulties in the post-adoption phase by company size. Medium-sized companies note this the most – over 50% – while micro companies score

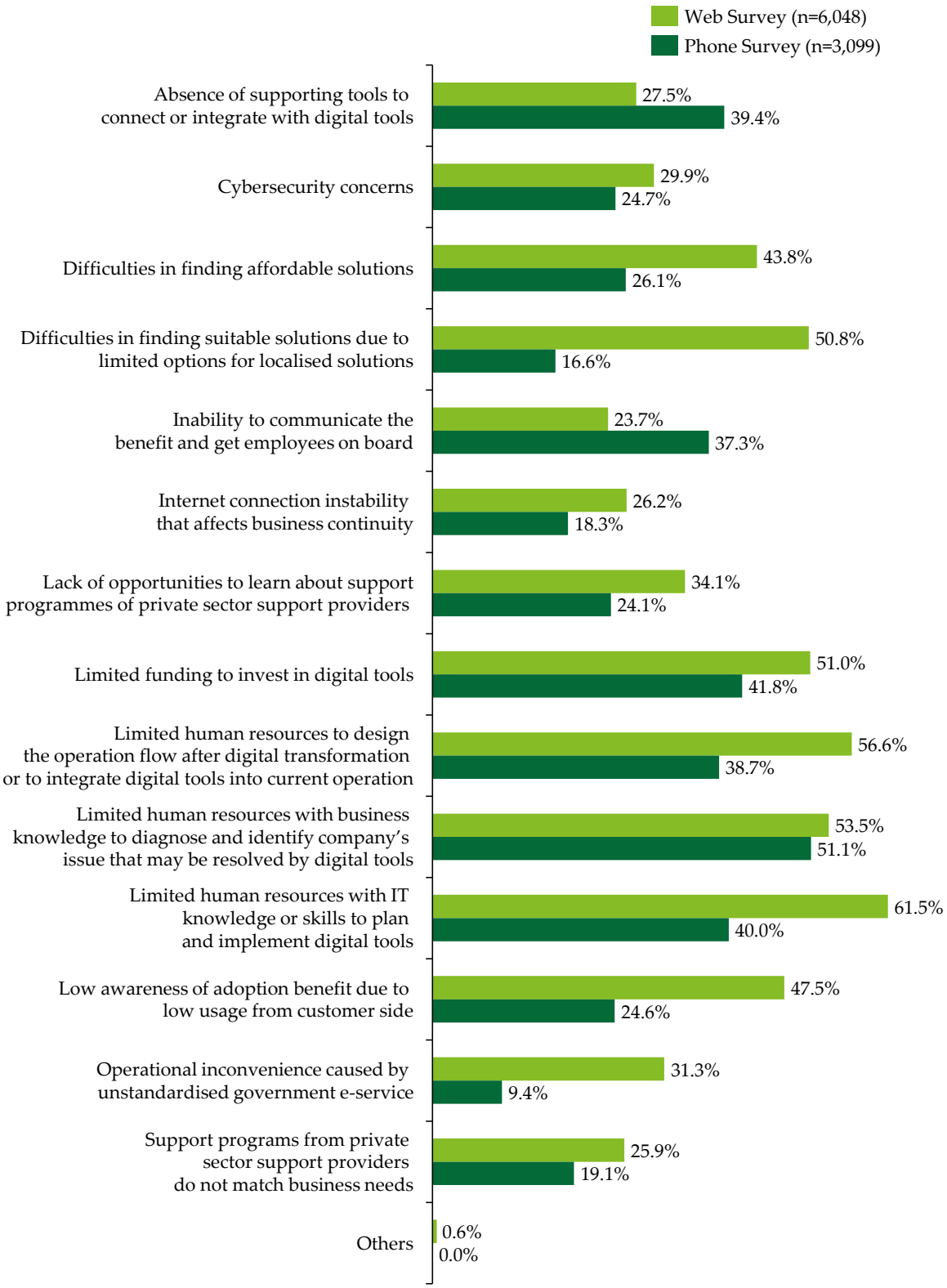
it relatively low. Such companies often have not yet embraced digital utilisation as much as others.

Figure 8.4. Respondents Facing Internet Instability by Company Size (Web Survey)

Note: The percentage of each bar is calculated by dividing the total number of respondents of 'Internet instability that affects consistent use' by the total questionnaire respondents by each bar. (Q29: What are the causes of difficulties in the post-adoption phase?)
Source: Authors.

While more than half of the web survey respondents identified 'internet instability that affects consistent use' as a cause of difficulties in the post-adoption phase of digital tools, 26.2% of web survey and 18.3% of phone survey respondents expected governments to focus on addressing this particular challenge (Figure 8.5). Other challenges – such as a lack of talent involved in digital tool adoption and insufficient funding for implementation – rank higher as issues that governments should address, however, suggesting that many companies face these issues during the adoption phase rather than after the implementation phase.

Figure 8.5. Issues That Governments Should Emphasise to Encourage Digital Adoption



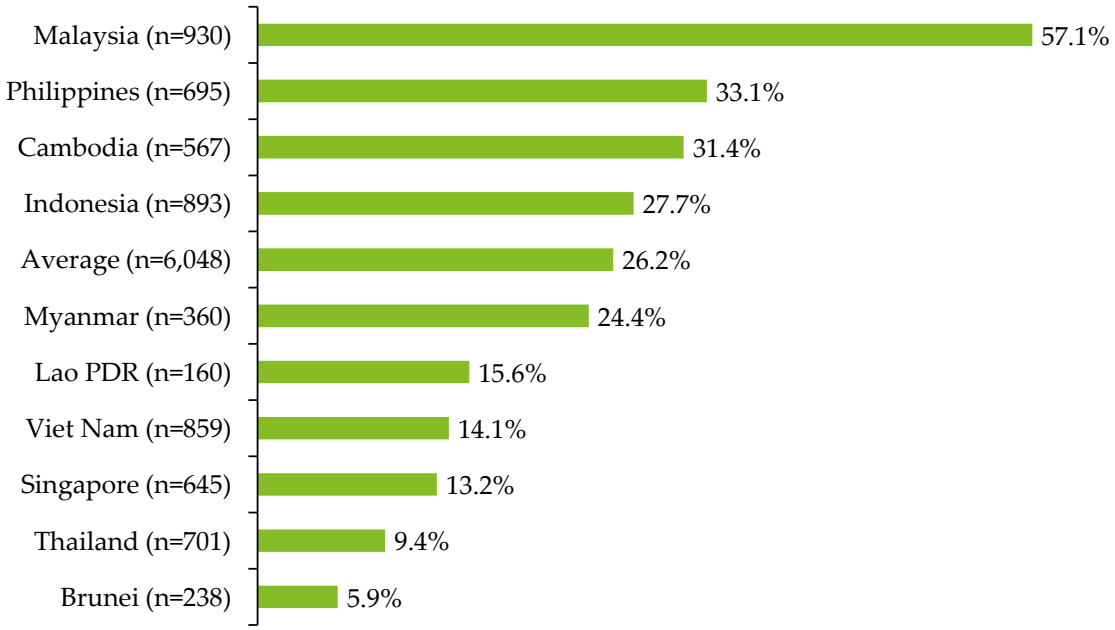
IT = information technology.

Note: The percentage of each bar is calculated by dividing the total number of respondents of the corresponding bar by the total respondents of the questionnaire. (Q39: Which issues of ASEAN companies do you think governments should emphasise to encourage digital adoption?)

Source: Authors.

Figure 8.6 shows the percentage of respondents that noted 'internet connection instability that affects business continuity' as an issue that governments should address to encourage digital adoption by country. It shows a similar trend to the proportion of companies perceiving 'internet instability that affects consistent use' as a cause of difficulties in adopting tools, with Malaysia ranking especially high. It is worth noting that Malaysia generally exhibits a high proportion of companies expecting government attention for various challenges.

Figure 8.6. Respondents Expecting Governments to Emphasise Internet Instability by Country
(Web Survey)



Lao PDR = Lao People's Democratic Republic.
Note: The percentage of each bar is calculated by dividing the total number of respondents of 'Internet instability that affects consistent use' by the total questionnaire respondents by each bar. (Q39: Which issues of ASEAN companies do you think governments should emphasise to encourage digital adoption?)
Source: Authors.

Figures 8.7 and 8.8 show the percentages of respondents that answered 'internet connection instability that affects business continuity' as an issue that governments should address to encourage digital adoption by location and company size. The same trends are observed in both. The data show an almost 10-point difference between urban- and rural-based companies as well as a 5-point difference between small and medium-sized companies and large and micro-sized companies, indicating larger disparities between segments. Companies located in urban areas as well as larger companies may thus believe that they can resolve challenges related to infrastructure through their own efforts or cooperation with the private sector. Yet companies located in rural areas and

small and medium-sized companies have fewer alternatives on which to rely besides governments.

Figure 8.7. Respondents Expecting Governments to Address Internet Instability by Location
(Web Survey)

Note: The percentage of each bar is calculated by dividing the total number of respondents of 'Internet instability that affects consistent use' by the total questionnaire respondents by each bar. (Q39: Which issues of ASEAN companies do you think governments should emphasise to encourage digital adoption?)
Source: Authors.

Figure 8.8. Respondents Expecting Governments to Address Internet Instability by Company Size
(Web Survey)

Note: The percentage of each bar is calculated by dividing the total number of respondents of 'Internet instability that affects consistent use' by the total questionnaire respondents by each bar. (Q39: Which issues of ASEAN companies do you think the government should emphasise to encourage digital adoption?)
Source: Authors.

Improving infrastructure is a significant challenge in addressing the digital divide – as well as inclusive growth – within the ASEAN region. This challenge requires particular attention for countries where digitalisation has progressed to some extent, such as Malaysia and Indonesia, and for small and medium-sized companies or companies located in rural areas with limited alternatives besides governments.

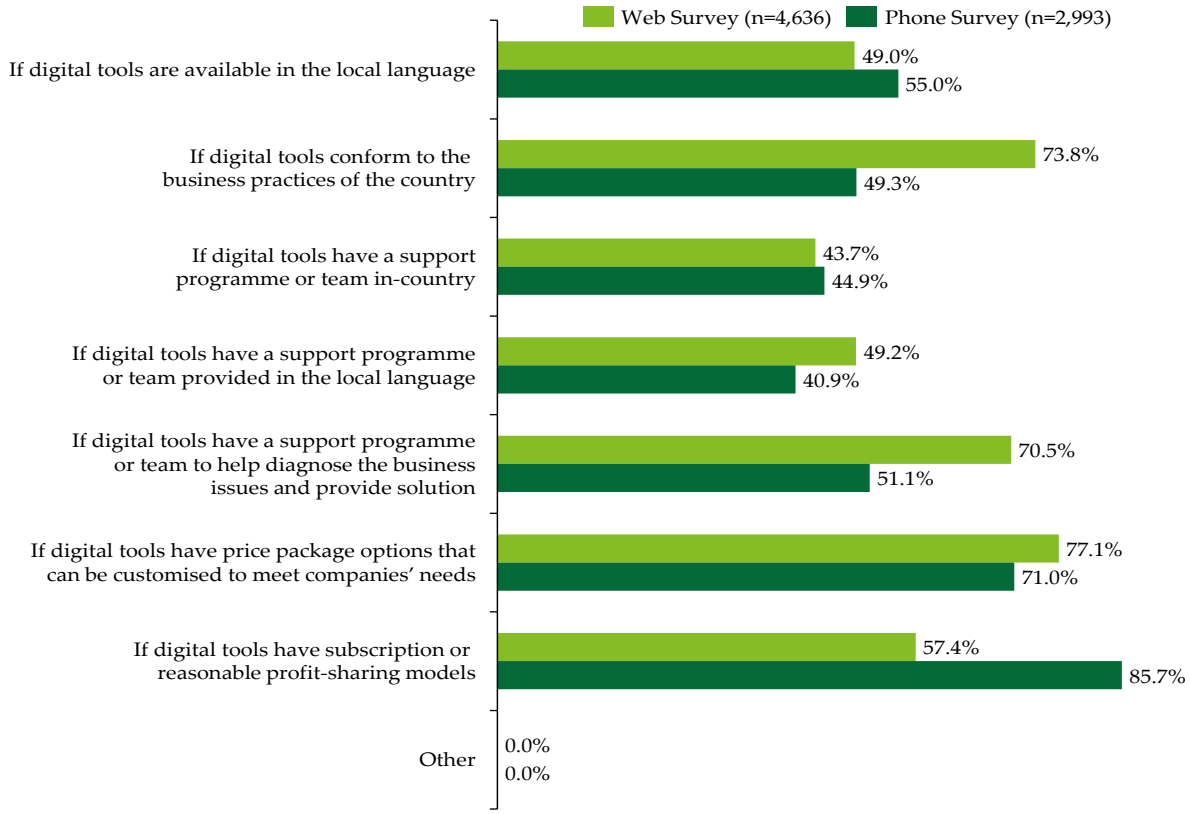
3. The Regional Market

This section focusses on issues regarding the provision of digital tools from companies in the ASEAN market. There are two main challenges – language barriers and lack of localised digital tools – each of which will be discussed in depth.

3.1. Language Barriers

The survey showed that some companies need support in adopting digital tools due to language barriers. Figure 8.9 demonstrates the percentage of respondents – those do not plan to implement digital tools over the next 3 years – that answered each option as an important factor in adopting digital tools. About 49.0% of respondents from the web survey and 55.0% from the phone survey stated that local language availability for products is important. Similarly, 49.2% of web survey and 40.9% of phone survey respondents stated that support programmes in the local language are important. Although language barriers are not the most significant, a certain number of companies do consider them obstacles.

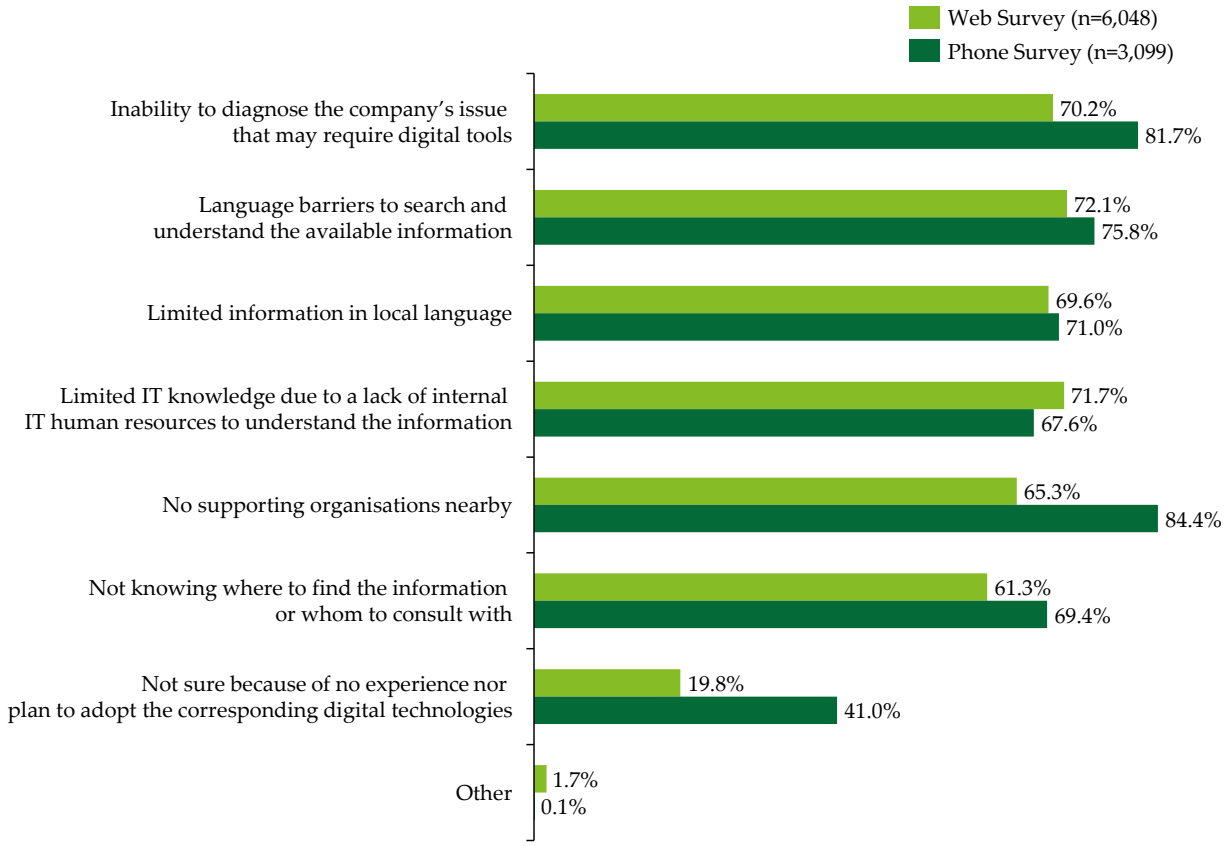
Figure 8.9. Important Factors When Adopting Digital Tools



Note: The percentage of each bar is calculated by dividing the total number of respondents of the corresponding bar by the total number of respondents that chose 'without implementation plan within the next 3 years' to at least one of the tools asked in Q23. (Q26: Please answer the following question regarding the tools selected as 'without implementation plan within the next 3 years' in Q23: Which factor(s) do you consider important when adopting digital tools?)
Source: Authors.

Figure 8.10 shows the percentage of respondents that cited each option as a cause of difficulties in the information-gathering phase of digital tool adoption. The web survey revealed that language is a major issue during the information-gathering phase, with 72.1% noting 'language barriers to search and understand the available information' and 69.6% noting 'limited information in local language'. The phone survey results showed a similar trend but with higher numbers.

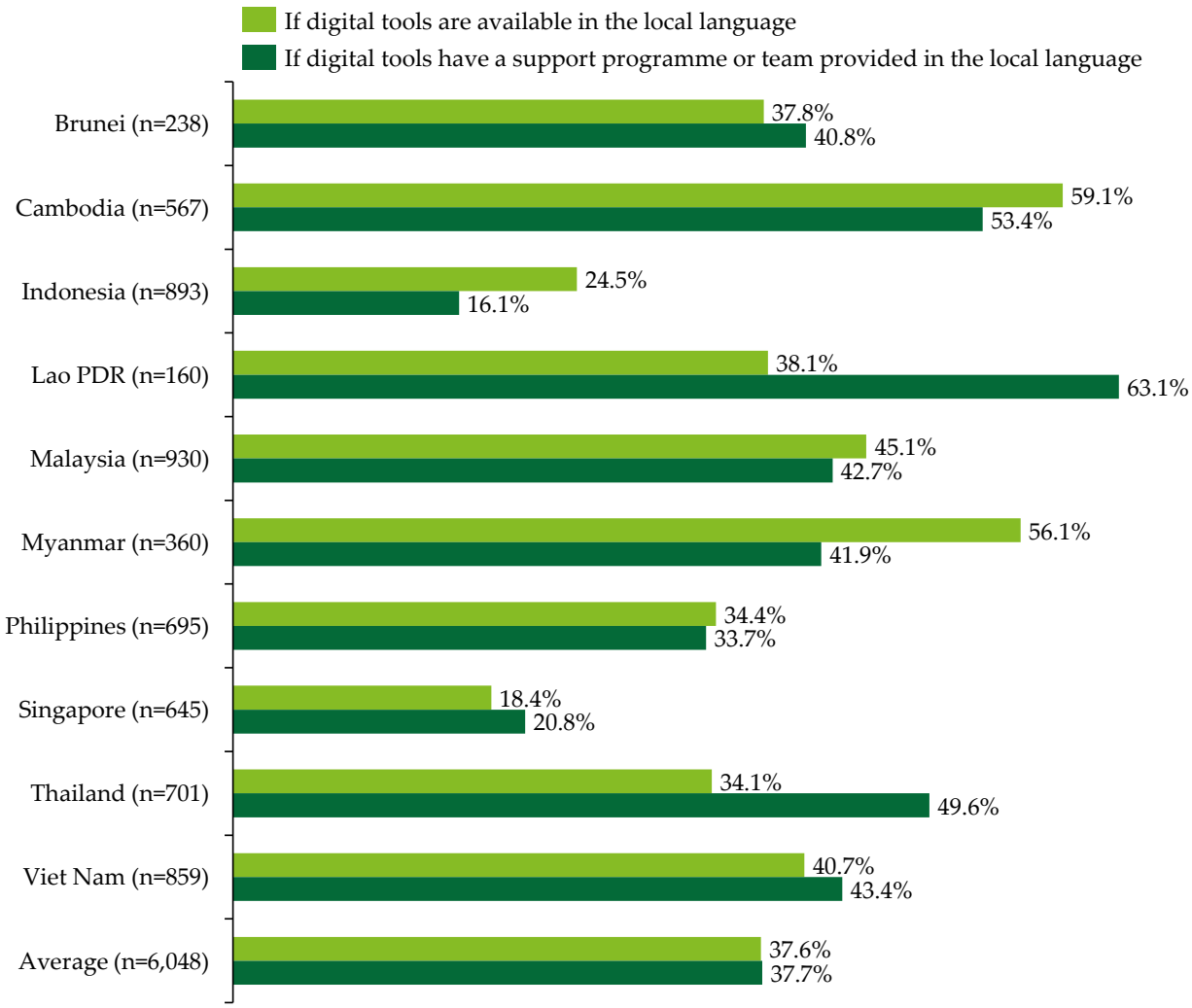
Figure 8.10. Causes of Difficulties in the Information-Gathering Phase



IT = information technology.
Note: The percentage of each bar is calculated by dividing the total number of respondents of the corresponding bar by the total respondents of the questionnaire. (Q27: What are the causes of difficulties in the information-gathering phase?)
Source: Authors.

Figure 8.11 shows that language barriers mainly occur in relatively lower-income countries. Cambodia has the most concern about local language availability in digital tools (59.1%) and the Lao People's Democratic Republic (Lao PDR) about the availability of support programme in the local language for digital tools (63.1%). In contrast, Singapore, a high-income country, and Indonesia, the largest economy in ASEAN, show that relatively few companies note these issues.

Figure 8.11. Respondents Considering Local Language Availability as an Important Factor in Adopting Digital Tools by Country (Web Survey)

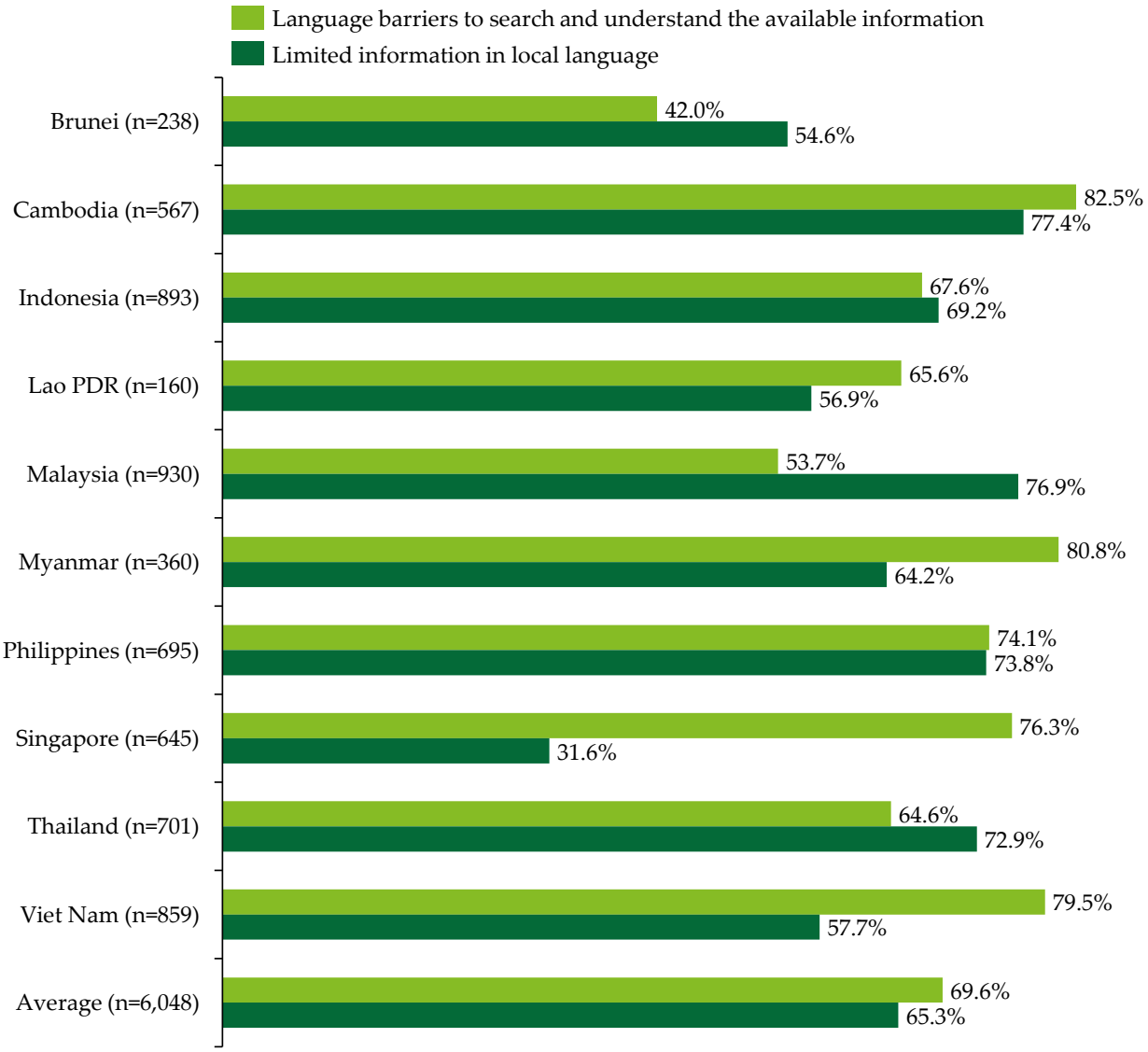


Lao PDR = Lao People's Democratic Republic.
Note: The percentage of the country's share is calculated by dividing the total number of responses for each answer option by the total of respondents to the questionnaire of each country. (Q26: Please answer the following question regarding the tools selected as 'without implementation plan within the next 3 years' in Q23: Which factor(s) do you consider important when adopting digital tools? [MULTIPLE CHOICE: choose all options that apply]: if digital tools are available in the local language and if the digital tools have a support programme or team provided in the local language.])
Source: Authors.

Language concerns during the information-gathering phase also primarily arise in low-income countries. Cambodia exhibits the highest level of concern regarding language barriers in searching for and understanding available information (82.5%). Interestingly, Malaysia, where English is a semi-official language, has the highest proportion of companies facing limited information in the local language (76.9%). Considering the relatively low proportion of Malaysian companies experiencing language barriers in

searching for and understanding available information, it appears that the actual process of information gathering is not a major challenge compared to countries like Cambodia, where information in the local language may be limited while the information in English is more accessible.

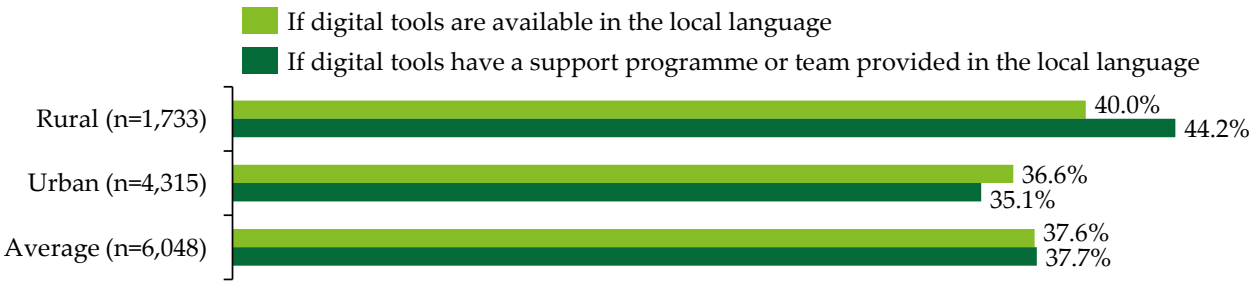
Figure 8.12. Respondents Facing Language Barriers as a Cause of Difficulty in the Information-Gathering Phase by Country
(Web Survey)



IT = information technology, Lao PDR = Lao People's Democratic Republic.
Note: The percentage of the country's share is calculated by dividing the total number of responses for each answer option by the total of respondents to the questionnaire in each country. (Q27: Please answer the following questions based on your past implementation or current plans to implement IT tools. If none apply to you, please answer the questions assuming you will implement IT tools. What are the causes of difficulties in the information-gathering phase? [MULTIPLE CHOICE: choose all options that apply]: Language barriers to search and understand the available information, and Limited information in local language])
Source: Authors.

Figure 8.13 shows that companies in rural areas have more concerns about language barriers. Many companies located in rural areas note that a digital tool's availability in the local language (40.0%) and support programme provided in the local language (44.2%) are important.

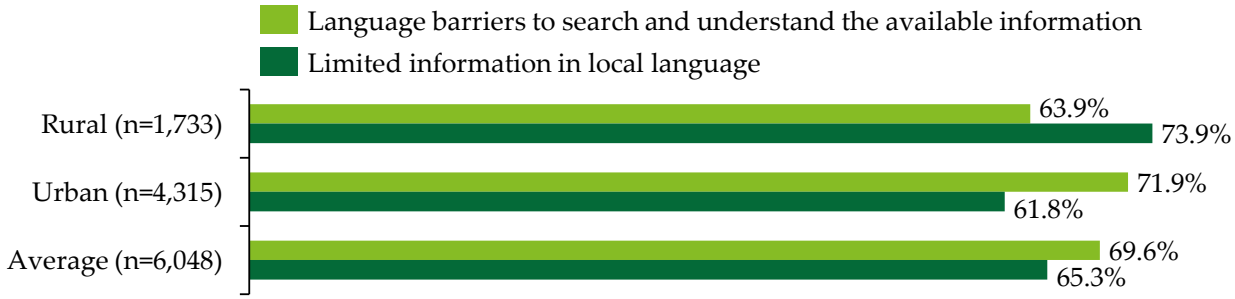
Figure 8.13. Respondents Considering Local Language Availability as an Important Factor in Adopting Digital Tools by Location
(Web Survey)



Note: The percentage of the country's share is calculated by dividing the total number of responses for each answer option by the total of respondents to the questionnaire in each country. (Q26: Please answer the following question regarding the tools selected as 'without implementation plan within the next 3 years' in Q23: Which factor(s) do you consider important when adopting digital tools?)
Source: Authors.

Figure 8.14 shows the percentage of respondents that cited language-related issues as causes of difficulties during the information-gathering phase by location. Companies in rural areas note higher percentages of limited information in the local language, and those in urban areas note language barriers to searching and understanding the available information. As both causes were noted by 70% of respondents, many companies do feel language barriers in the information-gathering phase, regardless of location.

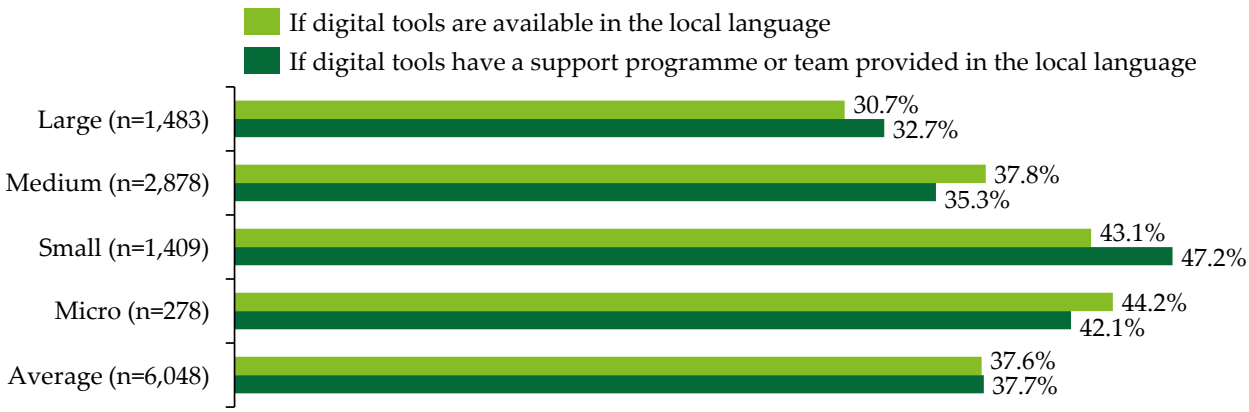
Figure 8.14. Respondents Facing a Language Barrier as Cause of Difficulty in the Information-Gathering Phase by Location
(Web Survey)



IT = information technology.
Note: The percentage of the country's share is calculated by dividing the total number of responses for each answer option by the total of respondents to the questionnaire in each country. (Q27: Please answer the following questions based on your past implementation or current plans to implement IT tools. If none apply to you, please answer the questions assuming you will implement IT tools. What are the causes of difficulties in the information-gathering phase?)
Source: Authors.

Figure 8.15 shows the percentage of respondents that cited language-related issues as an important factor in adopting digital tools by company size. The smaller the company's size, the more companies mentioned language issues. Indeed, larger companies often have more English-speaking personnel and are generally more comfortable using English in their operations.

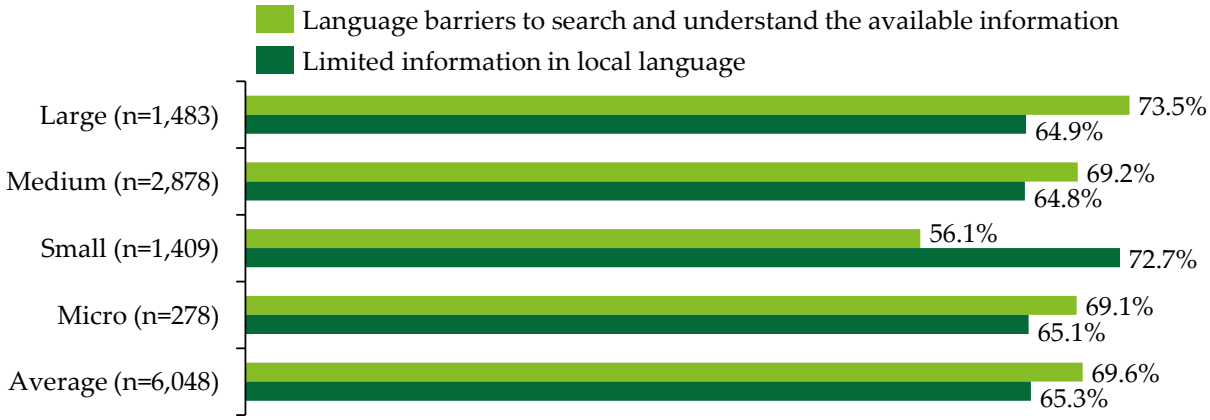
Figure 8.15. Respondents Considering Local Language Availability as an Important Factor in Adopting Digital Tools by Company Size
(Web Survey)



Note: The percentage of the country's share is calculated by dividing the total number of responses for each answer option by the total of respondents to the questionnaire in each country. (Q26: Please answer the following question regarding the tools selected as 'without implementation plan within the next 3 years' in Q23: Which factor(s) do you consider important when adopting digital tools?)
Source: Authors.

Figure 8.16 shows the percentage of respondents that name language-related issues as causes of difficulties during the information-gathering phase by company size. Many companies, regardless of size, face language barriers.

Figure 8.16. Respondents Facing a Language Barrier as a Cause of Difficulty in the Information-Gathering Phase by Company Size
(Web Survey)



Note: The percentage of the location's share is calculated by dividing the total number of responses for each answer option by firm size divided by the total respondents of the questionnaire. (Q27: What are the causes of difficulties in the information-gathering phase? [MULTIPLE CHOICE: Language barriers to search and understand the available information, and Limited information in local language])
Source: Authors.

From the survey results, it can be concluded that the availability of local languages – both for using digital tools and information gathering – is a concern to a certain extent for many MSMEs. This survey finding is aligned with the finding from the desktop research, as MSMEs face difficulties using digital tools, considering that most of the tools and some associated information are only available in English. One of the key challenges in closing the digital divide in ASEAN will be resolving these language barriers.

3.2. Lack of Localised Digital Tools

Based on survey findings, some concerns from MSMEs regarding the need for more localised digital tools were observed. As Figure 8.9 shows, regarding the factors for adopting digital tools within the next 3 years, localisation is considered a middle-level factor for both web (56.6%) and phone (47.6%) survey respondents. Additionally, as Figure 8.5 illustrates, the web survey showed the need for localisation as a potential contributor to promoting digital adoption in MSMEs through related efforts. Specifically, 50.8% of respondents from the web survey identified difficulties in finding suitable solutions due to limited options for localised solutions. The phone survey yielded a lower proportion of respondents that considered this issue one that governments should help address.

From the survey results, it can be concluded that localised digital tools are required for companies currently without an implementation plan or those that have implemented digitalisation tools. Digital tools should be aligned with a country's business practices, and local solution providers should be available to provide necessary support in using these digital tools. These findings are aligned with the interview survey results.

Regarding the availability of functions or features from global solutions providers, some need to be more suited to local needs. Other findings regarding the availability of local solution providers indicate that some overseas solutions require more local services to visit MSMEs and to provide on-site support and timely assistance.

From the perspective of MSMEs regarding required support from governments to encourage digital adoption, difficulties in finding solutions due to limited options for localised solutions emphasise the need for localised digital tools. This survey finding is aligned with the interview survey. Based on the interview survey, localising language and features are keys to encouraging digital tool adoption in MSMEs. From the government's side, providing indirect support to MSMEs in collaboration with global solutions providers and enforcing laws and policies can help promote the localisation of solutions.

4. Cyberattacks

As mentioned in the *ASEAN Digital Masterplan 2025*, cybersecurity is an issue for companies during digital tool implementation (ASEAN, 2021). Furthermore, 31% of MSMEs perceive cybersecurity and data privacy issues as obstacles to adopting digital tools (JETRO, 2020).

Table 8.1 presents the stages of consideration for implementing cybersecurity or protection software amongst surveyed companies. The web survey revealed that 49.5% of companies already implemented such measures. Additionally, 16.3% of companies plan to implement cybersecurity software within the next 3 years, including pilot implementation. However, 34.2% of companies do not have any implementation plans.

Adopting cybersecurity tools is closely linked to company size, with larger companies having higher adoption rates. This can be attributed to the complexity of their operations and larger volume of online systems and data that they handle. Based on the web survey, 22.7% of micro companies and 32.6% of small companies implemented cybersecurity or protection software. In comparison, the adoption rates are significantly higher for medium-sized (52.7%) and large companies (64.3%). The phone survey showed slightly higher implementation percentages for micro (47.2%) and small companies (52.2%) than the web survey.

Table 8.1. Companies' Stage of Implementing Cybersecurity or Protection Software

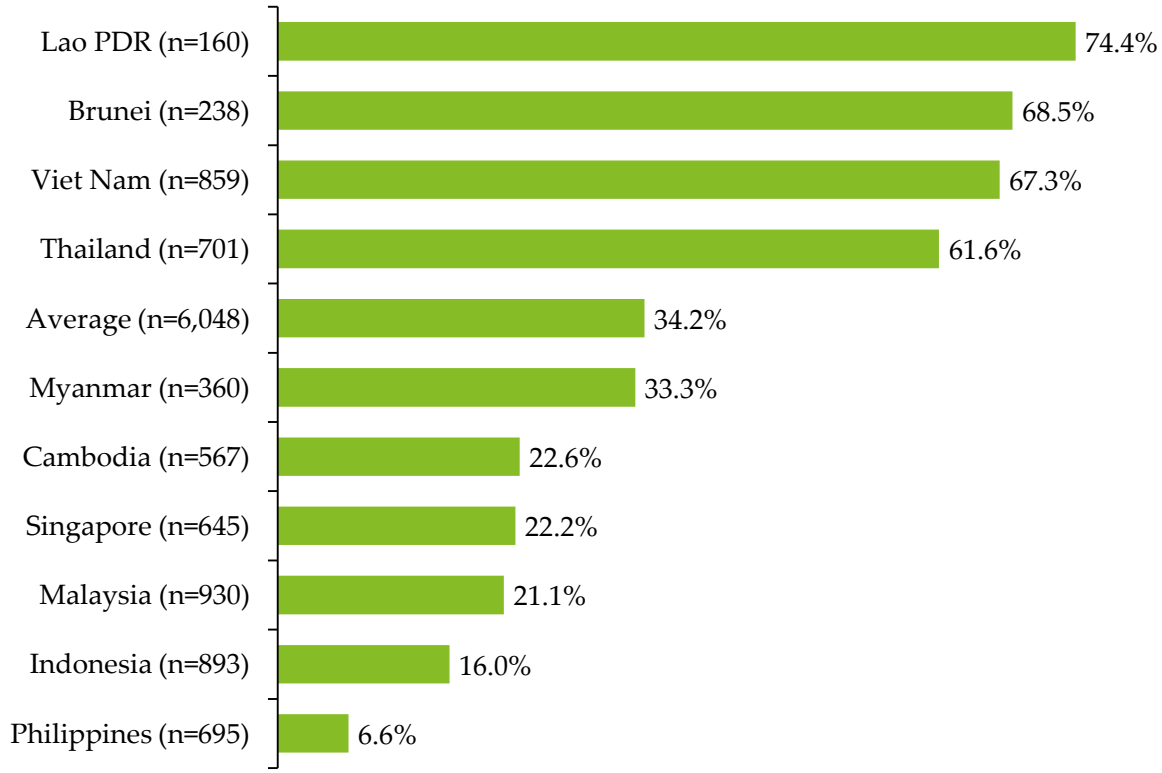
Stage of Implementation	Web Survey					Phone Survey		
	Total (n = 6,048)	Micro (n = 278)	Small (n = 1,409)	Medium (n = 2,878)	Large (n = 1,483)	Total (n = 3,099)	Micro (n = 677)	Small (n = 2,422)
Already implemented (pre-, during, or post-pandemic)	2,992 (49.5%)	63 (22.7%)	459 (32.6%)	1,516 (52.7%)	954 (64.3%)	1,585 (51.1%)	320 (47.3%)	1,265 (52.2%)
Plan to implement in the next 3 years (including pilot implementation)	988 (16.3%)	75 (27.0%)	237 (16.8%)	435 (15.1%)	241 (16.3%)	654 (21.1%)	113 (16.7%)	541 (22.3%)
No plan to implement within the next 3 years	2,068 (34.2%)	140 (50.4%)	713 (50.6%)	927 (32.2%)	288 (19.4%)	860 (27.8%)	244 (36.0%)	616 (25.4%)

Note: The percentage for each row is calculated by dividing the number of respondents selecting the answer option in the corresponding row by the relevant total population (n) in each column. (Q23: Which stage of consideration is your company in for each of the tools?)
Source: Authors.

It is concerning that a significant proportion of micro and small companies have yet to implement cybersecurity and protection software. Additionally, 50.4% of micro and 50.6% of small companies, according to the web survey, have no plans to implement such tools within the next 3 years. This exposes their businesses to cyber risks and attacks, considering the increasing complexity of the digital landscape. These findings align with other surveys and studies noting the lack of cybersecurity measures amongst micro and small companies. About 43% of cyberattacks have targeted MSMEs, while only 14% of them have adequate countermeasures (Steinberg, 2019). Over 66% of ultimate decision-makers in MSMEs believe that their businesses will not be targeted (Lurey, 2019).

Figure 8.17 illustrates countries with the most companies that do not plan to implement cybersecurity tools in the next 3 years – Lao PDR, Brunei Darussalam, Viet Nam, and Thailand. This finding aligns with insights from qualitative interviews conducted by the project team with local solution providers in Thailand and Cambodia, highlighting the need to raise awareness about cyberattacks in these countries.

Figure 8.17. Companies without Plans to Implement Cybersecurity or Protection Software in the Next 3 Years by Country
(Web Survey)



Lao PDR = Lao People's Democratic Republic.
Note: The percentage for each bar is calculated by dividing the number of respondents selecting the answer option 'No plan to implement within the next 3 years' for cybersecurity or protection software of each company size in each country by the total respondents selecting that answer option of each country. (Q23: Which stage of consideration is your company in for each of the tools?)
Source: Authors.

Additionally, based on interviews with solution providers in Thailand and Malaysia, MSMEs face budget constraints. The limited availability of financial resources makes it challenging for MSMEs to prioritise cybersecurity initiatives, underscoring the importance of addressing budgetary limitations and raising awareness to support cybersecurity efforts amongst MSMEs.

Table 8.2 reveals that in the web survey, cybersecurity was noted as an issue that governments should emphasise by 29.9% of companies to encourage digital tool adoption. However, it ranks 10 out of 14 options, indicating that cybersecurity is not a major concern for most. When focussing on micro and small companies in the web survey, only 14.7% of micro and 24.7% of small companies consider cybersecurity an issue that governments should emphasise. The phone survey painted a similar picture, with 28.2% of micro and 23.7% of small companies considering the same.

This lower prioritisation of cybersecurity by micro and small companies can be understood due to their more pressing challenges, such as information and communications technology (ICT) skills gaps, limited business knowledge, and financial constraints. Moreover, as these companies typically have low adoption rates of digital tools, they may perceive fewer risks in terms of cybersecurity.

Table 8.2. Issues That Governments Should Emphasise to Encourage Digital Adoption

Issue	Web Survey					Phone Survey		
	Total (n = 6,048)	Micro (n = 278)	Small (n = 1,409)	Medium (n = 2,878)	Large (n = 1,483)	Total (n = 3,099)	Micro (n = 677)	Small (n = 2,422)
Limited human resources with IT knowledge or skills to plan and to implement digital tools	3,719 (61.5%)	138 (49.6%)	878 (62.3%)	1,899 (66.0%)	804 (54.2%)	1,239 (40.0%)	282 (41.7%)	957 (39.5%)
Limited human resources to design the operation flow after digital transformation or to integrate digital tools into current operation	3,421 (56.6%)	132 (47.5%)	860 (61.0%)	1,631 (56.7%)	798 (53.8%)	1,198 (38.7%)	230 (34.0%)	968 (40.0%)
Limited human resources with business knowledge to diagnose and to identify company issues that may be resolved by digital tools	3,237 (53.5%)	167 (60.1%)	670 (47.6%)	1,611 (56.0%)	789 (53.2%)	1,585 (51.1%)	375 (55.4%)	1210 (50.0%)
Limited funding to invest in digital tools	3,085 (51.0%)	141 (50.7%)	771 (54.7%)	1,565 (54.4%)	608 (41.0%)	1,295 (41.8%)	303 (44.8%)	992 (41.0%)
Absence of supporting tools to connect or to integrate with digital tools	1,664 (27.5%)	70 (25.2%)	407 (28.9%)	730 (25.4%)	457 (30.8%)	1,222 (39.4%)	239 (35.3%)	983 (40.6%)
Inability to communicate the benefit and to get employees on board	1,436 (23.7%)	63 (22.7%)	310 (22.0%)	674 (23.4%)	389 (26.2%)	1,157 (37.3%)	283 (41.8%)	874 (36.1%)

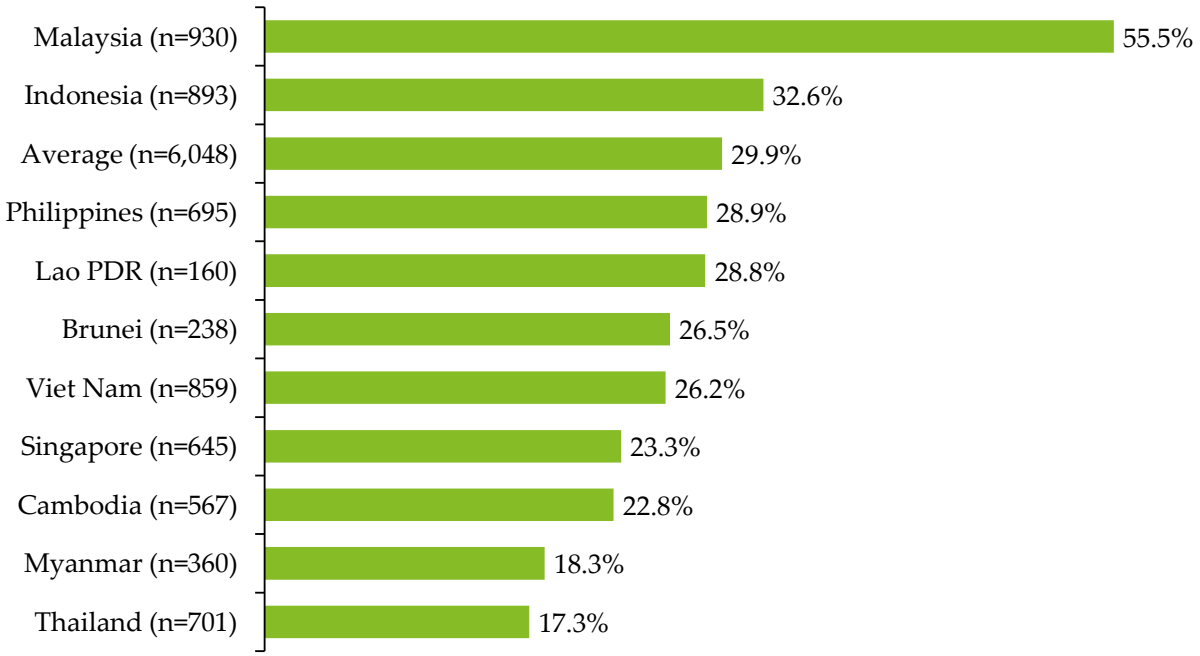
Issue	Web Survey					Phone Survey		
	Total (n = 6,048)	Micro (n = 278)	Small (n = 1,409)	Medium (n = 2,878)	Large (n = 1,483)	Total (n = 3,099)	Micro (n = 677)	Small (n = 2,422)
Difficulties in finding suitable solutions due to limited options for localised solutions	3,071 (50.8%)	153 (55.0%)	709 (50.3%)	1,467 (51.0%)	742 (50.0%)	514 (16.6%)	124 (18.3%)	390 (16.1%)
Low awareness of adoption benefit due to low customer usage	2,874 (47.5%)	90 (32.4%)	761 (54.0%)	1,364 (47.4%)	659 (44.4%)	763 (24.6%)	230 (34.0%)	533 (22.0%)
Difficulties in finding affordable solutions	2,647 (43.8%)	143 (51.4%)	643 (45.6%)	1,276 (44.3%)	585 (39.4%)	809 (26.1%)	200 (29.5%)	609 (25.1%)
Lack of opportunities to learn about support programmes of private sector support providers	2,060 (34.1%)	140 (50.4%)	530 (37.6%)	922 (32.0%)	468 (31.6%)	747 (24.1%)	183 (27.0%)	564 (23.3%)
Operational inconvenience caused by unstandardised government e-service	1,895 (31.3%)	45 (16.2%)	436 (30.9%)	905 (31.4%)	509 (34.3%)	291 (9.4%)	38 (5.6%)	253 (10.4%)
Cybersecurity concerns	1,808 (29.9%)	41 (14.7%)	348 (24.7%)	975 (33.9%)	444 (29.9%)	764 (24.7%)	191 (28.2%)	573 (23.7%)
Internet connection instability that affects business continuity	1,585 (26.2%)	46 (16.5%)	375 (26.6%)	852 (29.6%)	312 (21.0%)	567 (18.3%)	120 (17.7%)	447 (18.5%)

Issue	Web Survey					Phone Survey		
	Total (n = 6,048)	Micro (n = 278)	Small (n = 1,409)	Medium (n = 2,878)	Large (n = 1,483)	Total (n = 3,099)	Micro (n = 677)	Small (n = 2,422)
Support programmes from private sector support providers do not match business needs	1,565 (25.9%)	34 (12.2%)	297 (21.1%)	861 (29.9%)	373 (25.2%)	592 (19.1%)	129 (19.1%)	463 (19.1%)
Others	38 (0.6%)	3 (1.1%)	3 (0.2%)	21 (0.7%)	11 (0.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)

Note: The percentage for each row is calculated by dividing the number of respondents selecting the answer option in the corresponding row in the web survey and phone survey by the total of respondents in the corresponding column. (Q39: Which issues of ASEAN companies do you think governments should emphasise to encourage digital adoption?)
Source: Authors.

Figure 8.18 provides a country-wise breakdown of respondents who selected 'cybersecurity concerns' as an issue that governments should address regarding digital tool adoption. Malaysia stands out with 55.5% of companies noting this, followed by Indonesia at 32.6%. The high rate in Malaysia indicates a significant level of cybersecurity awareness; indeed, around 84.0% of MSMEs in Malaysia have encountered cyberthreats, with approximately 76.0% facing multiple attacks (Malaysia Digital Economy Corporation, 2022).

Figure 8.18. Distribution of Responses for 'Cybersecurity Concerns' by Country (Web Survey)



Lao PDR = Lao People's Democratic Republic.
Note: The percentage for each bar is calculated by dividing the number of respondents selecting the answer option 'cybersecurity concerns' in each country by the total number of respondents from each country. (Q39: Which issues of ASEAN companies do you think governments should emphasise to encourage digital adoption?)
Source: Authors.

Moreover, companies seeking government help concerning cybersecurity are predominantly concentrated in rural areas. Companies located in urban areas generally have better access to information and, therefore, can acquire cybersecurity information and to take measures independently.

Figure 8.19. Distribution of Responses for 'Cybersecurity Concerns' by Location (Web Survey)

Note: The percentage for each bar is calculated by dividing the number of respondents selecting the answer option 'cybersecurity concerns' in each location by the total number of respondents from each location. (Q39: Which issues of ASEAN companies do you think governments should emphasise to encourage digital adoption?)
Source: Authors.

It is important to recognise that cybersecurity is an inevitable risk that businesses will face as they continue to advance in their digitalisation efforts. Ignoring or underestimating the importance of cybersecurity can leave companies vulnerable to various threats and potential disruptions in their digital journeys. Therefore, governments must include cybersecurity concerns in their digital tool adoption agendas. This proactive approach will help prevent potential risks, address hesitancy, and fully enable micro and small companies to leverage digital tools' benefits. A comprehensive regional programme can be developed to mitigate cybersecurity threats across ASEAN further. This programme could involve regional funding and capacity development initiatives supporting MSMEs.

5. E-Government

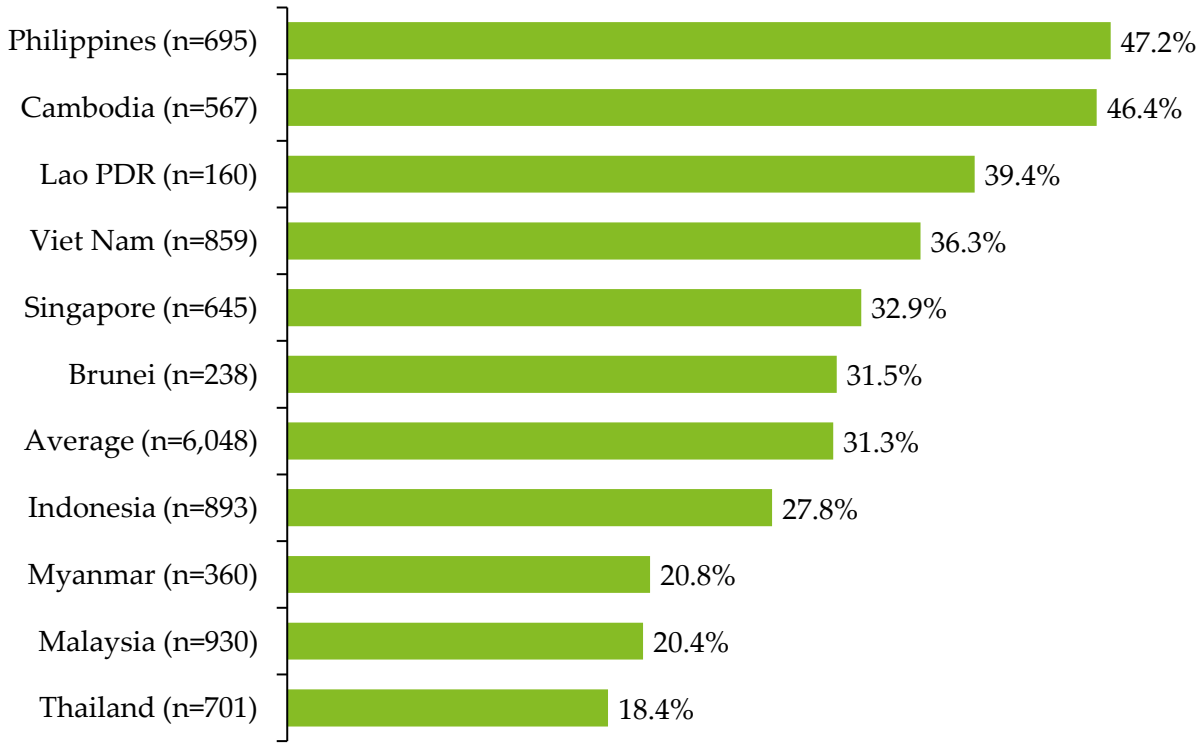
As stated in the *ASEAN Digital Masterplan 2025*, governments play a crucial role in ensuring digital services are accessible to all citizens, thereby removing a significant barrier to digital inclusion (ASEAN, 2021). As Table 8.2 shows, 3% of the respondents to the web survey considered the 'operational inconvenience caused by unstandardised government e-service' as an issue on which governments should focus. However, this concern ranks 9 out of 14 options, indicating that it is not a significant priority for most. The low priority of e-government services is particularly evident among micro and small companies, at 16.2% and 30.9%, respectively. Phone survey data showed this as having the lowest score of the answer options.

This lower prioritisation can be attributed to more urgent challenges that micro and small companies face, such as lack of business knowledge, poor ICT skills, and financial gaps. However, optimising the delivery of public services through digital platforms is essential for streamlining processes, improving efficiency, and enhancing citizen engagement. Governments can begin this process incrementally, as suggested by the findings from qualitative interviews with logistics MSMEs in Viet Nam, where standardising processes and documents before implementing e-government services was highlighted as

necessary (ASEAN, 2021). By addressing these challenges and gradually enhancing e-government services, governments can lay the groundwork for broader digitalisation initiatives across industries.

Figure 8.20 provides the country breakdown of respondents who express concern about the 'operational inconvenience caused by unstandardised government e-service'. The countries with the highest levels of anxiety are the Philippines, Cambodia, Lao PDR, and Viet Nam, with 47.2%, 46.4%, 39.4%, and 36.3% of companies noting this, respectively. The Philippines ranks 89, Cambodia 127, Lao PDR 159, and Viet Nam 86 in digital government, which reflect a country's readiness and institutional capacity to utilise ICT to fulfil public obligations (UN, 2022). Both national governments and ASEAN should consider these concerns and further enhance their initiatives to meet the expectations of businesses and citizens.

Figure 8.20. Distribution of Responses for 'Operational Inconvenience Caused by Unstandardised Government E-Service' by Country
(Web Survey)



Lao PDR = Lao People's Democratic Republic.
Note: The percentage for each bar is calculated by dividing the number of respondents selecting the answer option 'Operational inconvenience caused by unstandardised government e-service' in each country by the total number of respondents from each country. (Q39: Which issues of ASEAN companies do you think governments should emphasise to encourage digital adoption?)
Source: Authors.

The need for improved e-government initiatives is viewed as relatively equal amongst companies in urban (31.8%) and rural areas (30.2%). However, governments need to consider the unique needs and challenges faced by both urban and rural areas when developing and implementing e-government initiatives. By doing so, they can ensure that all companies, regardless of location, have equal access to government services and can benefit from the advantages of digital governance.

Figure 8.21. Distribution of Responses for 'Operational Inconvenience Caused by Unstandardised Government E-Service' by Location (Web Survey)

Note: The percentage for each bar is calculated by dividing the number of respondents selecting the answer option 'operational inconvenience caused by unstandardised government e-service' in each location by the total number of respondents from each location. (Q39: Which issues of ASEAN companies do you think governments should emphasise to encourage digital adoption?)
Source: Authors.

While e-government may not be the top priority for companies in ASEAN, it is still crucial for governments to continue improving their e-government measures to create a favourable ecosystem that encourages the widespread adoption of digital technologies amongst companies in the region.

6. Microenvironment

The micro business environment encompasses the factors or components within a company's immediate surroundings that impact its performance and decision-making processes, such as suppliers, competitors, marketing intermediaries, customers, and the public.[1] This section aims to explore the correlation between companies' digital tool implementation and their suppliers and customers, as this relationship has the potential to influence digital tool implementation within an organisation.

As already discussed, the implementation rates of digital tools in ASEAN exhibit a proportional relationship to company size, with larger companies generally showing higher implementation rates than smaller ones. One contributing factor to the lower

[1] Monash University, Micro-Environment, https://www.monash.edu/business/marketing/marketing-dictionary/m/micro-environment#:~:text=the%20factors%20or%20elements%20in,marketing%20intermediaries%2C%20customers%20and%20publics

implementation rates in micro and small companies is their primary focus on serving consumers and other MSMEs, with a smaller percentage serving larger manufacturing or non-manufacturing companies.

Table 8.3 shows the customer segments across company sizes, in which a significant portion of micro (90.6%) and small (72.8%) companies report serving consumers in the web survey, while the phone survey indicated 68.7% of micro and 78.2% of small companies serve consumers. The limited presence of large customers in the customer base of micro and small companies is consistent across both surveys. For example, in the web survey, only 5.0% of micro companies have large manufacturing customers and 13.7% serve large non-manufacturing customers.

As a result of the focus on consumers and MSME customers, the demand for adopting many digital tools – especially advanced technologies to meet specific requirements of micro and small businesses – is relatively lower. As shown in Table 8.4, the customer base composed of large companies necessitates adopting digital tools to handle their unique requirements. For example, in the web survey, companies catering to large manufacturing and non-manufacturing organisations exhibit higher average digital tool implementation rates at 72.8% and 69.3%, respectively. Conversely, companies catering to consumers show the lowest average implementation rate, 65.7%. In the phone survey, companies serving large non-manufacturing entities boast an implementation rate of 86.9% for other advanced digital tools, while those serving consumers lag behind with a rate of only 61.4%. While the implementation rates of digital tools may be lower in companies with a focus on serving consumers and MSMEs, these companies still value digitalisation and leverage relevant technologies where appropriate and affordable.

Table 8.3. Customer Segments by Company Size

Customer Segment	Web Survey					Phone Survey		
	Total (n = 6,048)	Micro (n = 278)	Small (n = 1,409)	Medium (n = 2,878)	Large (n = 1,483)	Total (n = 3,099)	Micro (n = 677)	Small (n = 2,422)
Consumer (individual or household consumer)	4,047 (66.9%)	252 (90.6%)	1,026 (72.8%)	1,880 (65.3%)	889 (59.9%)	2,358 (76.1%)	465 (68.7%)	1,893 (78.2%)
Manufacturing MSMEs	2,082 (34.4%)	29 (10.4%)	490 (34.8%)	1,066 (37.0%)	497 (33.5%)	1,331 (42.9%)	355 (52.4%)	976 (40.3%)
Large manufacturing companies	1,148 (19.0%)	14 (5.0%)	65 (4.6%)	414 (14.4%)	655 (44.2%)	627 (20.2%)	124 (18.3%)	503 (20.8%)
Non-manufacturing MSMEs	2,803 (46.3%)	104 (37.4%)	677 (48.0%)	1,466 (50.9%)	556 (37.5%)	1,747 (56.4%)	445 (65.7%)	1,302 (53.8%)
Large non-manufacturing companies	1,335 (22.1%)	38 (13.7%)	138 (9.8%)	555 (19.3%)	604 (40.7%)	495 (16.0%)	46 (6.8%)	449 (18.5%)
Public institutions	622 (10.3%)	19 (6.8%)	91 (6.5%)	290 (10.1%)	222 (15.0%)	17 (0.5%)	4 (0.6%)	13 (0.5%)

MSMEs = micro, small, and medium sized enterprises.

Note: The table shows the percentage of companies that have customers in each segment. The percentage for each row is calculated by dividing the number of respondents choosing the corresponding customer type by the relevant total population (n) in each column. (Q12: Which segment is your customer?)

Source: Authors.

Table 8.4. Companies That Have Implemented at Least One Type of Digital Tool by Customer Segment

Tool Category	Web Survey (Micro and Small Companies)						Phone Survey (Micro and Small Companies)					
	A	B	C	D	E	F	A	B	C	D	E	F
Intra-Company Management	1,240 (97.0%)	494 (95.2%)	77 (97.5%)	769 (98.5%)	175 (99.4%)	105 (95.5%)	1,963 (83.2%)	1,150 (86.4%)	560 (89.3%)	1,601 (91.6%)	492 (99.4%)	17 (100.0%)
Procurement	1,113 (87.1%)	449 (86.5%)	65 (82.3%)	699 (89.5%)	156 (88.6%)	94 (85.5%)	1,837 (77.9%)	1,121 (84.2%)	540 (86.1%)	1,514 (86.7%)	456 (92.1%)	15 (88.2%)
Logistics	594 (46.5%)	279 (53.8%)	55 (69.6%)	398 (51.0%)	90 (51.1%)	70 (63.6%)	1,624 (68.9%)	901 (67.7%)	434 (69.2%)	1,227 (70.2%)	376 (76.0%)	15 (88.2%)
Sales and Marketing	1,212 (94.8%)	467 (90.0%)	73 (92.4%)	744 (95.3%)	168 (95.5%)	100 (90.9%)	1,193 (50.6%)	777 (58.4%)	446 (71.1%)	1,088 (62.3%)	441 (89.1%)	14 (82.4%)
Overall Company Operation	444 (34.7%)	224 (43.2%)	44 (55.7%)	297 (38.0%)	77 (43.8%)	52 (47.3%)	1,081 (45.8%)	730 (54.8%)	444 (70.8%)	1,032 (59.1%)	415 (83.8%)	12 (70.6%)
Other Advanced Tools	438 (34.3%)	145 (27.9%)	31 (39.2%)	272 (34.8%)	66 (37.5%)	44 (40.0%)	984 (41.7%)	668 (50.2%)	416 (66.3%)	935 (53.5%)	402 (81.2%)	8 (47.1%)
Average	65.7%	66.1%	72.8%	67.8%	69.3%	70.5%	61.4%	67.0%	75.5%	70.6%	86.9%	79.4%

MSMEs = micro, small, and medium-sized enterprises.

A = consumer (individual or household), B = manufacturing MSMEs, C = large manufacturing companies, D = non-manufacturing MSMEs, E = large non-manufacturing companies, F = public institutions.

Note: The percentage for each row is calculated by dividing the number of respondents selecting at least one tool in the corresponding tool category for each of the following stages: 'Already implemented (pre-pandemic period, before 2020)', 'Already implemented (during pandemic restriction period, Jan 2020–Dec 2021)', 'Already implemented (post-pandemic restriction period, Jan 2022–now)' by the relevant total population (n) in each column. (Q23: Which stage of consideration is your company in for each of the tools?)

Source: Authors.

Customer origin, in addition to customer segments, is a crucial factor influencing the digitalisation efforts of companies. Web and phone surveys revealed that surveyed companies primarily serve local customers rather than multi-national corporations (MNCs). According to Table 8.5, the web survey indicated that only 24.1% of companies have direct MNC customers. Furthermore, the customer base varies based on company size, with micro and small companies having fewer MNC customers than larger companies. Specifically, only 11.5% of micro companies and 9.5% of small companies have direct MNC customers, while in large companies, these account for 44.8%. Similar insights are obtained from the phone survey, which showed slightly higher percentages of micro and small companies having direct MNC customers (23.8% and 29.4%, respectively). However, these percentages still suggest a limited presence of companies targeting MNC customers compared to those focussing solely on local markets. Moreover, a significant proportion of direct customers for micro and small companies are based domestically. Specifically, findings from the phone survey indicated that 71.8% of direct customers of such companies are domestic, while the web survey revealed an even higher percentage of 75.9% of domestic direct customers.

One contributing factor is that the majority of micro and small companies surveyed are domestic companies. Table 8.6 shows that, in the web survey, 89.50% of micro companies and 96.18% of small companies are domestic companies. According to the phone survey, all micro and small companies are domestic. Therefore, it is reasonable for these companies to prioritise the local market. By doing so, they can leverage their strength (i.e. their knowledge of the local market) and mitigate their weaknesses, including limited financial and human resources. Targeting local customers enables micro and small companies to concentrate their efforts on a more manageable market segment. This approach can potentially lead to better customer service, improved market penetration, and overall business success.

Table 8.5. Customer Origin by Company Size

Customer Segment	Web Survey					Phone Survey		
	Total (n = 6,048)	Micro (n = 278)	Small (n = 1,409)	Medium (n = 2,878)	Large (n = 1,483)	Total (n = 3,099)	Micro (n = 677)	Small (n = 2,422)
Have direct MNC customers	1,460 (24.1%)	32 (11.5%)	134 (9.5%)	630 (21.9%)	664 (44.8%)	873 (28.2%)	161 (23.8%)	712 (29.4%)
No direct MNC customers	4,588 (75.9%)	246 (88.5%)	1,275 (90.5%)	2,248 (78.1%)	819 (55.2%)	2,226 (71.8%)	516 (76.2%)	1,710 (70.6%)

MNC = multi-national corporation.

Note: The table shows the percentage of companies that have or do not have direct MNC customers. The percentage for each row is calculated by dividing the number of respondents choosing the corresponding customer origin by the relevant total population (n) in each column. (Q13-1: Does your company have direct customers that include multi-national companies, including joint venture companies where at least one owner is a foreign company?)

Source: Authors.

Table 8.6. Company Type by Size (Domestic or Foreign)

Company Type	Web Survey					Phone Survey		
	Total (n = 6,048)	Micro (n = 278)	Small (n = 1,409)	Medium (n = 2,878)	Large (n = 1,483)	Total (n = 3,099)	Micro (n = 677)	Small (n = 2,422)
Domestic	5,413 (89.5%)	269 (96.8%)	1,351 (95.9%)	2,604 (90.5%)	1,189 (80.2%)	677 (100.0%)	2,422 (100.0%)	3,099 (100.0%)
Foreign	635 (10.5%)	9 (3.2%)	58 (4.1%)	274 (9.5%)	294 (19.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)

Note: The percentage for each row is calculated by dividing the number of respondents choosing the corresponding company type by the relevant total population (n) in each column. (Q10-1: Please tell us whether your company is domestic or foreign.)
Source: Authors.

The influence of customer origin on companies' implementation of digital tools is evident. Companies with direct MNC customers exhibited higher average rates of digital tool implementation across the web and phone surveys, regardless of company size. Micro and small companies with direct MNC customers have an average digital tool implementation rate of 83.2%, whereas companies without direct MNC customers have a significantly lower implementation rate of 64.7% (Table 8.7). The phone survey reflected a similar pattern, with an average implementation rate of 80.6% for companies with direct MNC customers and 62.6% for those without.

The most significant gaps in digital tool implementation rates are observed regarding overall company management and other advanced tools categories. For example, micro and small companies with direct MNC customers have implementation rates of 66.3% according to the web survey and 71.2% via the phone survey. In contrast, companies without direct MNC customers have much lower rates of 32.3% (web survey) and 43.7% (phone survey).

These disparities can be attributed to various factors. For example, companies serving MNC customers often face higher security risks due to the global nature of their operations. Consequently, they tend to invest more in robust cybersecurity software and protocols to protect sensitive customer data, comply with international data protection laws, and safeguard against cyberthreats across different regions. Conversely, companies operating at a local level may face lower cybersecurity risks, leading them to allocate fewer resources to such digital tools.

Companies' origin of suppliers shares many similarities with that of customers. The majority do not directly engage with MNC suppliers. Table 8.8 shows that, in the web survey, only 18.1% have direct MNC suppliers. Furthermore, the composition of the supplier base varies depending on the company size, with micro and small companies exhibiting a lower percentage of MNC suppliers than their larger counterparts. Specifically, direct MNC suppliers constitute only 8.3% of micro companies and 10.4% of small companies' supplier base, while in large companies, direct suppliers account for 32.4%. The phone survey provided similar insights, albeit with slightly higher percentages of micro and small companies having direct MNC customers (24.5% and 26.1%, respectively).

Table 8.7. Companies That Have Implemented at Least One Type of Digital Tool by Customer Origin

Tool Category	Web Survey (All Companies)		Web Survey (Micro and Small Companies)		Phone Survey (Micro and Small Companies)	
	Direct MNC Customers (n = 1,460)	No Direct MNC Customers (n = 4,588)	Direct MNC Customers (n = 166)	No Direct MNC Customers (n = 1,521)	No Direct MNC Customers (n = 873)	No Direct MNC Customers (n = 2,226)
Intra-Company Management	1,430	4,513	161	1,467	838	1,865
	(97.9%)	(98.4%)	(97.0%)	(96.4%)	(96.0%)	(83.8%)
Procurement	1,374	4,202	144	1,302	793	1,759
	(94.1%)	(91.6%)	(86.7%)	(85.6%)	(90.8%)	(79.0%)
Logistics	1,326	3,072	130	705	605	1,554
	(90.8%)	(67.0%)	(78.3%)	(46.4%)	(69.3%)	(69.8%)
Sales and Marketing	1,424	4,413	161	1,407	691	1,156
	(97.5%)	(96.2%)	(97.0%)	(92.5%)	(79.2%)	(51.9%)
Overall Company Operation	1,254	2,398	123	528	674	1,052
	(85.9%)	(52.3%)	(74.1%)	(34.7%)	(77.2%)	(47.3%)
Other Advanced Tools	993	1,920	110	492	622	972
	(68.0%)	(41.8%)	(66.3%)	(32.3%)	(71.2%)	(43.7%)
Average	89.1%	74.5%	83.2%	64.7%	80.6%	62.6%

MNC = multi-national corporation.

Note: The percentage for each row is calculated by dividing the number of respondents selecting at least one tool in the corresponding tool category for each of the following stages: 'Already implemented (pre-pandemic period, before 2020)', 'Already implemented (during pandemic restriction period, Jan 2020–Dec 2021)', 'Already implemented (post-pandemic restriction period, Jan 2022–now)' by the relevant total population (n) in each column. (Q23: Which stage of consideration is your company in for each of the tools?)

Source: Authors.

Table 8.8. Supplier Origin by Company Size

Supplier Segment	Web Survey					Phone Survey		
	Total (n = 6,048)	Micro (n = 278)	Small (n = 1,409)	Medium (n = 2,878)	Large (n = 1,483)	Total (n = 3,099)	Micro (n=677)	Small (n=2,422)
Direct MNC Suppliers	1,095 (18.1%)	23 (8.3%)	146 (10.4%)	446 (15.5%)	480 (32.4%)	799 (25.8%)	166 (24.5%)	633 (26.1%)
No Direct MNC Suppliers	4,953 (81.9%)	255 (91.7%)	1,263 (89.6%)	2,432 (84.5%)	1,003 (67.6%)	2,300 (74.2%)	511 (75.5%)	1,789 (73.9%)

MNC = multi-national corporation.

Note: The percentage for each row is calculated by dividing the number of respondents choosing the corresponding supplier origin by the relevant total population (n) in each column. (Q15-1: Does your company have direct suppliers that include multi-national companies, including joint venture companies where at least one owner is a foreign company?)

Source: Authors.

These figures still pale in comparison to the proportion of companies that do not have direct MNC suppliers. To explain this phenomenon, it is plausible that micro and small companies predominantly rely on local suppliers as they are mostly domestic companies themselves. The proximity of local suppliers is advantageous as it reduces transport costs and lead times. This factor holds particular significance for micro and small companies that operate on limited budgets and cannot afford the high shipping or logistics expenses associated with sourcing from distant suppliers. Moreover, local suppliers often exhibit greater flexibility and adaptability to meet the unique requirements of local small businesses, such as adjusting product specifications to cater to their local customers' specific needs and constraints.

The impact of supplier origin on businesses' utilisation of digital tools is apparent. Regardless of company size, those with direct MNC suppliers demonstrate higher rates of digital tool implementation in both the phone and web surveys. Table 8.9 shows that, in the web survey, micro and small companies with direct MNC suppliers have an impressive average implementation rate of 85.9% of digital tools, while companies without direct MNC suppliers have a significantly lower rate of 64.3%. The phone survey reveals a similar trend, with implementation rates of 82.0% for companies with direct MNC suppliers in contrast to 62.7% for those without such suppliers.

The most notable disparities in implementation rates are observed in the overall company management and other advanced tools categories. For instance, micro and small companies with direct MNC suppliers demonstrate implementation rates of 81.3% according to the web survey and 76.5% via the phone survey. In comparison, companies lacking direct MNC suppliers exhibit much lower rates of 33.8% (web survey) and 48.5% (phone survey). Data show that collaboration with MNC suppliers often drives companies to prioritise adopting overall company management tools such as enterprise resource planning (ERP), cybersecurity software, and cloud technology.

Table 8.9. Companies Have Implemented at Least One Type of Digital Tool by Supplier Origin

Tool Category	Web Survey (All Companies)		Web Survey (Micro and Small Companies)		Phone Survey (Micro and Small Companies)	
	Direct MNC Supplier (n = 1,095)	No Direct MNC Supplier (n = 4,953)	Direct MNC Supplier (n = 169)	No Direct MNC Supplier (n = 1,518)	Direct MNC Supplier (n = 799)	No Direct MNC Supplier (n = 2,300)
Intra-Company Management	1,087 (99.3%)	4,856 (98.0%)	165 (97.6%)	1,463 (96.4%)	765 (95.7%)	1,938 (84.3%)
Procurement	1,041 (95.1%)	4,535 (91.6%)	155 (91.7%)	1,291 (85.0%)	734 (91.9%)	1,818 (79.0%)
Logistics	1,012 (92.4%)	3,386 (68.4%)	151 (89.3%)	684 (45.1%)	604 (75.6%)	1,555 (67.6%)
Sales and Marketing	1,080 (98.6%)	4,757 (96.0%)	163 (96.4%)	1,405 (92.6%)	635 (79.5%)	1,212 (52.7%)
Overall Company Operation	971 (88.7%)	2,681 (54.1%)	138 (81.7%)	513 (33.8%)	611 (76.5%)	1,115 (48.5%)
Other Advanced Tools	736 (67.2%)	2,177 (44.0%)	99 (58.6%)	503 (33.1%)	584 (73.1%)	1,010 (43.9%)
Average	90.2%	75.3%	85.9%	64.3%	82.0%	62.7%

MNC = multi-national company.

Note: The percentage for each row is calculated by dividing the number of respondents selecting at least one tool in the corresponding tool category for each of the following stages: 'Already implemented (pre-pandemic period, before 2020)', 'Already implemented (during pandemic restriction period, Jan 2020–Dec 2021)', 'Already implemented (post-pandemic restriction period, Jan 2022–now)' by the relevant total population (n) in each column. (Q23: Which stage of consideration is your company in for each of the tools?)

Source: Authors.

Companies working with MNC suppliers often operate across different geographical locations and time zones; ERP enables streamlined information sharing, real-time data updates, and efficient supply chain management. ERP helps integrate various functions such as procurement, inventory management, and logistics, improving operational efficiency and cost savings. Working with MNC suppliers involves sharing sensitive information, such as intellectual property, product specifications, and customer data. Companies can implement cybersecurity software to mitigate the risks associated with data breaches and cyberattacks. Cloud storage and technologies offer scalable and flexible infrastructure for collaborative workflows, remote access, and real-time data sharing.

Overall, the types of customers and suppliers with which companies engage significantly influence their digitalisation efforts. When companies interact with digitally advanced and demanding customers (e.g. large companies and MNCs) and collaborate with MNC suppliers, they are motivated to adopt more advanced digital tools. However, micro and small companies typically operate within domestic markets, work with local suppliers, and serve local individual and household consumers. In this context, it is crucial for governments to promote the adoption of digital tools across the entire ecosystem and amongst all stakeholders in the supply chain (i.e. local customers and suppliers). This comprehensive approach can provide a well-rounded push for micro and small companies to embrace digitalisation to keep up with their customers and suppliers and to improve overall businesses.

Furthermore, ASEAN needs to encourage micro and small companies to engage in cross-border trade, initially within the region and eventually globally. As MSMEs often have limited resources, efforts should focus on reducing barriers that hinder their participation in the larger regional economy and cross-border business activities. By enabling MSMEs to connect with digitally advanced customers and suppliers, they will be incentivised to adopt more digital tools to meet evolving business requirements and to drive growth. This enhances their competitiveness and contributes to the overall digitalisation of the ASEAN region.

7. Macroenvironment

The data analysis of digital tool implementation reveals certain influences of the COVID-19 pandemic on digital adoption during different periods: pre-pandemic (before 2020), during the pandemic restriction period (January 2020 to December 2021), and post-pandemic restriction period (January 2022 on). The data are shown in Tables 8.10, 8.11, and 8.12.

As observed from the web survey pre-pandemic data in Table 8.10, a significant percentage of companies in ASEAN already implemented digital tools to enhance their operations pre-pandemic. Intra-company management tools exhibited high adoption

rates, such as e-mail and/or chat applications, mobile devices, computers, and office suites. Over 80% of companies implemented these tools before 2020, except for web meeting systems. The adoption of these tools can be attributed to the recognition of their value in improving communication, productivity, and overall management efficiency. Even before the pandemic, companies sought to optimise their operations and to gain a competitive edge.

When considering the adoption of intra-company management tools from the company size perspective, based on the web survey, a significant percentage of small companies – ranging from 78.6% (for office suite tools) to 84.0% (for computers) – already embraced these tools before the pandemic. However, the adoption rates amongst micro companies are relatively lower, ranging from 55.8% (for office suite tools) to 67.6% (for mobile devices).

The implementation rates of intra-company management tools amongst micro and small companies, as recorded in the phone survey, are much lower than in the web survey. Regarding small companies, the most widely used tool is computers, employed by 66.4%, followed by mobile devices at 60.4%. The adoption rates for e-mail and/or chat applications and office suites are only 19.2% and 27.6%, respectively. For micro companies, the adoption rates of intra-company management tools before the pandemic are significantly lower than small companies; computers were utilised by 35.9% of companies, mobile devices by 32.8%, office suites by 14.8%, and e-mail and/or chat applications by 7.7%.

Although the results of the web and phone surveys differ – likely due to the unique characteristics of each sample – a significant gap exists in the adoption of intra-company management tools between micro and small companies before the pandemic, with micro companies lagging. Micro companies typically have a very limited number of employees (e.g. one to four) and may not face a pressing need to utilise such tools. Additionally, micro companies' financial resources may be constrained, making it challenging for them to invest in these tools.

Even before the pandemic, e-payments were already commonly implemented by companies in ASEAN. Based on the web survey, the percentages of companies utilising e-payments before the pandemic were 74.4% in sales and marketing and 72.9% in procurement. The significant adoption rates of e-payment tools before the pandemic indicate that, generally, ASEAN companies already acknowledged the benefits of digital payment systems and leveraged them in their businesses. The web survey showed that micro companies lagged behind larger companies in e-payment adoption before the pandemic, with only 56.8% in sales and marketing adopting them and 52.2% in procurement. Following the overall trend in ASEAN, around 10.0% of micro companies embraced e-payments during the pandemic, and an additional 8.0% adopted them after the pandemic.

The phone survey also highlighted a similar pattern in the adoption of e-payments amongst micro companies. Before the pandemic, 13.7% of micro companies utilised e-payments in sales and marketing, while 27.8% employed it in procurement. However, the adoption rate of e-payments in procurement witnessed a significant increase, with 14.9% of companies adopting them during the pandemic and a remarkable 28.4% implementing them post-pandemic. On the other hand, the momentum of e-payments in sales and marketing was slower, with only 3.0% of micro companies implementing them during the pandemic and 6.4% adopting them post-pandemic.

Table 8.10. Companies Implementing Digital Tools Pre-Pandemic

(before 2020)

Tool Category	Tool	Web Survey					Phone Survey		
		Total (n = 6,048)	Micro (n = 278)	Small (n = 1,409)	Medium (n = 2,878)	Large (n = 1,483)	Total (n = 3,099)	Micro (n = 677)	Small (n = 2,422)
Intra-Company Management	E-mail and/or chat applications	82.7%	61.9%	81.4%	85.0%	83.4%	16.7%	7.7%	19.2%
	Mobile device	82.3%	67.6%	79.9%	84.5%	83.0%	54.4%	32.8%	60.4%
	Computer	84.4%	59.7%	84.0%	86.7%	85.1%	59.8%	35.9%	66.4%
	Office suite	80.5%	55.8%	78.6%	82.9%	82.4%	24.8%	14.8%	27.6%
	Web meeting system	45.2%	16.9%	27.3%	50.4%	57.5%	0.2%	0.0%	0.2%
Procurement	E-data interchange - Procurement	51.6%	16.2%	33.6%	56.5%	65.6%	17.3%	10.3%	19.2%
	E-payments - Procurement	72.9%	52.2%	71.2%	74.6%	75.1%	46.0%	27.8%	51.0%
Logistics	Document or cargo delivery application	50.3%	17.3%	31.4%	54.1%	67.0%	31.2%	16.5%	35.3%
	Storage or inventory management system	49.0%	13.3%	32.3%	51.8%	66.4%	18.6%	8.3%	21.4%
Sales and Marketing	E-data interchange - Sales and marketing	52.8%	14.0%	35.7%	58.3%	65.7%	11.5%	5.0%	13.3%
	Social network service	77.7%	55.8%	77.5%	79.7%	78.2%	26.4%	17.4%	28.9%
	E-commerce	52.6%	42.1%	41.9%	55.4%	59.5%	20.4%	14.8%	22.0%

Tool Category	Tool	Web Survey					Phone Survey		
		Total (n = 6,048)	Micro (n = 278)	Small (n = 1,409)	Medium (n = 2,878)	Large (n = 1,483)	Total (n = 3,099)	Micro (n = 677)	Small (n = 2,422)
Overall Company Operation	E-payments - Sales and marketing	74.4%	56.8%	73.9%	75.6%	75.7%	23.1%	13.7%	25.8%
	Sales management and automation tool	47.6%	11.9%	29.6%	52.5%	62.0%	7.0%	3.1%	8.1%
	Enterprise resource planning	37.9%	13.3%	23.1%	39.7%	52.9%	6.9%	3.5%	7.9%
	Cloud storage or centralised server	33.4%	11.2%	20.9%	35.6%	45.1%	4.7%	1.8%	5.5%
	Cybersecurity or protection software	34.3%	11.9%	21.1%	38.3%	43.2%	40.3%	24.5%	44.8%
Other Advanced Tools	3D printing	20.1%	7.2%	14.1%	23.3%	21.9%	5.7%	3.4%	6.4%
	Artificial intelligence	14.5%	3.2%	10.6%	16.9%	15.7%	0.4%	0.0%	0.5%
	Augmented reality	9.0%	2.9%	4.2%	9.0%	14.6%	0.1%	0.0%	0.1%
	Drone	12.7%	1.8%	8.4%	14.2%	16.1%	0.3%	0.1%	0.3%
	Internet-of-things device	24.1%	4.3%	20.9%	26.4%	26.6%	9.8%	4.6%	11.3%
	Radio frequency identification	18.1%	1.4%	12.0%	20.5%	22.2%	29.0%	18.9%	31.9%
	Robotics	12.5%	1.4%	6.0%	13.0%	19.8%	2.8%	0.4%	3.5%

Note: The percentage for each tool (each row) is calculated by dividing the number of respondents selecting 'Already implemented, pre-pandemic period before 2020)' by the total responses of the questionnaire. (Q23: Which stage of consideration is your company in for each of the tools?)
Source: Authors.

As shown in Table 8.11, the pandemic restriction period witnessed a notable shift in adoption patterns, driven by the sudden need for remote work and virtual communication. Despite having the lowest adoption rate before the pandemic (45.2%) within the intra-company management category, web meeting systems experienced a substantial increase in adoption, with 27.9% of web survey respondents starting to implement them during this period. The reliance on virtual meetings and conferences became crucial as lockdowns and social-distancing measures prevented in-person interactions (Karl, Peluchette, Aghakhani, 2022).

However, the phone survey painted a different picture. Currently, only 0.1% of small companies have implemented web meeting systems, and no micro companies have embraced this digital tool for their business operations. The gaps between the web and phone survey results highlight that even amongst micro and small companies, there are distinct differences in adopting digital tools and approaches to tackling business tasks and challenges. These findings suggest the need for stakeholders and policymakers to consider diverse digital trajectories when proposing relevant assistance or policies to promote digitalisation for micro and small companies.

Based on the web survey, social network services, such as Twitter, Facebook, and Instagram, saw an adoption rate of 9.3% during the pandemic, adding to 87.0% of the companies using these before. This shift indicates that companies recognised the importance of online channels for marketing, customer engagement, and maintaining brand visibility during the pandemic (Dubbelink, Herrando, Constantinides, 2021).

The COVID-19 pandemic significantly accelerated the digitalisation process across ASEAN. According to a national business survey conducted in Singapore in November 2020, 84% of participating companies acknowledged the pandemic's role in accelerating their digital transformation efforts; 26% stated that the pandemic had greatly expedited their digital transformation (Statista, 2021). Singapore, being more digitally developed than other countries, has focussed on adopting advanced digital tools during the pandemic. Notably, advanced digital tools in Singapore during this time – augmented reality, artificial intelligence (AI), and internet of things – reached adoption rates of 26.5%, 25.9% and 23.1% across companies there, respectively.

In alignment with Singapore's Smart Nation Strategy and as a response to the pandemic, the country collaborated closely with telecommunications companies to make timely investments in network upgrades, which aimed to enhance Singapore's nationwide network capacity.[2] By bolstering national broadband infrastructure, the government aims to facilitate the digitalisation of companies, enabling them to leverage emerging

[2] Broadband Commission for Sustainable Development, Singapore's COVID-19 Response and Digitalization Following the Agenda for Action, https://www.broadbandcommission.org/insight/singapores-covid-19-response-and-digitalization-following-the-agenda-for-action/

technologies.[3] In the health care sector of Singapore, AI technology implementation has played a crucial role in combating the COVID-19 outbreak (Liu et al., 2020). Post-pandemic, AI is expected to play an even greater role in transforming Singapore's health care system with applications such as the development and delivery of improved management services for chronic diseases, digital health coaching tools for patients to manage their conditions at home, and enhanced accuracy and efficiency in disease diagnosis (Liu et al., 2020).

In Indonesia, the pandemic also drove a significant wave of digitalisation, with 70% of consumers trying at least one new digital service during this time, which led to the adoption of various digital tools in sectors such as health, online education, and e-commerce (Australia-Indonesia Centre, 2020). Consequently, the top digital tools implemented in Indonesia during the pandemic were web meeting systems (23.2%), sales management automation tools (16.0%), cloud storage or inventory management systems (15.7%), and e-data interchange (EDI) (15.1%). These tools are essential for businesses to efficiently manage customer data and interactions, especially during the pandemic.

In the Philippines, the pandemic necessitated the adoption of digital tools to facilitate overall company operations. Cloud storage (22.3%) and cybersecurity (21.7%) emerged as the top tools implemented during this time. Notably, cloud-based ICT solutions were perceived as vital by 94% of Philippine businesses in mitigating the impact of the pandemic; consequently, more than half (51%) of the businesses reported an increase in the adoption of cloud-based ICT solutions to navigate the new business conditions (Alibaba Clouder, 2021).

In the post-pandemic restriction period, adoption rates for most digital tools remain relatively stable or have experienced slight changes, especially for those implemented before and during COVID-19 by most companies, such as intra-company management tools. However, based on the web survey, certain tools related to sales and marketing (e.g. e-commerce and sales management automation) observe a positive trend, with 13.5% and 8.5% of companies starting to use them. This indicates how companies recognise the need to adapt to the changing business environment after the pandemic.

[3] *Ibid.*

Table 8.11. Companies Implementing Digital Tools during the Pandemic

(January 2020–December 2021)

Tool Category	Tool	Web Survey					Phone Survey		
		Total	Micro	Small	Medium	Large	Total	Micro	Small
		(n = 6,048)	(n = 278)	(n = 1,409)	(n = 2,878)	(n = 1,483)	(n = 3,099)	(n = 677)	(n = 2,422)
Intra-Company Management	E-mail and/or chat applications	7.2%	8.6%	6.5%	6.7%	8.8%	0.5%	0.3%	0.6%
	Mobile device	8.0%	7.2%	7.0%	8.1%	9.0%	9.1%	18.5%	6.5%
	Computer	6.8%	6.5%	7.4%	6.2%	7.3%	9.4%	18.6%	6.9%
	Office suite	8.4%	6.8%	8.4%	8.4%	8.8%	3.5%	6.4%	2.6%
	Web meeting system	27.9%	29.5%	31.7%	26.7%	26.4%	0.0%	0.0%	0.0%
Procurement	E-data interchange - Procurement	9.8%	6.1%	8.3%	9.7%	12.0%	3.7%	7.8%	2.6%
	E-payments - Procurement	10.2%	9.7%	9.7%	9.8%	11.5%	8.0%	14.9%	6.0%
Logistics	Document or cargo delivery application	9.2%	7.6%	7.5%	9.5%	10.5%	7.5%	15.8%	5.1%
	Storage or inventory management system	8.6%	6.8%	6.3%	8.7%	10.9%	1.8%	3.1%	1.5%
Sales and Marketing	E-data interchange - Sales and marketing	9.6%	6.8%	8.3%	9.1%	12.1%	6.2%	13.4%	4.2%

Tool Category	Tool	Web Survey					Phone Survey		
		Total (n = 6,048)	Micro (n = 278)	Small (n = 1,409)	Medium (n = 2,878)	Large (n = 1,483)	Total (n = 3,099)	Micro (n = 677)	Small (n = 2,422)
	Social network service	9.3%	9.0%	7.9%	9.3%	10.7%	2.4%	4.1%	1.9%
	E-commerce	10.1%	6.5%	8.9%	11.3%	9.8%	2.2%	4.0%	1.7%
	E-payments - Sales and marketing	10.2%	7.6%	8.9%	10.6%	11.2%	1.9%	3.0%	1.6%
	Sales management and automation tool	10.4%	6.1%	8.0%	10.9%	12.4%	0.3%	0.1%	0.3%
Overall Company Operation	Enterprise resource planning	9.1%	3.2%	6.9%	9.7%	11.3%	0.5%	0.9%	0.3%
	Cloud storage or centralised server	9.7%	3.6%	7.4%	9.9%	12.4%	0.3%	0.4%	0.3%
	Cyber-security or protection software	8.1%	4.0%	6.9%	7.9%	10.6%	8.5%	17.7%	5.9%
Other Advanced Tools	3D printing	4.8%	3.2%	2.1%	4.6%	8.0%	0.5%	0.6%	0.5%
	Artificial intelligence	6.8%	0.4%	3.3%	7.8%	9.3%	0.0%	0.0%	0.0%
	Augmented reality	6.7%	1.4%	3.5%	8.0%	8.5%	0.0%	0.0%	0.0%
	Drone	4.7%	1.4%	2.3%	4.5%	8.1%	0.0%	0.0%	0.0%
	Internet-of-things device	6.5%	2.5%	4.2%	6.2%	9.8%	0.6%	0.9%	0.5%

Tool Category	Tool	Web Survey					Phone Survey		
		Total	Micro	Small	Medium	Large	Total	Micro	Small
		(n = 6,048)	(n = 278)	(n = 1,409)	(n = 2,878)	(n = 1,483)	(n = 3,099)	(n = 677)	(n = 2,422)
	Radio frequency identification	5.1%	2.2%	2.8%	4.1%	9.6%	7.6%	17.0%	5.0%
	Robotics	4.5%	2.2%	1.8%	4.1%	8.3%	0.1%	0.0%	0.1%

Note: The percentage for each tool (each row) is calculated by dividing the number of respondents selecting 'Already implemented, during pandemic restriction period Jan 2020–Dec 2021' by the total responses of the questionnaire. (Q23: Which stage of consideration is your company in for each of the tools?)
Source: Authors.

Table 8.12. Companies Implementing Digital Tools Post-Pandemic

(January 2022–now)

Tool Category	Tool	Web Survey					Phone Survey		
		Total (n = 6,048)	Micro (n = 278)	Small (n = 1,409)	Medium (n = 2,878)	Large (n = 1,483)	Total (n = 3,099)	Micro (n = 677)	Small (n = 2,422)
Intra-Company Management	E-mail and/or chat applications	4.6%	9.4%	3.8%	4.2%	5.1%	0.3%	0.1%	0.3%
	Mobile device	4.3%	9.4%	4.3%	3.5%	5.0%	17.3%	37.1%	11.8%
	Computer	4.9%	11.2%	4.8%	4.6%	4.7%	17.7%	37.7%	12.1%
	office suite	5.2%	9.0%	5.5%	4.7%	5.0%	11.3%	24.5%	7.6%
	Web meeting system	9.8%	12.6%	9.6%	10.1%	8.8%	0.1%	0.0%	0.1%
Procurement	E-data interchange - Procurement	7.4%	6.1%	4.9%	8.4%	8.2%	1.9%	5.2%	1.0%
	E-payments - Procurement	7.5%	13.3%	5.4%	8.5%	6.3%	13.5%	28.4%	9.3%
Logistics	Document or cargo delivery application	7.5%	7.9%	6.2%	8.2%	7.2%	13.6%	28.8%	9.3%
	Storage or inventory management system	7.1%	10.1%	5.7%	7.5%	6.9%	2.0%	3.8%	1.4%
Sales and Marketing	E-data interchange - Sales and marketing	7.2%	7.2%	4.8%	8.0%	7.7%	0.2%	0.3%	0.2%
	Social network service	5.8%	15.5%	5.0%	5.5%	5.5%	1.8%	4.6%	1.0%
	E-commerce	13.5%	14.7%	10.5%	13.6%	16.0%	0.8%	2.1%	0.5%
	E-payments - Sales and marketing	6.5%	12.2%	5.0%	6.7%	6.3%	3.0%	6.4%	2.1%
	Sales management and automation tool	8.5%	8.3%	6.4%	9.3%	9.0%	0.4%	0.7%	0.3%
	Enterprise resource planning	7.2%	6.8%	4.6%	7.1%	9.9%	1.5%	3.7%	0.8%

Tool Category	Tool	Web Survey					Phone Survey		
		Total (n = 6,048)	Micro (n = 278)	Small (n = 1,409)	Medium (n = 2,878)	Large (n = 1,483)	Total (n = 3,099)	Micro (n = 677)	Small (n = 2,422)
Overall Company Operation	Cloud storage or centralised server	6.8%	8.3%	4.4%	6.4%	9.5%	0.2%	0.3%	0.2%
	Cybersecurity or protection software	7.1%	6.8%	4.5%	6.5%	10.6%	2.3%	5.0%	1.6%
Other Advanced Tools	3D printing	6.6%	5.4%	3.9%	7.0%	8.7%	0.2%	0.6%	0.1%
	Artificial intelligence	5.2%	6.1%	3.2%	4.7%	8.0%	0.1%	0.1%	0.0%
	Augmented reality	5.9%	4.0%	3.5%	6.3%	7.8%	0.1%	0.1%	0.0%
	Drone	5.2%	2.5%	2.7%	5.5%	7.4%	0.0%	0.0%	0.0%
	Internet-of-things device	5.6%	4.0%	3.8%	5.9%	6.8%	0.4%	0.9%	0.2%
	Radio frequency identification	5.0%	2.9%	3.8%	5.5%	5.7%	2.8%	6.1%	1.9%
	Robotics	3.7%	2.2%	2.2%	3.6%	5.5%	0.2%	0.4%	0.1%

Note: The percentage for each tool (each row) is calculated by dividing the number of respondents selecting 'Already implemented, post-pandemic restriction period Jan 2022–now' by the total responses of the questionnaire. (Q23: Which stage of consideration is your company in for each of the tools?)
Source: Authors.

Across different periods, the survey reveals low implementation rates for the tools under the overall company operations and other advanced tools category. Additionally, the number of companies planning to implement these tools in the next 3 years is relatively low. For example, when considering emerging technologies like 3D printing, AI, augmented reality, drones, and robotics, the percentage of companies planning to implement these tools within the next 3 years remains in the range of 12.6% to 18.5%. On average, more than 50.0% of companies have no plan to use them in the next 3 years. Future prospects are slightly better for overall company operations, as about 16% of the companies plan implementation.

The web survey demonstrated that companies are planning to implement cybersecurity or protection software (16.3%), ERP (15.5%), and cloud storage or centralised servers (14.8%). This suggests that the pandemic has influenced the adoption of overall company operations tools, possibly due to the increased need for remote work involving digital collaboration and security protection during lockdowns and restrictions. However, the pandemic's impact appears to be less pronounced when it comes to more advanced technologies. Implementing digitally advanced tools depends more on individual companies' intrinsic needs and specific requirements, characteristics, and resources, rather than being directly influenced by the pandemic.

Table 8.13. Stage of Digital Tool Implementation with a Breakdown of the Implementation Period (Web Survey)

Tool Category	Tool	Plan to Implement in the Next 3 Years	No Plan to Implement within the Next 3 Years
Intra-Company Management	E-mail and/or chat applications	192 (3.2%)	139 (2.3%)
	Mobile device	169 (2.8%)	157 (2.6%)
	Computer	160 (2.6%)	74 (1.2%)
	Office suite	235 (3.9%)	120 (2.0%)
	Web meeting system	428 (7.1%)	606 (10.0%)
Procurement	E-data interchange - procurement	722 (11.9%)	1,168 (19.3%)
	E-payments - procurement	384 (6.3%)	187 (3.1%)
Logistics	Document or cargo delivery application	691 (11.4%)	1,308 (21.6%)

	Storage or inventory management system	772 (12.8%)	1,361 (22.5%)
Sales and Marketing	E-data interchange - sales and marketing	708 (11.7%)	1,134 (18.8%)
	Social network service	297 (4.9%)	135 (2.2%)
	E-commerce	781 (12.9%)	653 (10.8%)
	E-payments - sales and marketing	380 (6.3%)	160 (2.6%)
	Sales management and automation tool	883 (14.6%)	1,145 (18.9%)
Overall Company Operation	Enterprise resource planning	938 (15.5%)	1,831 (30.3%)
	Cloud storage or centralised server	895 (14.8%)	2,140 (35.4%)
	Cybersecurity or protection software	988 (16.3%)	2,068 (34.2%)
Other Advanced Tools	3D printing	930 (15.4%)	3,214 (53.1%)
	Artificial intelligence	1,119 (18.5%)	3,328 (55.0%)
	Augmented reality	986 (16.3%)	3,757 (62.1%)
	Drone	799 (13.2%)	3,880 (64.2%)
	Internet-of-things device	763 (12.6%)	3,099 (51.2%)
	Radio frequency identification	772 (12.8%)	3,573 (59.1%)
	Robotics	1,076 (17.8%)	3,719 (61.5%)

Note: The percentage for each row is calculated by dividing the number of respondents selecting the tool for each of the following stages: 'Plan to implement in the next 3 years (including pilot implementation)', 'No plan to implement within the next 3 years' by the total responses of the questionnaire. (Q23: Which stage of consideration is your company in for each of the tools?)
Source: Authors.

Overall, the data reflect a significant impact of the COVID-19 pandemic on the adoption of digital tools by companies in ASEAN. The crisis accelerated the adoption of tools necessary for remote work, virtual communication, and online business operations.

8. Conclusion

This chapter detailed MSMEs' external factors that are causing the digital divide. The first section, infrastructure, revealed that sufficient infrastructure is desired to cover a broader range of MSMEs so that they can implement digital tools. In Malaysia and Indonesia, where digitalisation has progressed amongst certain companies and the communication volume has increased, the lack of adequate infrastructure contributes to a higher proportion of companies perceiving those needs, in contrast to Cambodia and Myanmar. Regarding company size, all companies except micro companies noted that around 50% face internet instability. Companies' expectations of governments to improve internet connections lagged behind concerns over a shortage of talent involved in digital tool adoption and insufficient funding. Improving infrastructure is undoubtedly a significant challenge in addressing the digital divide within ASEAN; however, as the data shows, this is not always the highest priority for all countries and segments.

Digital tool provision from the market is considered a driver to encourage MSMEs to go digital. Language barriers are observed at a certain level, and a certain number of ASEAN companies consider it an obstacle. This obstacle arises in collecting information for digital tool implementation, especially in relatively lower-income countries, such as Cambodia and the Lao PDR, and is shared amongst all company sizes. For those that do not plan to implement digital tools, the smaller the company's size, the more companies note language issues. This may be because larger companies have more English-speaking personnel and are more comfortable using English in their operations. From the survey results, it can be concluded that the availability of local languages both for using digital tools and information gathering is not the biggest challenge but is still an issue.

The lack of localised digital tools is also observed as an issue. The web survey showed the need for localisation as a potential contributor to promoting digital adoption in MSMEs. Specifically, half of the web survey respondents identified difficulties in finding suitable solutions due to limited options for localised solutions as a significant concern. In contrast, the phone survey yielded a relatively lower proportion of respondents (less than 20%) who considered this an issue that governments should address. The survey results have two main findings: digital tools should be aligned with a country's business practices, and local solution providers should be available to provide necessary support in using digital tools. From the perspective of MSMEs, the difficulties in finding solutions due to limited options for localised solutions emphasise the need for localised digital tools. From the government's side, providing indirect support to MSMEs in collaboration with global solution providers and enforcing laws and policies can help promote the localisation of solutions.

As numerous previous studies have shown, cybersecurity preparedness is one of the most important initiatives in the digital era. The survey revealed that almost half of the surveyed companies have already implemented cybersecurity or protection software. Around 20% of them plan to do so, and around 30% do not plan to do so. The survey

revealed that adopting cybersecurity tools is closely linked to company size in the region, with larger companies having higher adoption rates. It is concerning that a significant proportion of micro and small companies have yet to implement cybersecurity and protection software and do not plan to do so in the next 3 years. This trend is significant in some countries, such as the Lao PDR, Brunei, Viet Nam, and Thailand, confirmed through the qualitative interview research conducted in this study. Smaller companies, in particular, were found to have lower expectations of cybersecurity measures from the government, implying cybersecurity was not a priority. This lower prioritisation of cybersecurity by micro and small companies can be understood due to more pressing challenges, such as ICT skills gaps, limited business knowledge, and financial constraints. As these companies typically have low adoption rates of digital tools, they may perceive fewer risks in terms of cybersecurity.

It has been observed that companies seeking government measures concerning cybersecurity are predominantly concentrated in rural areas. Cybersecurity may not be a priority for many, including micro and small companies. However, it is important to recognise that cybersecurity is an inevitable risk that businesses will face as they continue to advance in their digitalisation efforts. Therefore, governments must include cybersecurity concerns in their digital tool adoption agenda. This proactive approach will help prevent potential risks, address hesitancy, and fully enable micro and small companies to fully leverage digital tools' benefits. A comprehensive regional programme can be developed to further mitigate cybersecurity threats across ASEAN. This programme could involve regional funding and capacity development initiatives supporting MSMEs. By implementing such a programme, ASEAN can enhance cybersecurity resilience and protect the interests of MSMEs throughout the region.

The survey revealed the correlation between digital tool implementation and the surveyed companies' microenvironment. The report explored analyses of their suppliers and customers, as this relationship can potentially influence digital tool implementation. The web and phone surveys revealed that surveyed companies primarily serve local rather than MNC customers. However, companies with direct MNC customers exhibit higher average rates of digital tool implementation across web and phone surveys, regardless of company size. According to this data, the influence of customer origin on companies' implementation of digital tools is evident. The most significant gaps in implementation rates are observed regarding overall company management and other advanced tools categories. Additionally, this trend is shared with supplier origins. Regardless of company size, those with direct MNC suppliers demonstrate notably higher rates of digital tool implementation in both phone and web surveys.

When companies interact with digitally advanced and demanding customers (e.g. large companies and MNCs) and collaborate with MNC suppliers, they are motivated to adopt a greater quantity and more advanced digital tools. However, micro and small companies typically operate within domestic markets, work with local suppliers, and serve local

individual and household consumers. In this context, it becomes crucial for governments to promote the adoption of digital tools across the entire ecosystem and amongst all stakeholders in the supply chain. This comprehensive approach can provide a well-rounded push for micro and small companies to embrace digitalisation to keep up with their customers and suppliers and to improve overall businesses.

Furthermore, ASEAN needs to encourage micro and small companies to engage in cross-border trade, initially within the region and eventually globally. As MSMEs often have limited resources, efforts should focus on reducing barriers that hinder their participation in the larger regional economy and cross-border business activities. By enabling MSMEs to connect with digitally advanced customers and suppliers, they will be incentivised to adopt more digital tools to meet evolving business requirements and to drive growth. This enhances their competitiveness and contributes to the overall digitalisation of the ASEAN region.

Lastly, the survey data observed the concrete impact of the macroenvironment on digital tool implementation in the region. Before the pandemic, a significant percentage of companies already implemented digital tools to enhance their operations, especially basic tools. However, the adoption rate amongst micro companies was lower. In addition, even before the pandemic, e-payments were already commonly implemented. The pandemic restriction period then witnessed a notable shift in adoption patterns for digital tools. For example, driven by the sudden need for remote work and virtual communication, web meeting systems experienced a substantial increase in adoption for web survey respondents during this period. This significant implementation of digital tools within the region widely appears in AMS.

Across different periods, the survey reveals low implementation rates for some categories, such as overall company operations and other advanced tools. Additionally, the number of companies planning to implement these tools in the next 3 years is relatively low. However, the pandemic has influenced the adoption of overall company operations tools and accelerated the adoption of these, possibly due to the increased need for remote work involving digital collaboration, and security protection during lockdowns and restrictions. The significance of these matters is ever-present even after the pandemic. However, the pandemic's impact appears to be less pronounced when it comes to more advanced technologies. Implementing digitally advanced tools depends more on individual companies' intrinsic needs and specific requirements, characteristics, and resources rather than being directly influenced by the pandemic.

To conclude, the COVID-19 pandemic was pivotal in influencing the timing of digital tool adoption by companies in ASEAN. The sudden disruption caused by the pandemic and associated restrictions accelerated the adoption of digital tools, particularly those enabling remote work, virtual communication, and online marketing.

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Chapter 9

Digital Divide in Industry

1. Introduction

This chapter provides an industry-specific overview of the digital divide, focusing on three sectors: (i) agriculture, fishery, and forestry; (ii) services; and (iii) manufacturing. Both web and phone survey data are used to present a holistic picture of each industry's digital landscape.

For each industry, this chapter examines the digital adoption rates at both overall and tool-specific levels. This multifaceted analysis is conducted to point out significant similarities or variations while considering various company attributes, such as the country and the size of the company.

The analysis for each industry shows the underlying reasons for the observed digital disparities through an investigation of internal and external impact factors by company characteristics such as the percentage of employees involved in digital-related tasks, customer or supplier segments, and the separation of business functions in different locations.

The chapter also analyses the challenges and concerns that industry players face during the digital tool implementation journey – the information gathering, adoption, and post-adoption phases. This offers insights into the prevailing pain points at each stage, highlighting digital gaps that public and private sector stakeholders in the Association of Southeast Asian Nations (ASEAN) should focus on resolving to promote higher rates of digital tool implementation and catalyse digital growth across these three industries.

2. Agriculture, Fishery, and Forestry

Agriculture, fishery, and forestry (henceforth, agriculture) has played a significant and ongoing role in ASEAN, serving as a crucial catalyst for inclusive growth and social development. It acts as a vital source of export revenue, ensuring food availability for the population and creating employment opportunities within the agriculture sector and through associated value-added activities (Teng and McConville, 2016). Accelerating digitalisation in agriculture is critical to building a resilient, sustainable, and inclusive agri-food system in the region.

Table 9.1 shows that the percentage of companies implementing at least one digital tool in agriculture (70.5%) is lower than the average across all ASEAN Member States (78.0%). This indicates that agriculture is lagging in terms of digital adoption. The adoption rates

of digital tools in the agriculture sector vary by company size. According to the web survey results, large companies exhibit the highest average implementation rates across all tool categories, reaching 81.3%, while micro companies have the lowest adoption rates (45.5%). The phone survey reveals a higher average implementation rate for micro companies (65.4%) than the web survey. However, micro agriculture companies still fall behind the ASEAN average (70.2%).

The difference between the web and phone survey data is evident in overall company operation tools (e.g. enterprise resource planning (ERP), cloud storage, or centralised server). While 60.4% of the ASEAN average in the web survey have adopted at least one tool in this category, only 41.3% of companies in the agriculture industry have done so. The lower adoption rates in the agriculture industry can be attributed to the presence of micro and small agriculture companies whose implementation rates are lower than the industry average across all tool categories, especially in the overall company operation and other advanced tools categories. For instance, the web survey data show that only 13.6% of micro companies and 14.5% of small companies have adopted at least one overall company operation tool. Similarly, only 18.2% of micro companies and 35.7% of small companies have adopted at least one type of emerging technology in the other advanced tools category.

Table 9.1. Agriculture Companies Having Implemented at Least One Type of Digital Tool

Tool Category	Web survey						Phone survey		
	Total (n=6,048)	Agriculture					Agriculture		
		Subtotal (n=747)	Micro (n=22)	Small (n=241)	Medium (n=314)	Large (n=170)	Subtotal (n=613)	Micro (n=107)	Small (n=506)
Intra-company management	5,943 (98.3%)	733 (98.1%)	19 (86.4%)	237 (98.3%)	308 (98.1%)	169 (99.4%)	550 (89.7%)	106 (99.1%)	444 (87.7%)
Procurement	5,576 (92.2%)	631 (84.5%)	11 (50.0%)	186 (77.2%)	280 (89.2%)	154 (90.6%)	494 (80.6%)	93 (86.9%)	401 (79.2%)
Logistics	4,398 (72.7%)	428 (57.3%)	7 (31.8%)	53 (22.0%)	228 (72.6%)	140 (82.4%)	430 (70.2%)	82 (76.6%)	348 (68.8%)
Sales & marketing	5,837 (96.5%)	705 (94.4%)	16 (72.7%)	221 (91.7%)	303 (96.5%)	165 (97.1%)	400 (65.3%)	56 (52.3%)	344 (68.0%)
Overall company operation	3,652 (60.4%)	310 (41.5%)	3 (13.6%)	35 (14.5%)	156 (49.7%)	116 (68.2%)	369 (60.2%)	44 (41.1%)	325 (64.2%)
Other advanced tools	2,913 (48.2%)	355 (47.5%)	4 (18.2%)	86 (35.7%)	180 (57.3%)	85 (50.0%)	339 (55.3%)	39 (36.4%)	300 (59.3%)
Average	78.0%	70.5%	45.5%	56.6%	77.2%	81.3%	70.2%	65.4%	71.2%

Notes: The table shows the percentage of companies implementing at least one digital tool within each tool category. The percentage for each row is calculated by dividing the number of respondents selecting at least one tool in the corresponding tool category for each of the following stages – already implemented (pre-pandemic period (before 2020), already implemented (during pandemic restriction period (Jan 2020–Dec 2021)), and already implemented (post-pandemic restriction period (Jan 2022–now)) – by the relevant total population (n) in each column. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 9.2 shows the digital tool implementation rates for all the surveyed tools.

Table 9.2. Digital Tool Implementation of Agriculture Companies

Tool Category	Digital Tool	Web Survey			Phone Survey		
		Total (n=6,048)	Agriculture (n=747)		Total (n=3,099)	Agriculture (n=613)	
		Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years	Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years
Intra-company management	Email and/or chat applications (e.g. digital tools for text message)	5,717 (94.5%)	702 (94.0%)	14 (1.9%)	542 (17.5%)	97 (15.8%)	508 (82.9%)
	Mobile device	5,722 (94.6%)	671 (89.8%)	18 (2.4%)	2,505 (80.8%)	505 (82.4%)	82 (13.4%)
	Computer	5,814 (96.1%)	710 (95.0%)	22 (2.9%)	2,691 (86.8%)	549 (89.6%)	64 (10.4%)
	Office suite (e.g. Microsoft Office, Google Workspace, iWork)	5,693 (94.1%)	673 (90.1%)	45 (6.0%)	1,226 (39.6%)	211 (34.4%)	277 (45.2%)
	Web meeting system	5,014 (82.9%)	523 (70.0%)	75 (10.0%)	9 (0.3%)	1 (0.2%)	193 (31.5%)
Procurement	Electronic data interchange	4,158 (68.8%)	376 (50.3%)	123 (16.5%)	711 (22.9%)	169 (27.6%)	286 (46.7%)
	E-payment – procurement	5,477 (90.6%)	626 (83.8%)	75 (10.0%)	2,089 (67.4%)	375 (61.2%)	183 (29.9%)

Tool Category	Digital Tool	Web Survey			Phone Survey		
		Total (n=6,048)	Agriculture (n=747)		Total (n=3,099)	Agriculture (n=613)	
		Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years	Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years
Logistics	Document or cargo delivery application	4,049 (66.9%)	407 (54.5%)	138 (18.5%)	1,619 (52.2%)	323 (52.7%)	165 (26.9%)
	Storage or inventory management system	3,915 (64.7%)	354 (47.4%)	121 (16.2%)	693 (22.4%)	120 (19.6%)	397 (64.8%)
Sales & marketing	Electronic data interchange – sales & marketing	4,206 (69.5%)	370 (49.5%)	138 (18.5%)	555 (17.9%)	146 (23.8%)	258 (42.1%)
	Social network service (e.g. Twitter, Facebook, Instagram)	5,616 (92.9%)	678 (90.8%)	47 (6.3%)	949 (30.6%)	162 (26.4%)	326 (53.2%)
	E-commerce	4,614 (76.3%)	463 (62.0%)	126 (16.9%)	727 (23.5%)	141 (23.0%)	389 (63.5%)
	E-payment – sales & marketing	5,508 (91.1%)	639 (85.5%)	67 (9.0%)	868 (28.0%)	184 (30.0%)	399 (65.1%)
	Sales management	4,020 (66.5%)	377 (50.5%)	163 (21.8%)	240 (7.7%)	53 (8.6%)	439 (71.6%)

Tool Category	Digital Tool	Web Survey			Phone Survey		
		Total (n=6,048)	Agriculture (n=747)		Total (n=3,099)	Agriculture (n=613)	
		Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years	Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years
	and automation tool (e.g. Salesforce)						
Overall company operation	Enterprise resource planning	3,279 (54.2%)	282 (37.8%)	129 (17.3%)	274 (8.8%)	33 (5.4%)	380 (62.0%)
	Cloud storage or centralised server	3,013 (49.8%)	247 (33.1%)	109 (14.6%)	161 (5.2%)	51 (8.3%)	224 (36.5%)
	Cybersecurity or protection software	2,992 (49.5%)	231 (30.9%)	121 (16.2%)	1,585 (51.1%)	313 (51.1%)	137 (22.3%)
Other advanced tools	3D printing	1,904 (31.5%)	149 (19.9%)	86 (11.5%)	200 (6.5%)	15 (2.5%)	147 (24.0%)
	Artificial intelligence	1,601 (26.5%)	128 (17.1%)	143 (19.1%)	15 (0.5%)	0 (0.0%)	24 (3.9%)
	Augmented reality	1,305 (21.6%)	106 (14.2%)	136 (18.2%)	4 (0.1%)	0 (0.0%)	11 (1.8%)
	Drone (e.g. farming management)	1,369 (22.6%)	216 (28.9%)	136 (18.2%)	9 (0.3%)	5 (0.9%)	174 (28.4%)
	Internet of things device	2,186 (36.1%)	273 (36.5%)	119 (15.9%)	335 (10.8%)	38 (6.2%)	230 (37.5%)

Tool Category	Digital Tool	Web Survey			Phone Survey		
		Total (n=6,048)	Agriculture (n=747)		Total (n=3,099)	Agriculture (n=613)	
		Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years	Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years
	Radio frequency identification	1,703 (28.2%)	157 (21.0%)	121 (16.2%)	1,224 (39.5%)	297 (48.5%)	195 (31.8%)
	Robotics (e.g. factory robots, farming robots)	1,253 (20.7%)	144 (19.3%)	114 (15.3%)	95 (3.1%)	11 (1.8%)	93 (15.2%)

Notes: The percentage for each row is calculated by dividing the number of respondents' corresponding row answer options by the total questionnaire responses. 'Already implemented' includes (i) already implemented (pre-pandemic period (before 2020)), (ii) already implemented (during pandemic restriction period (Jan 2020–Dec 2021)), and (iii) already implemented (post-pandemic restriction period (Jan 2022–now)). (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

In line with the broader trends in ASEAN, utilising intra-company management tools is most prevalent amongst agricultural companies. The web survey shows that approximately 90% of these companies have incorporated email or chat applications, mobile devices, and computers into their operations. According to the phone survey, the implementation rates for computers (89.6%) and mobile devices (82.4%) stand out as the highest amongst all the digital tools surveyed. The phone survey shows that the current usage of email and other chat applications remains relatively low (15.8%), and these data align with the general trend amongst the phone survey respondents. However, it is encouraging to note that 82.9% of companies have plans to implement them within the next 3 years. Furthermore, the implementation of web meeting systems is currently 0.2% amongst the surveyed companies, but 31.5% have expressed intentions to implement them in the next 3 years. These findings from the phone survey indicate the growing importance of basic digital tools for companies, especially amongst micro and small companies.

Notably, the web survey data show that a significant proportion of agriculture companies in ASEAN have also embraced social network services, with a usage rate of 90.8%, slightly higher than the general trend (92.9%). This finding is backed by research from Grow Asia (2021). According to the study, farmers leverage these digital communication tools to engage efficiently and maintain relationships with various business partners, such as traders, lenders, retailers, and trucking operators. Social media platforms have facilitated the creation of broader and more efficient communication networks, surpassing the limitations of face-to-face interactions or phone calls. Farmers are joining large crop-based chat groups on platforms like Facebook or WhatsApp, where they exchange photos, discuss growing techniques, and share industry news related to their crops. These smartphone-enabled peer group dialogues have provided farmers with access to a wealth of information that was previously unavailable to them.

It is important to note that contrary to the overall trend in the agriculture industry in the web survey, the phone survey shows that small and micro companies exhibit a relatively low implementation rate for social network services (SNS), at 26.4%, which is lower than the general trend amongst the phone survey respondents (30.6%). Nevertheless, the phone survey data show positive signs, as a noticeable proportion (53.2%) have plans to implement SNS in the next 3 years, indicating their recognition of the importance of leveraging social media platforms to enhance company presence and achieve better business outcomes. The widespread adoption of these basic tools has been and will be made possible by the region's expanding network coverage, affordable mobile devices, and supportive government policies (Grow Asia, 2021).

Furthermore, in the web survey, the implementation of e-payment systems stands out prominently amongst agricultural companies in ASEAN, at 83.8% (e-payment – procurement), and 85.5% (e-payment – sales & marketing). The phone survey reveals a similar trend, but the respondents' plans indicate that they are following the overall trend, as 29.9% of them plan to implement e-payment – procurement within the next 3 years

and 65.1% plans to implement e-payment – sales & marketing within the same period. The shift towards digital payments for general goods and services is already well established in ASEAN. Observations from Grow Asia (2021) indicate that farmers in ASEAN are gradually adopting these digital payment tools to facilitate transactions for purchasing inputs and receiving payments for their crops. This trend is expected to continue to expand throughout ASEAN in the upcoming years (Grow Asia, 2021).

For overall company operations, in the web survey, the score for all three tools is lower than the general trend. However, in the phone survey, ERP (62.0%) and cloud storage or centralised servers (36.5%) are expected to be implemented within 3 years. Cybersecurity or protection software has already been implemented by more than 50% of the respondents, which is almost the same score as the general trend of the phone survey. Aguilar (2015) noted that micro and small businesses are increasingly becoming targets for cybercriminals. Attackers often perceive them as easier targets due to their potentially weaker security infrastructure and fewer resources dedicated to cybersecurity. Therefore, the phone survey data show a positive sign that micro and small companies in agriculture are taking proactive steps to safeguard their systems and data by investing in cybersecurity and protection software.

Table 9.3 shows the percentage of employees involved in digital tasks of the agriculture respondents. According to the data, micro and small companies may not have dedicated information technology (IT) departments or personnel with the required skills to comprehend, manage, and maintain the technical aspects of digital tools.

Table 9.3. Employees Involved in Digital Tasks of Agriculture Companies

Answer option	Web survey					Phone survey		
	Average (n=747)	Micro (n=22)	Small (n=241)	Medium (n=314)	Large (n=170)	Average (n=613)	Micro (n=107)	Small (n=506)
None	19 (2.5%)	5 (22.7%)	7 (2.9%)	3 (1.0%)	4 (2.4%)	204 (33.3%)	84 (78.5%)	120 (23.7%)
Less than 5% (excluding 'none')	278 (37.2%)	7 (31.8%)	69 (28.6%)	120 (38.2%)	82 (48.2%)	160 (26.1%)	11 (10.3%)	149 (29.4%)
5%–9%	186 (24.9%)	1 (4.5%)	87 (36.1%)	70 (22.3%)	28 (16.5%)	147 (24.0%)	5 (4.7%)	142 (28.1%)
10%–19%	124 (16.6%)	1 (4.5%)	56 (23.2%)	46 (14.6%)	21 (12.4%)	92 (15.0%)	7 (6.5%)	85 (16.8%)
20%–29%	57 (7.6%)	2 (9.1%)	16 (6.6%)	23 (7.3%)	16 (9.4%)	9 (1.5%)	0 (0.0%)	9 (1.8%)
30%–39%	55 (7.4%)	6 (27.3%)	2 (0.8%)	39 (12.4%)	8 (4.7%)	1 (0.2%)	0 (0.0%)	1 (0.2%)
40%–49%	18 (2.4%)	0 (0.0%)	1 (0.4%)	11 (3.5%)	6 (3.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
More than 50%	10 (1.3%)	0 (0.0%)	3 (1.2%)	2 (0.6%)	5 (2.9%)	0 (0.0%)	0 (0.0%)	0 (0.0%)

Notes: The percentage for each row is calculated by dividing the number of respondents choosing the corresponding row answer options by the total number of corresponding column respondents. (Q6. Of the regular employees you answered in Q5, what percentage are involved in digital-related tasks? (e.g. those in charge of consideration and planning, implementation of digitalisation within the company including in-house engineers) [SINGLE CHOICE: choose one option])

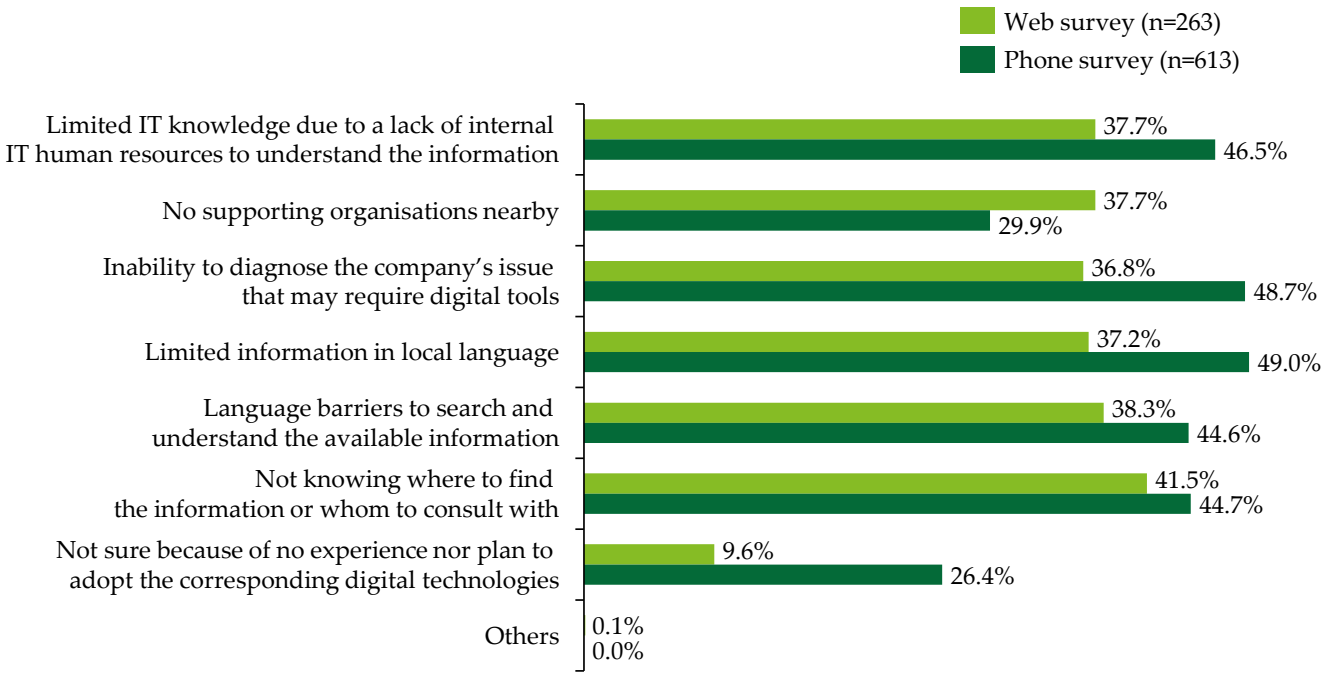
Source: Authors.

The web survey reveals that 22.7% of micro agriculture companies do not have employees dedicated to digital tasks, while the average score is 2.5%. The phone survey reveals that 78.5% of micro and 23.7% of small companies do not have employees for digital tasks, highlighting the lack of human resources within the companies.

Furthermore, the web survey data show that about 40% of micro and 65% of small agriculture companies have only 9% or less of their employees involved in digital work (excluding those categorised as having 'none'). The number from the phone survey is 15% for micro companies and nearly 60% for small companies. This indicates a limited workforce allocation and a relatively low digital capacity within small and micro agriculture companies.

Figure 9.1 shows the causes of difficulties in the information gathering phase.

Figure 9.1. Causes of Difficulties in the Information Gathering Phase of Agriculture Small and Micro Companies



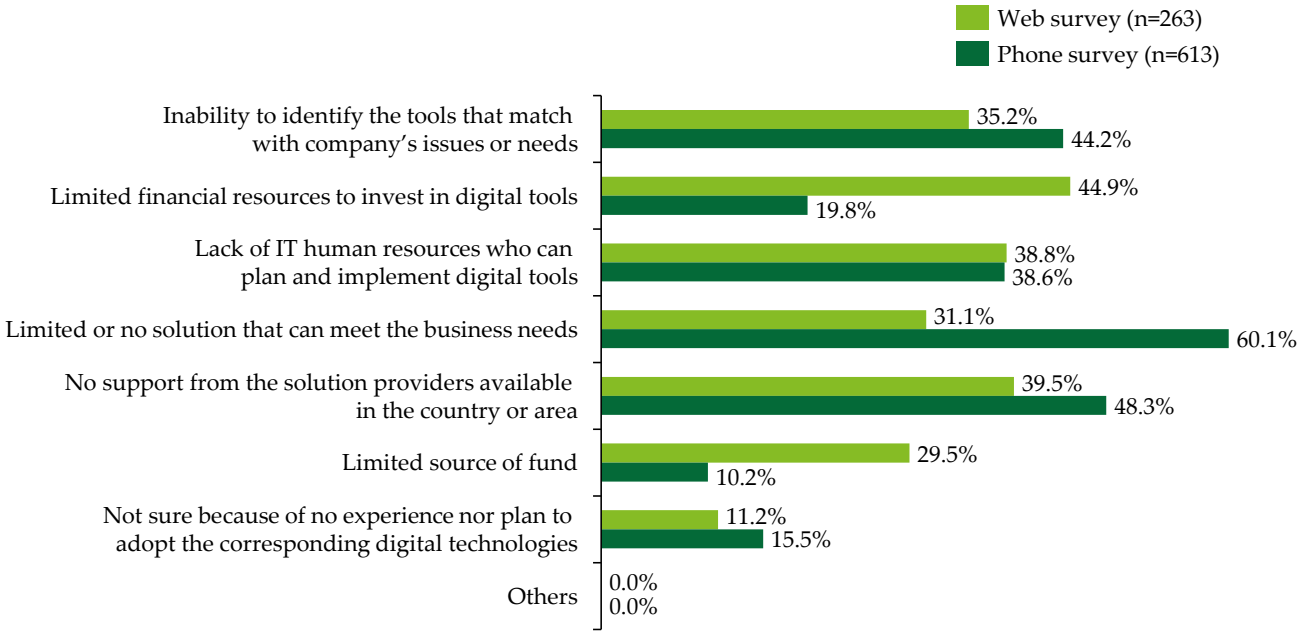
IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of respondents selecting the answer option in the corresponding row by the total responses of small and micro agriculture companies. (Q27. What are the causes of difficulties in information gathering phase? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

'Not knowing where to find the information or whom to consult with' ranks first in the web survey at 41.5% and fourth in the phone survey at 44.7%. The shortage of support, especially in local areas (e.g. technology consultants or industry experts), complicates efforts to gather information and seek assistance. In the phone survey, 'limited

information in local language' ranks first at 49.0%, while 'inability to diagnose the company's issue that may require digital tools' and 'limited IT knowledge due to a lack of internal IT human resources to understand the information' follow with significant scores, at 48.7% and 46.5% respectively. These issues are hindering small and micro agriculture companies from identifying their companies' issues and acquiring the necessary knowledge about digital tools. This suggests that significant information and communication technology (ICT) skills and business knowledge gaps need to be addressed to foster digital growth amongst micro and small agriculture companies.

Figure 9.2 shows the causes of difficulties in the adoption phase.

Figure 9.2. Causes of Difficulties in the Adoption Phase of Agriculture Small and Micro Companies

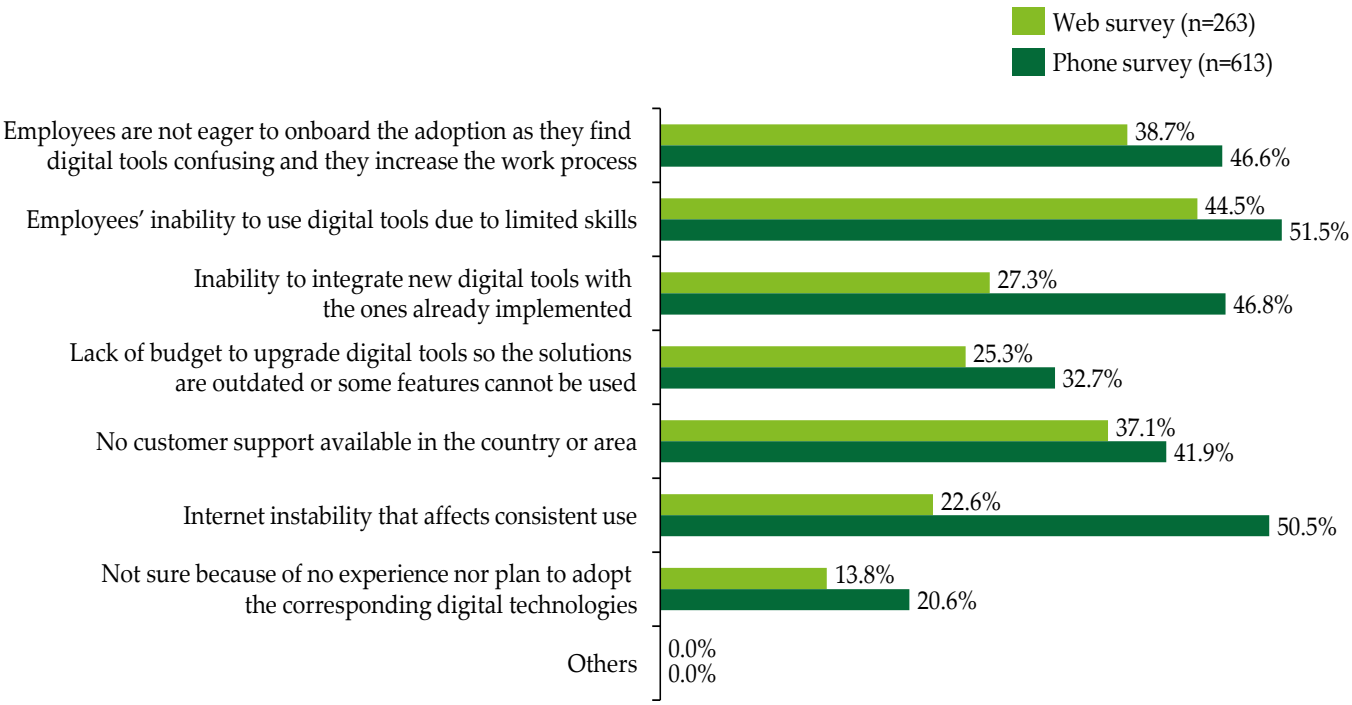


IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of respondents selecting the answer option in the corresponding row by the total responses of small and micro agriculture companies. (Q28. What are the causes of difficulties in adoption phase? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

During the adoption phase, small and micro companies face various challenges. According to the web survey, 'limited financial resources to invest in digital tools' ranked first at 44.9% but scored lower in the phone survey (19.8%). Meanwhile, in the phone survey, the most significant difficulty was 'limited or no solution that can meet the business needs' and 'no support from the solution providers available in the country or area'. These findings highlight the range of difficulties faced by agriculture micro and small companies during the adoption phase. These challenges encompass financial limitations, the ICT skills gap, and the need for localised solutions and support.

Figure 9.3 shows the causes of difficulties in the post-adoption phase.

Figure 9.3. Causes of Difficulties in the Post-Adoption Phase of Agriculture Small and Micro Companies



Notes: The percentage of each bar is calculated by dividing the total number of respondents selecting the answer option in the corresponding row by the total responses of small and micro agriculture companies. (Q29. What are the causes of difficulties in the post-adoption phase? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

In the post-adoption phase, both the web and phone surveys showed that 'employees' inability to use digital tools due to limited skills' is the top concern. Additionally, the web and phone surveys show that 'employees are not eager to onboard the adoption as they find digital tools confusing and they increase the work process' is a concern. It should be highlighted that the phone survey shows a relatively high score for 'internet instability that affects consistent use' as the second highest amongst the answer options. To address these concerns, it is essential to focus on comprehensive employee training programmes to enhance digital literacy and skills as the prioritised support. Besides, efforts should be made to improve internet infrastructure and access, ensuring a stable and reliable connection for uninterrupted usage of digital tools.

In contrast to micro and small agriculture companies, as already indicated in this section, the web survey shows that large and medium-sized agriculture companies demonstrate higher adoption rates of digital tools, in line with the average adoption rates across all industries. Moreover, the proportion of large and medium-sized agriculture companies

that have adopted at least one advanced digital tool in the 'other advanced tools' category surpasses the ASEAN average (Table 9.4).

This discrepancy can be attributed to the customer profiles of these companies. Table 9.4 shows the customer segments of agriculture companies.

Table 9.4. Customer Segments of Agriculture Companies (Web Survey)

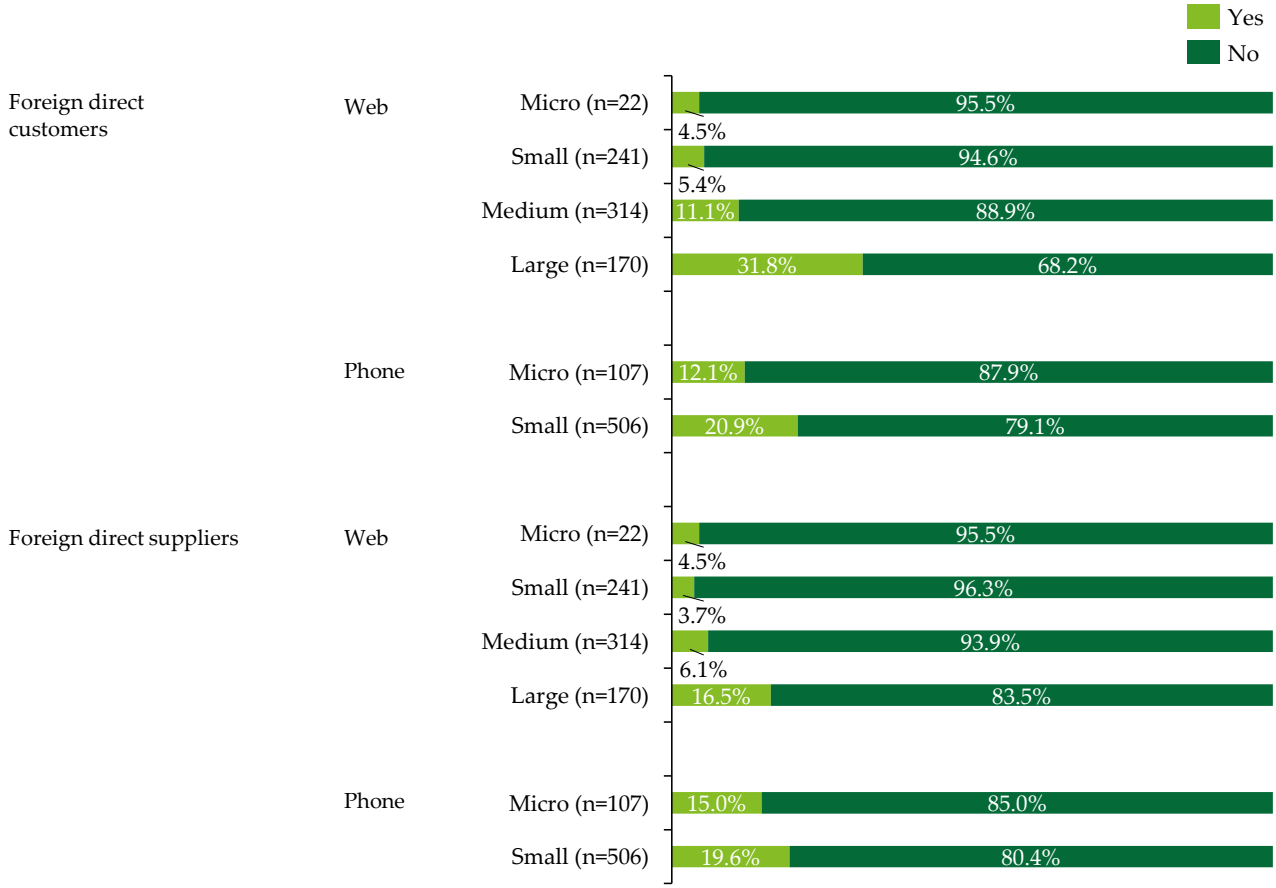
Customer Type	Micro (n=22)	Small (n=241)	Medium (n=314)	Large (n=170)
Consumer (individual or household consumer)	20 (90.9%)	193 (80.1%)	233 (74.2%)	126 (74.1%)
Manufacturing MSMEs	3 (13.6%)	74 (30.7%)	111 (35.4%)	36 (21.2%)
Manufacturing large companies	2 (9.1%)	7 (2.9%)	19 (6.1%)	67 (39.4%)
Non-manufacturing MSMEs	11 (50.0%)	142 (58.9%)	183 (58.3%)	91 (53.5%)
Non-manufacturing large companies	2 (9.1%)	25 (10.4%)	67 (21.3%)	99 (58.2%)
Public institutions (including central or local governments)	1 (4.5%)	7 (2.9%)	16 (5.1%)	23 (13.5%)

MSMEs = micro, small, and medium-sized enterprises.
Notes: The percentage for each row is calculated by dividing the number of respondents choosing the corresponding customer type by the relevant total population (n) in each column. (Q12. Which segment is your customer? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

While most micro agriculture companies serve individual consumers or households, with only a small portion serving large manufacturing companies, large agriculture companies have a different customer base. About 39.4% of large agriculture companies serve large manufacturing customers and 58.2% serve large non-manufacturing companies. These large customers often demand higher quality and efficiency, prompting large agriculture companies to adopt advanced technologies to meet their standards

Figure 9.4 shows the customer and supplier origins of respondents.

Figure 9.4. Foreign Customers and Suppliers of Agriculture Companies



Notes: The percentage for each bar is calculated by dividing the number of respondents choosing the corresponding answer options by the relevant total population (n) in each row. (Q13-1. Does your company have direct customers that include multinational companies, including joint venture companies where at least one owner is a foreign company? [SINGLE CHOICE: choose one option], Q15-1. Does your company have direct suppliers that include multinational companies, including joint venture companies where at least one owner is a foreign company? [SINGLE CHOICE: choose one option])
Source: Authors.

A significant difference is apparent between large agriculture companies and micro and small companies when considering foreign customer and supplier origins. In the web survey, 31.8% of large agriculture companies have foreign direct customers, compared with only 4.5% of micro companies and 5.4% of small companies. Similarly, around 16.5% of large agriculture companies have foreign direct suppliers, while only 4.5% of micro and 3.7% of small companies have such suppliers. Meanwhile, in the phone survey, micro and small companies have higher percentages of direct foreign customers, at 12.1% and 20.9%, respectively. For foreign direct customers, micro and small companies also scored higher than the web survey. As large agriculture companies engage in global operations, they could require robust systems such as ERP, cloud solutions, and cybersecurity measures to support their operations and ensure data protection.

Table 9.5 shows the digital tool implementation by country.

Table 9.5. Agriculture Companies Having Implemented at Least One Type of Digital Tool by Country (Web Survey)

Tool category	BR (n=9)	CA (n=74)	ID (n=115)	LA (n=20)	MM (n=24)	MY (n=113)	PH (n=42)	SG (n=75)	TH (n=131)	VN (n=144)
Intra-company management	8 (88.9%)	74 (100%)	111 (96.5%)	19 (95.0%)	21 (87.5%)	111 (98.2%)	41 (97.6%)	75 (100%)	131 (100%)	142 (98.6%)
Procurement	7 (77.8%)	66 (89.2%)	90 (78.3%)	17 (85.0%)	9 (37.5%)	99 (87.6%)	41 (97.6%)	73 (97.3%)	126 (96.2%)	103 (71.5%)
Logistics	1 (11.1%)	41 (55.4%)	97 (84.3%)	9 (45.0%)	8 (33.3%)	51 (45.1%)	38 (90.5%)	50 (66.7%)	76 (58.0%)	57 (39.6%)
Sales & marketing	8 (88.9%)	73 (98.6%)	102 (88.7%)	18 (90.0%)	20 (83.3%)	107 (94.7%)	40 (95.2%)	73 (97.3%)	130 (99.2%)	134 (93.1%)
Overall company operation	1 (11.1%)	29 (39.2%)	80 (69.6%)	0 (0.0%)	5 (20.8%)	47 (41.6%)	36 (85.7%)	41 (54.7%)	38 (29.0%)	33 (22.9%)
Other advanced tools	2 (22.2%)	64 (86.5%)	77 (67.0%)	4 (20.0%)	5 (20.8%)	76 (67.3%)	34 (81.0%)	27 (36.0%)	22 (16.8%)	44 (30.6%)
Average	50.0%	78.2%	80.7%	55.8%	47.2%	72.4%	91.3%	75.3%	66.5%	59.4%

BR = Brunei, CA = Cambodia, ID = Indonesia, LA = Lao PDR, MM = Myanmar, MY = Malaysia, PH = Philippines, SG = Singapore, TH = Thailand, VN = Viet Nam.

Notes: The table shows the percentage of companies implementing at least one digital tool within each tool category. The percentage for each row is calculated by dividing the number of respondents selecting at least one tool in the corresponding tool category for each of the following stages – already implemented (pre-pandemic period (before 2020)), already implemented (during pandemic restriction period (Jan 2020–Dec 2021)), and already implemented (post-pandemic restriction period (Jan 2022–now)) – by the relevant total population (n) in each column. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])

Source: Authors.

The data suggest that the Philippines (91.3%) and Indonesia (80.7%) have shown significant progress in digitalising agriculture, while Myanmar ranks last (47.2%). It is important to acknowledge that the findings should be interpreted cautiously due to the limited sample size for each country.

In conclusion, the agriculture industry trails other industries in the region regarding digital adoption. This gap is particularly noticeable amongst small and micro companies, especially in implementing advanced emerging technologies. However, there are positive signs as agriculture companies actively embrace digital tools for communication and other business functions, such as e-payment, amongst the surveyed digital tools. This initial adoption lays the foundation for further implementation of more advanced tools and serves as a starting point for agricultural firms to become familiar with digital behaviour and gradually transition to a digital culture. The divide in digital adoption results from significant gaps in ICT skills, business knowledge, and financial resources amongst these companies. In addition to internal capabilities, the digital divide is influenced by external factors such as the supplier or customer base of the companies. Furthermore, this divide is evident between company size and countries. To bridge the digital gap in agriculture, it is necessary to provide support to help agriculture companies enhance their ICT skills, business knowledge, and financial capabilities while considering the unique external factors they encounter so that these companies can embrace digital technologies effectively and propel the industry forward.

3. Services

Services is a sizeable and continuously expanding constituent of gross domestic product (GDP) in ASEAN economies. As of 2020, the services industry represents 27% to 46% of ASEAN Member States' GDP (ASEAN, n.d.).

Table 9.6 shows the percentage of companies implementing at least one digital tool in services. The web survey shows that the services sector outperforms the ASEAN average in all six tool categories, indicating a slightly higher level of digital adoption than the regional average. The level of digital tool implementation varies considerably by company size in services, with bigger companies having better implementation rates, as revealed by the web survey. The percentage of small and micro companies that have adopted at least one digital tool is lower in all six categories than in large companies. In the phone survey, intra-company management, procurement, and logistics are implemented by more than 70% of the surveyed companies, but sales & marketing, overall company operation, and other advanced tools are not widely implemented, at less than 60%.

Table 9.6. Services Companies that Have Implemented at Least One Type of Digital Tool

Tool Category	Total (n=6,048)	Web Survey					Phone Survey		
		Services					Services		
		Subtotal (n=2,126)	Micro (n=127)	Small (n=449)	Medium (n=1,102)	Large (n=448)	Subtotal (n=629)	Micro (n=132)	Small (n=497)
Intra-company management	5,943 (98.3%)	2,093 (98.4%)	111 (87.4%)	443 (98.7%)	1,095 (99.4%)	444 (99.1%)	543 (86.3%)	122 (92.4%)	421 (84.7%)
Procurement	5,576 (92.2%)	1,976 (92.9%)	96 (75.6%)	406 (90.4%)	1,049 (95.2%)	425 (94.9%)	479 (76.2%)	114 (86.4%)	365 (73.4%)
Logistics	4,398 (72.7%)	1,548 (72.8%)	43 (33.9%)	257 (57.2%)	858 (77.9%)	390 (87.1%)	442 (70.3%)	106 (80.3%)	336 (67.6%)
Sales & marketing	5,837 (96.5%)	2,057 (96.8%)	107 (84.3%)	431 (96.0%)	1,082 (98.2%)	437 (97.5%)	365 (58.0%)	73 (55.3%)	292 (58.8%)
Overall company operation	3,652 (60.4%)	1,430 (67.3%)	40 (31.5%)	217 (48.3%)	801 (72.7%)	372 (83.0%)	331 (52.6%)	67 (50.8%)	264 (53.2%)
Other advanced tools	2,913 (48.2%)	1,195 (56.2%)	29 (22.8%)	217 (48.3%)	678 (61.5%)	271 (60.5%)	279 (44.4%)	61 (46.2%)	218 (43.9%)
Average	78.0%	80.7%	55.9%	73.2%	84.1%	87.0%	64.6%	68.6%	63.6%

Notes: The table shows the percentage of companies that have implemented at least one digital tool within each tool category. The percentage for each row is calculated by dividing the number of respondents selecting at least one tool in the corresponding tool category for each of the following stages – already implemented (pre-pandemic period (before 2020)), already implemented (during pandemic restriction period (Jan 2020–Dec 2021)), and already implemented (post-pandemic restriction period (Jan 2022–now)) – by the relevant total population (n) in each column. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

Table 9.7 shows the digital tool implementation rates for all the surveyed tools.

Table 9.7. Digital Tool Implementation of Services Companies

Tool Category	Digital Tool	Web Survey			Phone Survey		
		Total (n=6,048)	Services (n=2,126)		Total (n=3,099)	Services (n=629)	
		Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years	Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years
Intra-company management	Email and/or chat applications (e.g. digital tools for text message)	5,717 (94.5%)	2,018 (94.9%)	542 (17.5%)	542 (17.5%)	135 (21.5%)	488 (77.6%)
	Mobile device	5,722 (94.6%)	2,027 (95.3%)	2505 (80.8%)	2505 (80.8%)	476 (75.7%)	119 (18.9%)
	Computer	5,814 (96.1%)	2,048 (96.3%)	2691 (86.8%)	2691 (86.8%)	538 (85.5%)	91 (14.5%)
	Office suite (e.g. Microsoft Office, Google Workspace, iWork)	5,693 (94.1%)	2,019 (95.0%)	1,226 (39.6%)	1,226 (39.6%)	233 (37.0%)	265 (42.1%)
	Web meeting system	5,014 (82.9%)	1,820 (85.6%)	9 (0.3%)	9 (0.3%)	2 (0.3%)	234 (37.2%)
Procurement	Electronic data interchange	4,158 (68.8%)	1,487 (69.9%)	711 (22.9%)	711 (22.9%)	153 (24.3%)	264 (42.0%)
	E-payment – procurement	5,477 (90.6%)	1,934 (91.0%)	2,089 (67.4%)	2,089 (67.4%)	371 (59.0%)	172 (27.3%)

Tool Category	Digital Tool	Web Survey			Phone Survey		
		Total (n=6,048)	Services (n=2,126)		Total (n=3,099)	Services (n=629)	
		Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years	Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years
Logistics	Document or cargo delivery application	4,049 (66.9%)	1,321 (62.1%)	1,619 (52.2%)	1,619 (52.2%)	331 (52.6%)	169 (26.9%)
	Storage or inventory management system	3,915 (64.7%)	1,428 (67.2%)	693 (22.4%)	693 (22.4%)	149 (23.7%)	360 (57.2%)
Sales & marketing	Electronic data interchange – sales & marketing	4,206 (69.5%)	1,566 (73.7%)	555 (17.9%)	555 (17.9%)	112 (17.8%)	244 (38.8%)
	Social network service (e.g. Twitter, Facebook, Instagram)	5,616 (92.9%)	1,986 (93.4%)	949 (30.6%)	949 (30.6%)	191 (30.4%)	382 (60.7%)
	E-commerce	4,614 (76.3%)	1,630 (76.7%)	727 (23.5%)	727 (23.5%)	135 (21.5%)	368 (58.5%)
	E-payment – sales & marketing	5,508 (91.1%)	1,937 (91.1%)	868 (28.0%)	868 (28.0%)	165 (26.2%)	419 (66.6%)
	Sales management	4,020 (66.5%)	1,460 (68.7%)	240 (7.7%)	240 (7.7%)	68 (10.8%)	353 (56.1%)

Tool Category	Digital Tool	Web Survey			Phone Survey		
		Total (n=6,048)	Services (n=2,126)		Total (n=3,099)	Services (n=629)	
		Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years	Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years
	and automation tool (e.g. Salesforce)						
Overall company operation	Enterprise resource planning	3,279 (54.2%)	1,194 (56.2%)	274 (8.8%)	274 (8.8%)	54 (8.6%)	336 (53.4%)
	Cloud storage or centralised server	3,013 (49.8%)	1,197 (56.3%)	161 (5.2%)	161 (5.2%)	30 (4.8%)	193 (30.7%)
	Cybersecurity or protection software	2,992 (49.5%)	1,274 (59.9%)	1,585 (51.1%)	1,585 (51.1%)	313 (49.8%)	135 (21.5%)
Other advanced tools	3D printing	1,904 (31.5%)	880 (41.4%)	200 (6.5%)	200 (6.5%)	29 (4.6%)	169 (26.9%)
	Artificial intelligence	1,601 (26.5%)	815 (38.3%)	15 (0.5%)	15 (0.5%)	2 (0.3%)	38 (6.0%)
	Augmented reality	1,305 (21.6%)	624 (29.4%)	4 (0.1%)	4 (0.1%)	0 (0.0%)	25 (4.0%)
	Drone (e.g. farming management)	1,369 (22.6%)	677 (31.8%)	9 (0.3%)	9 (0.3%)	2 (0.3%)	177 (28.1%)
	Internet of things device	2,186 (36.1%)	1,005 (47.3%)	335 (10.8%)	335 (10.8%)	65 (10.3%)	283 (45.0%)

Tool Category	Digital Tool	Web Survey			Phone Survey		
		Total (n=6,048)	Services (n=2,126)		Total (n=3,099)	Services (n=629)	
		Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years	Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years
	Radio frequency identification	1,703 (28.2%)	782 (36.8%)	1,224 (39.5%)	1,224 (39.5%)	196 (31.2%)	219 (34.8%)
	Robotics (e.g. factory robots, farming robots)	1,253 (20.7%)	423 (19.9%)	95 (3.1%)	95 (3.1%)	2 (0.3%)	99 (15.7%)

Notes: The percentage for each row is calculated by dividing the number of respondents' corresponding row answer options by the total questionnaire responses. 'Already implemented' includes (i) already implemented (pre-pandemic period (before 2020)), (ii) already implemented (during pandemic restriction period (Jan 2020–Dec 2021)), and (iii) already implemented (post-pandemic restriction period (Jan 2022–now)). (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

The web survey results show that about 95.0% of the services companies incorporate email and/or chat applications, mobile devices, computers, and office suites. The services companies also exhibit higher adoption rates for more advanced digital tools. For instance, 59.9% of the services companies have implemented cybersecurity or protection software, compared with the ASEAN average of 49.5% amongst the web survey respondents. This difference can be attributed to the specific characteristics of the services industry, which often deals with sensitive customer data and faces higher cybersecurity risks. Regarding emerging technologies in the other advanced tools category, the services sector generally demonstrates significantly higher adoption rates than the ASEAN average. For example, the adoption rate of artificial intelligence (AI) is 38.3%, whereas the ASEAN average is 26.5%. This aligns with a study by McKinsey (2018), which identifies services companies such as financial services, professional services, and telecom companies as leaders in overall AI adoption. Major AI applications include service operations, product or service development, marketing & sales, and risk management (McKinsey, 2018). Overall, digital tools have become integral to many services companies' operations and business models.

The phone survey shows that the adoption of intra-company management tools in services is about the same as the ASEAN average. Cybersecurity or protection software is widely implemented amongst the phone survey respondents, similar to the web survey result. Apart from the protection software, however, the findings show some differences regarding other advanced tools as these tools have already been implemented according to the web survey's findings, while there are still lags amongst the ASEAN average in the phone survey.

In general, the adoption of digital tools varies based on the business needs of different company sizes. When formulating initiatives to encourage digital tool adoption in ASEAN, digital solution providers and ASEAN support stakeholders should consider these variations to ensure their efforts are relevant and effective.

In contrast to small and micro services companies, medium-sized and large services companies surpass the services industry average and the overall ASEAN company average in the percentage of companies implementing at least one digital tool across all six categories. This disparity can be attributed to several factors, particularly when comparing micro companies with their larger counterparts:

(i) Proportion of human resources dedicated to digital tasks

Table 9.8 shows the percentage of employees involved in digital tasks of services companies. Larger companies have a higher proportion of employees dedicated to digital tasks. In the web survey, large services companies have IT staff, with 52.9% allocating 10%–49% of employees to digital tasks and 16.5% dedicating over 50% of their workforce to such tasks. In contrast, 22.0% of micro companies lack digital staff and only 37.0% have 10%–49% of employees engaged in digital tasks. A significant portion of micro companies (25.2%) have less than 9% of employees working on digital tasks (excluding those with none), and 15.7% have over 50% dedicated to digital tasks. Similar patterns, indicating an even lower investment in digital human resources amongst micro and small companies, are observed

in the phone survey. Some 72.0% of micro and 19.1% of small companies have not assigned employees to digital tasks, while 19.4% of micro and 65.6% of small companies have less than 9% of employees working on digital tasks (excluding those with none). These data indicate a significant difference in the number of human resources between the larger and smaller companies.

Table 9.8. Employees Involved in Digital Tasks of Services Companies

Answer Option	Web Survey					Phone Survey		
	Average (n=2,126)	Micro (n=127)	Small (n=449)	Medium (n=1,102)	Large (n=448)	Average (n=629)	Micro (n=132)	Small (n=497)
None	49 (2.3%)	28 (22.0%)	8 (1.8%)	11 (1.0%)	2 (0.4%)	190 (30.2%)	95 (72.0%)	95 (19.1%)
Less than 5% (excluding 'none')	408 (19.2%)	27 (21.3%)	109 (24.3%)	217 (19.7%)	55 (12.3%)	114 (18.1%)	9 (6.8%)	105 (21.1%)
5%–9%	406 (19.1%)	5 (3.9%)	85 (18.9%)	236 (21.4%)	80 (17.9%)	238 (37.8%)	17 (12.9%)	221 (44.5%)
10%–19%	329 (15.5%)	22 (17.3%)	62 (13.8%)	151 (13.7%)	94 (21.0%)	80 (12.7%)	10 (7.6%)	70 (14.1%)
20%–29%	192 (9.0%)	20 (15.7%)	43 (9.6%)	62 (5.6%)	67 (15.0%)	4 (0.6%)	1 (0.8%)	3 (0.6%)
30%–39%	312 (14.7%)	3 (2.4%)	75 (16.7%)	188 (17.1%)	46 (10.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
40%–49%	216 (10.2%)	2 (1.6%)	31 (6.9%)	153 (13.9%)	30 (6.7%)	1 (0.2%)	0 (0.0%)	1 (0.2%)
More than 50%	214 (10.1%)	20 (15.7%)	36 (8.0%)	84 (7.6%)	74 (16.5%)	2 (0.3%)	0 (0.0%)	2 (0.4%)

Notes: The percentage for each row is calculated by dividing the number of respondents choosing the corresponding row answer options by the total number of corresponding column respondents. (Q6. Of the regular employees you answered in Q5, what percentage are involved in digital-related tasks? (e.g. those in charge of consideration and planning, implementation of digitalisation within the company including in-house engineers) [SINGLE CHOICE: choose one option])
Source: Authors.

(ii) Variation in customer base

Table 9.9 shows the customer segments of the services companies. According to the web survey, large companies cater to a wide range of customers, requiring advanced digital logistics and procurement tools to meet diverse needs effectively. In contrast, micro and small companies primarily serve consumers and micro, small, and medium-sized enterprises (MSMEs), with a smaller percentage serving large manufacturing or non-manufacturing companies. Consequently, the demand for adopting logistics tools or advanced technologies to address their requirements is lower. Similarly, the phone survey reveals that 93.2% of micro and 93.4% of small companies have individual or household customers. Meanwhile, only 9.8% of micro and 6.2% of small companies serve large manufacturing customers and 3.0% of micro and 18.3% of small companies serve large non-manufacturing customers.

Table 9.9. Customer Segments of Services Companies

Customer Type	Web Survey				Phone Survey	
	Micro (n=127)	Small (n=449)	Medium (n=1,102)	Large (n=448)	Micro (n=132)	Small (n=497)
Consumer (individual or household consumer)	108 (85.0%)	294 (65.5%)	650 (59.0%)	266 (59.4%)	123 (93.2%)	464 (93.4%)
Manufacturing MSMEs	11 (8.7%)	64 (14.3%)	194 (17.6%)	106 (23.7%)	45 (34.1%)	106 (21.3%)
Manufacturing large companies	11 (8.7%)	24 (5.3%)	92 (8.3%)	120 (26.8%)	13 (9.8%)	31 (6.2%)
Non-manufacturing MSMEs	23 (18.1%)	195 (43.4%)	566 (51.4%)	100 (22.3%)	97 (73.5%)	334 (67.2%)
Non-manufacturing large companies	13 (10.2%)	31 (6.9%)	101 (9.2%)	160 (35.7%)	4 (3.0%)	91 (18.3%)
Public institutions (including central or local governments)	14 (11.0%)	52 (11.6%)	133 (12.1%)	108 (24.1%)	1 (0.8%)	4 (0.8%)

MSMEs = micro, small, and medium-sized enterprises.
Notes: The percentage for each row is calculated by dividing the number of respondents choosing the corresponding customer type by the relevant total population (n) in each column. (Q12. Which segment is your customer? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

(iii) Separation of business functions in different locations

Table 9.10 shows the services companies' separate sales, production, and procurement bases. The distribution of business functions across different locations is common amongst large and medium-sized companies. According to the web survey, 60.9% of large and 58.9% of medium-sized services companies have separate sales bases, which is higher than the shares of micro (28.3%) and small companies (49.0%). The phone survey results reveal even lower percentages for micro and small companies, with 0.0% for micro and 0.8% for small companies having separate sales bases. Similar disparities are also observed in production and procurement bases. The division of functions across multiple locations can significantly impact the adoption of specific digital tools. Having separate bases for different functions presents challenges in several areas, such as communication, logistics, and operations management. As a result, there is increased demand for digital solutions, particularly within larger companies, compared with smaller ones.

Table 9.10. Services Companies with Separate Bases for Sales, Production, and Procurement

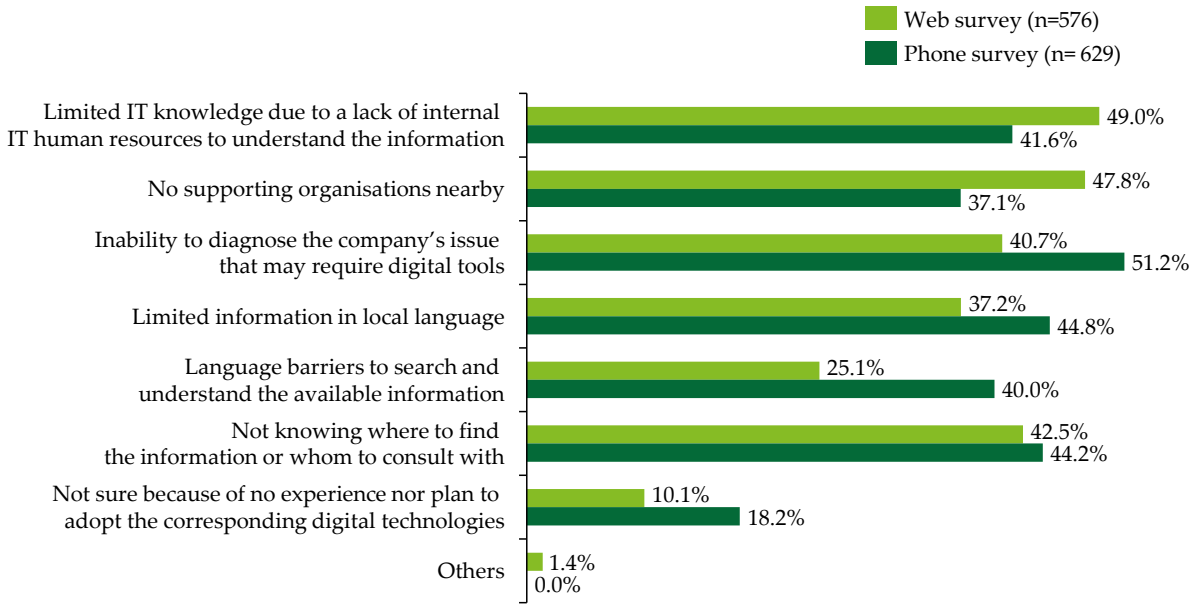
Separate Base	Web Survey				Phone Survey	
	Micro (n=127)	Small (n=440)	Medium (n=1,102)	Large (n=448)	Micro (n=132)	Small (n=497)
Sales	36 (28.3%)	220 (49.0%)	649 (58.9%)	273 (60.9%)	0 (0.0%)	4 (0.8%)
Production	23 (18.1%)	197 (43.9%)	555 (50.4%)	218 (48.7%)	0 (0.0%)	3 (0.6%)
Procurement	28 (22.0%)	190 (42.3%)	598 (54.3%)	229 (51.1%)	0 (0.0%)	8 (1.6%)

Notes: The percentage for each row is calculated by dividing the number of respondents indicating having a separate base for the corresponding business function by the relevant total population (n) in each column. (Q11. Does your company have separate base for sales, production, and procurement apart from your company's site? [SINGLE CHOICE: choose one option])
Source: Authors.

While the services sector has made remarkable progress in adopting digital tools, it still faces challenges during implementation. According to Figure 9.5, in the web survey, the information gathering phase reveals several major difficulties – 'limited IT knowledge due to a lack of internal IT human resources to understand the information (49.0%)', 'no supporting organisations nearby (47.8%)', 'not knowing where to find the information or whom to consult with (42.5%)', and 'inability to diagnose the company's issue that may require digital tools (40.7%)' are prominent obstacles for many micro and small companies. The phone survey shows similar perspectives, but it should be highlighted that 39.9% answered 'limited information in local language' and 40.0% selected 'language barriers to

search and understand the available information'. These findings indicate clear gaps in ICT skills, business knowledge, and the need for localised information and support within the services industry, particularly amongst micro and small companies.

Figure 9.5. Causes of Difficulties in the Information Gathering Phase of Services Small and Micro Companies

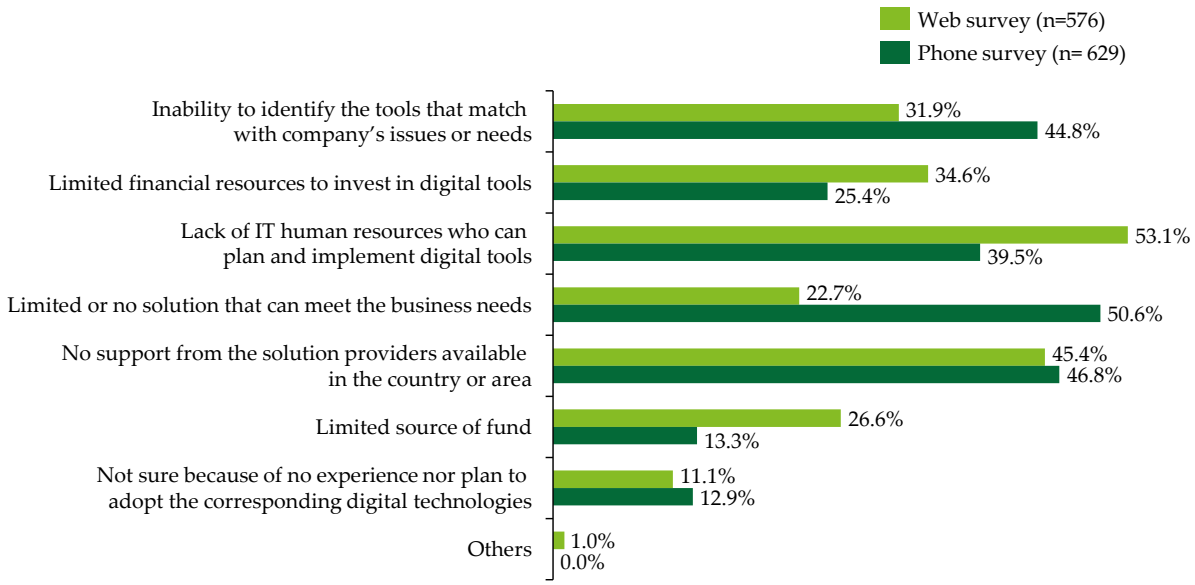


IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of respondents selecting the answer option in the corresponding row by the total number of responses of small and micro services companies. (Q27. What are the causes of difficulties in information gathering phase? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Figure 9.6 shows that during the adoption phase, the implementation of digital tools in the services industry is hindered by several key challenges. The web survey shows that the primary difficulties identified include 'lack of IT human resources who can plan and implement digital tools' (53.1%), 'no support from the solution providers available in the country or area' (45.4%), and 'limited financial resources to invest in digital tools' (34.6%). These findings indicate persistent gaps in ICT skills, business knowledge, and budget in services companies. It is evident that companies face internal limitations regarding having skilled personnel who can effectively manage the planning and implementation of digital tools. Furthermore, external factors such as the unavailability of adequate support from local solution providers exacerbate the challenges faced by services companies. Meanwhile, the phone survey highlights 'limited or no solution that can meet the business needs' (50.6%), 'no support from the solution providers available in the country or area' (46.8%), and 'inability to identify the tools that match with company's issues or needs' (44.8%). It is worth noting that a significant number of companies cite the challenge of limited or no

solutions that can meet their specific business needs. These findings underscore the importance for the public and private sectors of implementing measures catering to the unique requirements of micro and small services businesses.

Figure 9.6. Causes of Difficulties in the Adoption Phase of Services Small and Micro Companies

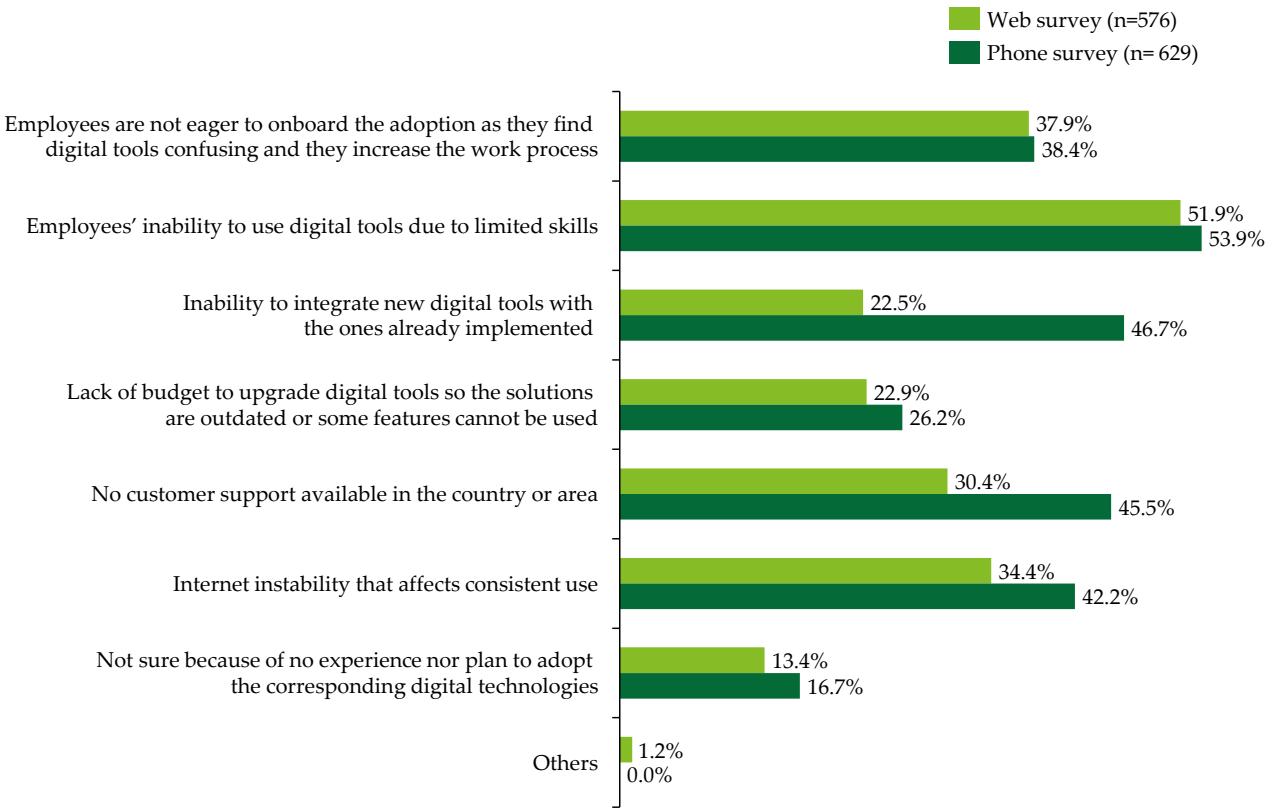


IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of respondents selecting the answer option in the corresponding row by the total number of responses of small and micro services companies. (Q28. What are the causes of difficulties in adoption phase? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Figure 9.7 shows the causes of difficulties in the post-adoption phase. In both the web and phone surveys, the top difficulty is 'employees' inability to use digital tools due to limited skills', at 51.9% and 53.9%, respectively. The web and phone surveys showed that 'employees are not eager to onboard the adoption as they find digital tools confusing and they increase the work process' as the most significant difficulty. The phone survey showed a wide range of difficulties, such as 'inability to integrate new digital tools with the ones already implemented', 'no customer support available in the country or area', and 'internet instability that affects consistent use'. These findings highlight gaps in ICT skills, business knowledge, and infrastructure in the post-adoption phase. These challenges are understandable given the limited number of employees and the smaller percentage dedicated to digital tasks in micro and small companies. Addressing the human resources issue is crucial for resolving many other problems that services companies face. By focusing on upskilling and training programmes, companies can enhance employees' digital proficiency and overcome the barrier of limited skills. Moreover, improving internet stability and ensuring accessible customer support as external factors are essential

infrastructure considerations that can facilitate smooth post-adoption experiences for companies.

Figure 9.7. Causes of Difficulties in the Post-Adoption Phase of Services Small and Micro Companies



Notes: The percentage of each bar is calculated by dividing the total number of respondents selecting the answer option in the corresponding row by the total number of responses of small and micro services companies. (Q29. What are the causes of difficulties in the post-adoption phase? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Table 9.11 shows digital tool implementation by country. Significant advancements in digitalising services have been observed in Malaysia, the Philippines, and Singapore. This is evident from the high average rates of digital tool implementation across all categories. Malaysia leads the way with an adoption rate of 96.6%, followed by the Philippines at 89.5% and Singapore at 89.3%. It should be noted that Malaysia and Indonesia demonstrate high shares of the other advanced tools category, including advanced digital technologies, with Malaysia at 90.4% and Indonesia at 72.5%. On the other hand, in terms of average rates across the six categories, Brunei (55.6%) and Myanmar (62.1%) rank lowest.

Table 9.11. Services Companies Having Implemented at Least One Type of Digital Tool by Country (Web Survey)

Tool Category	BR (n=136)	CA (n=158)	ID (n=320)	LA (n=88)	MM (n=138)	MY (n=501)	PH (n=196)	SG (n=194)	TH (n=170)	VN (n=225)
Intra-company management	133 (97.8%)	158 (100%)	308 (96.3%)	86 (97.7%)	132 (95.7%)	500 (99.8%)	196 (100%)	193 (99.5%)	165 (97.1%)	222 (98.7%)
Procurement	131 (96.3%)	156 (98.7%)	276 (86.3%)	82 (93.2%)	106 (76.8%)	482 (96.2%)	191 (97.4%)	191 (98.5%)	153 (90.0%)	208 (92.4%)
Logistics	30 (22.1%)	117 (74.1%)	274 (85.6%)	35 (39.8%)	65 (47.1%)	482 (96.2%)	174 (88.8%)	175 (90.2%)	87 (51.2%)	109 (48.4%)
Sales & marketing	133 (97.8%)	158 (100%)	302 (94.4%)	83 (94.3%)	120 (87.0%)	498 (99.4%)	192 (98.0%)	192 (99.0%)	163 (95.9%)	216 (96.0%)
Overall company operation	25 (18.4%)	83 (52.5%)	248 (77.5%)	22 (25.0%)	62 (44.9%)	488 (97.4%)	181 (92.3%)	180 (92.8%)	70 (41.2%)	71 (31.6%)
Other advanced tools	2 (1.5%)	98 (62.0%)	232 (72.5%)	32 (36.4%)	29 (21.0%)	453 (90.4%)	119 (60.7%)	109 (56.2%)	46 (27.1%)	75 (33.3%)
Average	55.6%	81.2%	85.4%	64.4%	62.1%	96.6%	89.5%	89.3%	67.1%	66.7%

BR = Brunei, CA = Cambodia, ID = Indonesia, LA = Lao PDR, MM = Myanmar, MY = Malaysia, PH = Philippines, SG = Singapore, TH Thailand, VN = Viet Nam.

Notes: The table shows the percentage of companies implementing at least one digital tool within each tool category. The percentage for each row is calculated by dividing the number of respondents selecting at least one tool in the corresponding tool category for each of the following stages – already implemented (pre-pandemic period (before 2020)), already implemented (during pandemic restriction period (Jan 2020–Dec 2021)), and already implemented (post-pandemic restriction period (Jan 2022–now)) – by the relevant total population (n) in each column. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])

Source: Authors.

In summary, the services sector has shown remarkable progress in digital adoption compared with other industries in the region. This demonstrates the industry's recognition of the importance of digital tools and technologies in enhancing different aspects of their businesses. However, the findings also shed light on persistent challenges faced by the services sector, such as the need for improved ICT skills and business knowledge. By addressing these gaps, services can overcome difficulties to achieve a higher implementation rate. In addition, it is crucial to emphasise bridging financial gaps and developing the digital workforce for micro and small services companies. These companies often face unique challenges due to their limited resources and smaller scale of operations.

4. Manufacturing

Table 9.12 shows the percentage of companies implementing at least one digital tool in manufacturing.

The web survey shows that manufacturing demonstrates a similar level of digital tool implementation to the average across all ASEAN industries and tool categories. This suggests that manufacturing is on a par with overall digital development in ASEAN. Moreover, the implementation rates within manufacturing are comparable across three types of manufacturing, indicating a consistent level of digital adoption. The web survey shows that the most commonly adopted tool categories are intra-company management tools (98.2%), sales & marketing (96.9%), and procurement (93.5%). From the web survey, the percentages of procurement, logistics, and sales & marketing are slightly higher than the ASEAN average. The phone survey data show a similar trend, as intra-company management tools (86.7%) and procurement (85.0%) are the most commonly implemented tool categories, followed by logistics (69.3%) and sales & marketing (58.3%).

Table 9.12. Manufacturing Companies Having Implemented at Least One Type of Digital Tool

Tool category	Web survey					Phone survey			
	Total (n=6,048)	Mfg.				Mfg.			
		Subtotal (n=3,175)	Mfg. light 1 (n=1,031)	Mfg. light 2 (n=1,048)	Mfg. heavy (n=1,096)	Subtotal (n=1,857)	Mfg. light 1 (n=632)	Mfg. light 2 (n=618)	Mfg. heavy (n=607)
Intra-company management	5,943 (98.3%)	3,117 (98.2%)	991 (96.1%)	1,038 (99.0%)	1,088 (99.3%)	1,610 (86.7%)	537 (85.0%)	531 (85.9%)	542 (89.3%)
Procurement	5,576 (92.2%)	2,969 (93.5%)	935 (90.7%)	990 (94.5%)	1,044 (95.3%)	1,579 (85.0%)	530 (83.9%)	514 (83.2%)	535 (88.1%)
Logistics	4,398 (72.7%)	2,422 (76.3%)	756 (73.3%)	758 (72.3%)	908 (82.8%)	1,287 (69.3%)	414 (65.5%)	435 (70.4%)	438 (72.2%)
Sales & marketing	5,837 (96.5%)	3,075 (96.9%)	990 (96.0%)	1,016 (96.9%)	1,069 (97.5%)	1,082 (58.3%)	362 (57.3%)	338 (54.7%)	382 (62.9%)
Overall company operation	3,652 (60.4%)	1,912 (60.2%)	626 (60.7%)	551 (52.6%)	735 (67.1%)	1,026 (55.3%)	328 (51.9%)	323 (52.3%)	375 (61.8%)
Other advanced tools	2,913 (48.2%)	1,363 (42.9%)	524 (50.8%)	392 (37.4%)	447 (40.8%)	976 (52.6%)	308 (48.7%)	304 (49.2%)	364 (60.0%)
Average	78.0%	78.0%	78.0%	75.5%	80.5%	67.9%	65.4%	65.9%	72.4%

Mfg. = manufacturing.

Notes: The table shows the percentage of companies implementing at least one digital tool within each tool category. The percentage for each row is calculated by dividing the number of respondents selecting at least one tool in the corresponding tool category for each of the following stages – already implemented (pre-pandemic period (before 2020)), already implemented (during pandemic restriction period (Jan 2020–Dec 2021)), and already implemented (post-pandemic restriction period (Jan 2022–now)) – by the relevant total population (n) in each column. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])

Source: Authors.

Table 9.13 shows the digital tool implementation rates for all surveyed tools across manufacturing companies.

Table 9.13. Digital Tool Implementation of Manufacturing Companies

Tool Category	Digital Tool	Web Survey			Phone Survey		
		Total (n=6,048)	Mfg. (n=3,175)		Total (n=3,099)	Mfg. (n=1,857)	
		Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years	Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years
Intra-company management	Email and/or chat applications (e.g. digital tools for text message)	5,717 (94.5%)	2,997 (94.4%)	542 (17.5%)	542 (17.5%)	310 (16.7%)	1,544 (83.1%)
	Mobile device	5,722 (94.6%)	3,024 (95.2%)	2,505 (80.8%)	2,505 (80.8%)	1,524 (82.1%)	271 (14.6%)
	Computer	5,814 (96.1%)	3,056 (96.3%)	2,691 (86.8%)	2,691 (86.8%)	1,604 (86.4%)	252 (13.6%)
	Office suite (e.g. Microsoft Office, Google Workspace, iWork)	5,693 (94.1%)	3,001 (94.5%)	1,226 (39.6%)	1,226 (39.6%)	782 (42.1%)	663 (35.7%)

Tool Category	Digital Tool	Web Survey			Phone Survey		
		Total (n=6,048)	Mfg. (n=3,175)		Total (n=3,099)	Mfg. (n=1,857)	
		Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years	Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years
	Web meeting system	5,014 (82.9%)	2,671 (84.1%)	9 (0.3%)	9 (0.3%)	6 (0.3%)	837 (45.1%)
Procurement	Electronic data interchange	4,158 (68.8%)	2,295 (72.3%)	711 (22.9%)	711 (22.9%)	389 (21.0%)	943 (50.8%)
	E-payment – procurement	5,477 (90.6%)	2,917 (91.9%)	2,089 (67.4%)	2,089 (67.4%)	1,343 (72.3%)	434 (23.4%)
Logistics	Document or cargo delivery application	4,049 (66.9%)	2,321 (73.1%)	1,619 (52.2%)	1,619 (52.2%)	965 (52.0%)	442 (23.8%)
	Storage or inventory management system	3,915 (64.7%)	2,133 (67.2%)	693 (22.4%)	693 (22.4%)	424 (22.8%)	1,073 (57.8%)
Sales & marketing	Electronic data interchange – sales & marketing	4,206 (69.5%)	2,270 (71.5%)	555 (17.9%)	555 (17.9%)	297 (16.0%)	721 (38.8%)
	Social network service (e.g. Twitter,	5,616 (92.9%)	2,952 (93.0%)	949 (30.6%)	949 (30.6%)	596 (32.1%)	1,095 (59.0%)

Tool Category	Digital Tool	Web Survey			Phone Survey		
		Total (n=6,048)	Mfg. (n=3,175)		Total (n=3,099)	Mfg. (n=1,857)	
		Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years	Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years
	Facebook, Instagram)						
	E-commerce	4,614 (76.3%)	2,521 (79.4%)	727 (23.5%)	727 (23.5%)	451 (24.3%)	1,026 (55.3%)
	E-payment – sales & marketing	5,508 (91.1%)	2,932 (92.3%)	868 (28.0%)	868 (28.0%)	519 (27.9%)	1,201 (64.7%)
	Sales management and automation tool (e.g. Salesforce)	4,020 (66.5%)	2,183 (68.8%)	240 (7.7%)	240 (7.7%)	119 (6.4%)	1,155 (62.2%)
Overall company operation	Enterprise resource planning	3,279 (54.2%)	1,803 (56.8%)	274 (8.8%)	274 (8.8%)	187 (10.1%)	965 (52.0%)
	Cloud storage or centralised server	3,013 (49.8%)	1,569 (49.4%)	161 (5.2%)	161 (5.2%)	80 (4.3%)	579 (31.2%)

Tool Category	Digital Tool	Web Survey			Phone Survey		
		Total (n=6,048)	Mfg. (n=3,175)		Total (n=3,099)	Mfg. (n=1,857)	
		Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years	Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years
	Cybersecurity or protection software	2,992 (49.5%)	1,487 (46.8%)	1,585 (51.1%)	1,585 (51.1%)	959 (51.6%)	382 (20.6%)
Other advanced tools	3D printing	1,904 (31.5%)	875 (27.6%)	200 (6.5%)	200 (6.5%)	156 (8.4%)	656 (35.3%)
	Artificial intelligence	1,601 (26.5%)	658 (20.7%)	15 (0.5%)	15 (0.5%)	13 (0.7%)	147 (7.9%)
	Augmented reality	1,305 (21.6%)	575 (18.1%)	4 (0.1%)	4 (0.1%)	4 (0.2%)	85 (4.6%)
	Drone (e.g. farming management)	1,369 (22.6%)	476 (15.0%)	9 (0.3%)	9 (0.3%)	2 (0.1%)	570 (30.7%)
	Internet of things device	2,186 (36.1%)	908 (28.6%)	335 (10.8%)	335 (10.8%)	232 (12.5%)	845 (45.5%)
	Radio frequency identification	1,703 (28.2%)	764 (24.1%)	1,224 (39.5%)	1,224 (39.5%)	731 (39.5%)	634 (34.1%)
	Robotics (e.g. factory	1,253 (20.7%)	686 (21.6%)	95 (3.1%)	95 (3.1%)	82 (4.5%)	400 (21.6%)

Tool Category	Digital Tool	Web Survey			Phone Survey		
		Total (n=6,048)	Mfg. (n=3,175)		Total (n=3,099)	Mfg. (n=1,857)	
		Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years	Already Implemented	Already Implemented	Plan to Implement in the Next 3 Years
	robots, farming robots)						

Mfg. = manufacturing.

Notes: The percentage for each row is calculated by dividing the number of respondents' corresponding row answer options by the total questionnaire responses of all manufacturing. 'Already implemented' includes (i) already implemented (pre-pandemic period (before 2020)), (ii) already implemented (during pandemic restriction period (Jan 2020–Dec 2021)), and (iii) already implemented (post-pandemic restriction period (Jan 2022–now)). (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])

Source: Authors.

Looking at the tool level in the web survey data, all procurement, logistics, and sales & marketing tools have a higher implementation rate than the ASEAN average. These statistics indicate that manufacturing generally relies on functional digital tools such as logistics, procurement, and sales & marketing tools. The phone survey data show a similar trend to the ASEAN average for many of the tools surveyed. For example, mobile devices (82.1%) and computers (86.4%) are widely used within intra-company management. E-payment (procurement) and document or cargo delivery applications (logistics) are also prevalent, at 72.3% and 52.0%, respectively. Cybersecurity or protection software has been adopted by a significant number of companies in the phone survey, aligning with the general trend amongst the surveyed companies in the phone survey.

Table 9.14 shows that the implementation rates of digital tools in the manufacturing sector correlate with company size.

Table 9.14. Companies that Have Implemented at Least One Type of Digital Tool by Company Size

Tool Category	Web Survey						Phone Survey		
	Total (n=6,048)	Manufacturing					Manufacturing		
		Subtotal (n=3,175)	Micro (n=129)	Small (n=719)	Medium (n=1,462)	Large (n=865)	Subtotal (n=1,857)	Micro (n=438)	Small (n=1,419)
Intra-company management	5,943 (98.3%)	3,117 (98.2%)	115 (89.1%)	703 (97.8%)	1,435 (98.2%)	864 (99.9%)	1,610 (86.7%)	398 (90.9%)	1212 (85.4%)
Procurement	5,576 (92.2%)	2,969 (93.5%)	105 (81.4%)	642 (89.3%)	1,381 (94.5%)	841 (97.2%)	1,579 (85.0%)	386 (88.2%)	1193 (84.1%)
Logistics	4,398 (72.7%)	2,422 (76.3%)	49 (38.0%)	426 (59.2%)	1,166 (79.8%)	781 (90.3%)	1,287 (69.3%)	315 (72%)	972 (68.5%)
Sales & marketing	5,837 (96.5%)	3,075 (96.9%)	117 (90.7%)	676 (94.0%)	1,427 (97.6%)	855 (98.8%)	1,082 (58.3%)	250 (57.1%)	832 (58.6%)
Overall company operation	3,652 (60.4%)	1,912 (60.2%)	40 (31.0%)	316 (43.9%)	875 (59.8%)	681 (78.7%)	1,026 (55.3%)	236 (53.9%)	790 (55.7%)
Other advanced tools	2,913 (48.2%)	1,363 (42.9%)	34 (26.4%)	232 (32.3%)	625 (42.7%)	472 (54.6%)	976 (52.6%)	224 (51.2%)	752 (53.0%)
Average	78.0%	78.0%	59.4%	69.4%	78.8%	86.6%	67.9%	68.8%	67.5%

Notes: The percentage for each row is calculated by dividing the number of respondents selecting at least one tool in the corresponding row tool category for each of the following stages – already implemented (pre-pandemic period (before 2020)), already implemented (during pandemic restriction period (Jan 2020–Dec 2021)), already implemented (post-pandemic restriction period (Jan 2022–now)) – by the relevant total population (n) in each column. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])
Source: Authors.

The web survey shows that large companies have the highest implementation rates across all tool categories, while micro companies have the lowest. In contrast, micro companies lag the manufacturing and all-industry average in the implementation rates of all tool categories. The gap (more than 20%) between micro companies and the ASEAN average is significant in logistics, overall company operations, and other advanced tools. Small companies follow a similar trend. Small companies have a slightly higher adoption rate than micro companies for intra-company management tools (97.8%) but fall behind in the same areas as small companies when compared with the ASEAN average. Both micro and small companies have better scores for logistics, overall company operations, and other advanced tools in the phone survey than in the web survey.

The discrepancies between larger and smaller companies can be attributed to three key factors:

(i) Proportion of human resources involved in digital tasks

Table 9.15 shows that large companies have considerably more employees responsible for digital tasks.

Combining the web survey result for 10% to 49% of human resources involved in digital tasks, 43.8% of large manufacturing companies have employees in charge of digital tasks and 5.1% have more than 50% dedicated to such tasks. Notably, 50.5% of large manufacturing companies have less than 9% (excluding those that have 'none') of human resources dedicated to digital tasks. In contrast, when combining the result from less than 5% to 5%–9%, the majority of small (67.3%) and medium-sized (65.8%) companies have less than 9% of employees working on digital tasks (excluding those that have 'none'), while only 0.8% and 1.5% have more than 50% dedicated to such tasks, respectively. Some 11.6% of micro companies do not have employees working on digital tasks, while just 0.6% of large manufacturing companies do not have any digital-related labour. Similar patterns are observed in the phone survey, where 30.1% of micro and 65.8% of small companies have less than 9% of human resources working on digital tasks (excluding those that have 'none'). In the phone survey, no respondents had more than 50% dedicated to such tasks, and 60.7% of micro and 21.6% of small companies have no digital-related employees.

Table 9.15. Employees Involved in Digital Tasks of Manufacturing Companies

Answer Option	Web Survey					Phone Survey		
	Average (n=3,175)	Micro (n=129)	Small (n=719)	Medium (n=1,462)	Large (n=865)	Average (n=1,857)	Micro (n=438)	Small (n=1,419)
None	45 (1.4%)	15 (11.6%)	17 (2.4%)	8 (0.5%)	5 (0.6%)	573 (30.9%)	266 (60.7%)	307 (21.6%)
Less than 5% (excluding 'none')	1,025 (32.3%)	25 (19.4%)	195 (27.1%)	494 (33.8%)	311 (36.0%)	394 (21.2%)	74 (16.9%)	320 (22.6%)
5%–9%	890 (28.0%)	7 (5.4%)	289 (40.2%)	468 (32.0%)	126 (14.6%)	671 (36.1%)	58 (13.2%)	613 (43.2%)
10%–19%	574 (18.1%)	58 (45.0%)	131 (18.2%)	225 (15.4%)	160 (18.5%)	218 (11.7%)	40 (9.1%)	178 (12.5%)
20%–29%	333 (10.5%)	18 (14.0%)	61 (8.5%)	131 (9.0%)	123 (14.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
30%–39%	129 (4.1%)	2 (1.6%)	15 (2.1%)	59 (4.0%)	53 (6.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
40%–49%	104 (3.3%)	1 (0.8%)	5 (0.7%)	55 (3.8%)	43 (5.0%)	1 (0.1%)	0 (0.0%)	1 (0.1%)
More than 50%	75 (2.4%)	3 (2.3%)	6 (0.8%)	22 (1.5%)	44 (5.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)

Notes: The percentage for each row is calculated by dividing the number of respondents choosing the corresponding row answer options by the total number of corresponding column respondents. (Q6. Of the regular employees you answered in Q5, what percentage are involved in digital-related tasks? (e.g. those in charge of consideration and planning, implementation of digitalisation within the company including in-house engineers) [SINGLE CHOICE: choose one option])
Source: Authors.

(ii) Differences in the customer base

Table 9.16 shows that large companies in the web survey serve a diverse range of customers, with all customer types scoring more than 30% except public institutions (10.5%). This variety necessitates advanced digital logistics tools to handle and cater to each customer type. On the other hand, micro and small companies primarily serve consumers and MSMEs, with a smaller percentage serving large manufacturing or non-manufacturing companies. As a result, the need to adopt logistics tools or advanced technologies to meet their requirements is lower in the web survey results.

The web survey shows that micro and small companies have a limited base of large customers. According to the web survey, 0.8% of micro and 4.7% of small companies had large manufacturing customers, while 17.8% of micro and 11.4% of small companies had large non-manufacturing customers. Conversely, the phone survey results indicate that 24.7% of micro and 31.4% of small companies serve large manufacturing customers, whereas 5.3% of micro and 17.4% of small companies serve large non-manufacturing customers.

Table 9.16. Customer Segments of Manufacturing Companies

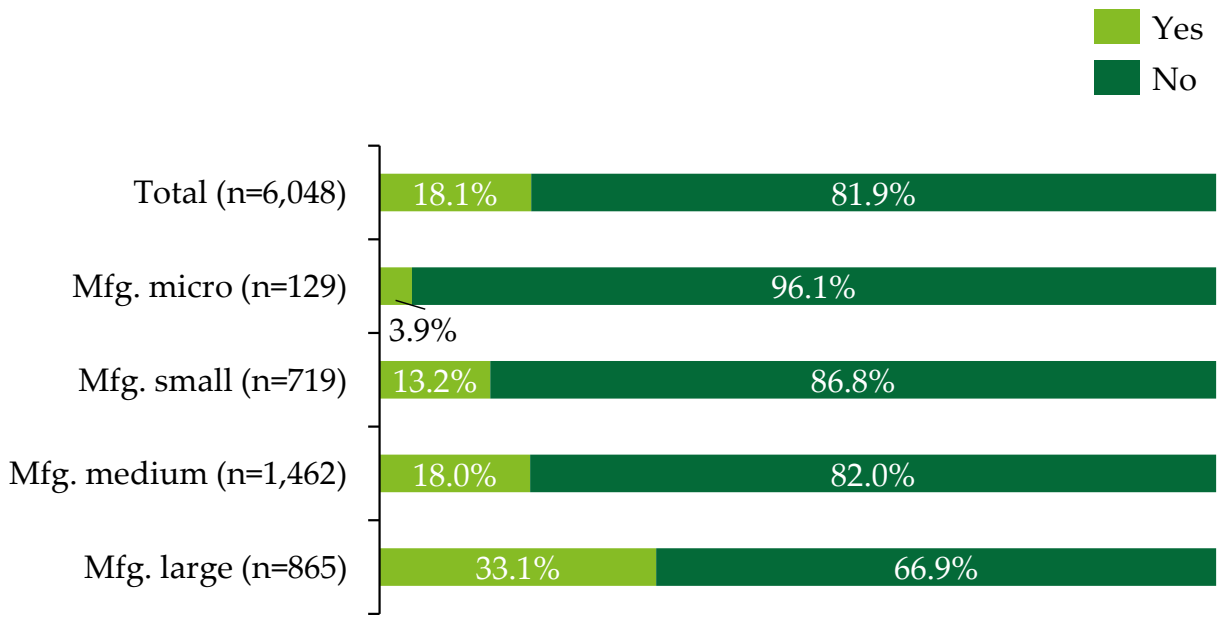
Customer Type	Web Survey				Phone Survey	
	Micro (n=129)	Small (n=719)	Medium (n=1,462)	Large (n=865)	Micro (n=438)	Small (n=1,419)
Consumer (individual or household consumer)	124 (96.1%)	539 (75.0%)	997 (68.2%)	497 (57.5%)	237 (54.1%)	942 (66.4%)
Manufacturing MSMEs	15 (11.6%)	352 (49.0%)	761 (52.1%)	355 (41.0%)	284 (64.8%)	775 (54.6%)
Manufacturing large companies	1 (0.8%)	34 (4.7%)	303 (20.7%)	468 (54.1%)	108 (24.7%)	446 (31.4%)
Non-manufacturing MSMEs	70 (54.3%)	340 (47.3%)	717 (49.0%)	365 (42.2%)	275 (62.8%)	616 (43.4%)
Non-manufacturing large companies	23 (17.8%)	82 (11.4%)	387 (26.5%)	345 (39.9%)	23 (5.3%)	247 (17.4%)
Public institutions (including central or local governments)	4 (3.1%)	32 (4.5%)	141 (9.6%)	91 (10.5%)	3 (0.7%)	5 (0.4%)

MSMEs = micro, small, and medium-sized enterprises.
Notes: The percentage for each row is calculated by dividing the number of respondents choosing the corresponding customer type by the relevant total population (n) in each column. (Q12. Which segment is your customer? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

(iii) Differences in the suppliers' base

Manufacturing tends to involve complex supply chains, where materials, components, and finished goods need to be transported efficiently and effectively. Logistics tools assist in such tasks as inventory management, shipment tracking, route optimisation, and timely delivery, enhancing overall operational efficiency (Glistau, Schenk, and Coello Machado, 2016). Hence, manufacturing companies often deal with multiple suppliers locally and internationally, requiring streamlined procurement processes. The web survey shows that manufacturing companies have the highest percentage (33.1%) of foreign direct suppliers, including multinational companies, surpassing the average of the web survey respondents (18.1%). The disparity in implementing procurement and logistics tools between larger and smaller companies can be justified by these data. Using those tools can allow for efficient supplier management, automating purchasing workflows, facilitating electronic data exchange, and enhancing cost control, etc.

Figure 9.8. Foreign Direct Suppliers (Web Survey)



Mfg. = manufacturing.
Notes: The percentage for each bar is calculated by dividing the number of respondents choosing the corresponding answer options by the relevant total population (n) in each row. (Q15-1. Does your company have direct suppliers that include multinational companies, including joint venture companies where at least one owner is a foreign company? [SINGLE CHOICE: choose one option])
Source: Authors.

(iv) Separation of business functions in different locations

Many large and medium-sized companies have separate bases for different business functions, such as sales, production, and procurement. Table 9.17 shows that, in the web survey, more than 60% of large manufacturing companies have a separate base for all sales,

production, and procurement. Meanwhile, the scores are much lower for small (25%–34%) and micro companies (21%–29%).

According to the phone survey, micro and small companies with separate sales bases are much lower, approximately by 19% for micro and 27% for small companies. This separation may influence the implementation of certain digital tools, as having separate bases for different functions can create communication and logistics challenges and potentially stimulate greater need for digital solutions within large companies compared with smaller companies.

Table 9.17. Manufacturing Companies Having Separate Bases for Sales, Production, and Procurement

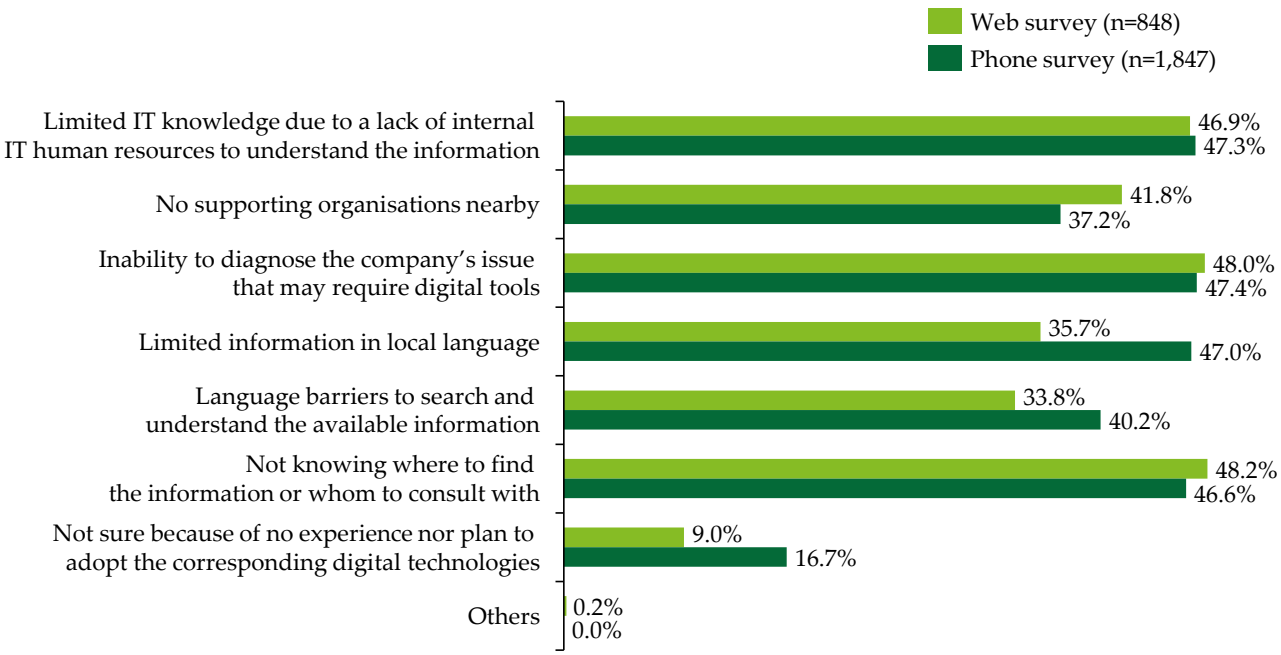
Separate Base	Web Survey				Phone Survey	
	Micro (n=129)	Small (n=719)	Medium (n=1,462)	Large (n=865)	Micro (n=438)	Small (n=1,419)
Sales	37	233	809	670	43	79
	(28.7%)	(32.4%)	(55.3%)	(77.5%)	(9.8%)	(5.6%)
Production	33	241	740	581	32	59
	(25.6%)	(33.5%)	(50.6%)	(67.2%)	(7.3%)	(4.2%)
Procurement	28	181	639	558	51	114
	(21.7%)	(25.2%)	(43.7%)	(64.5%)	(11.6%)	(8.0%)

Notes: The percentage for each row is calculated by dividing the number of respondents indicating that they have a separate base for the corresponding business function by the relevant total population (n) in each column. (Q11. Does your company have separate base for sales, production, and procurement apart from your company's site? [SINGLE CHOICE: choose one option])
Source: Authors.

The limited adoption of digital tools in small and micro manufacturing companies results from various difficulties and concerns they face during the implementation journey.

Figure 9.9 shows the causes of difficulties in the information gathering phase.

Figure 9.9. Causes of Difficulties in the Information Gathering Phase of Manufacturing Small and Micro Companies



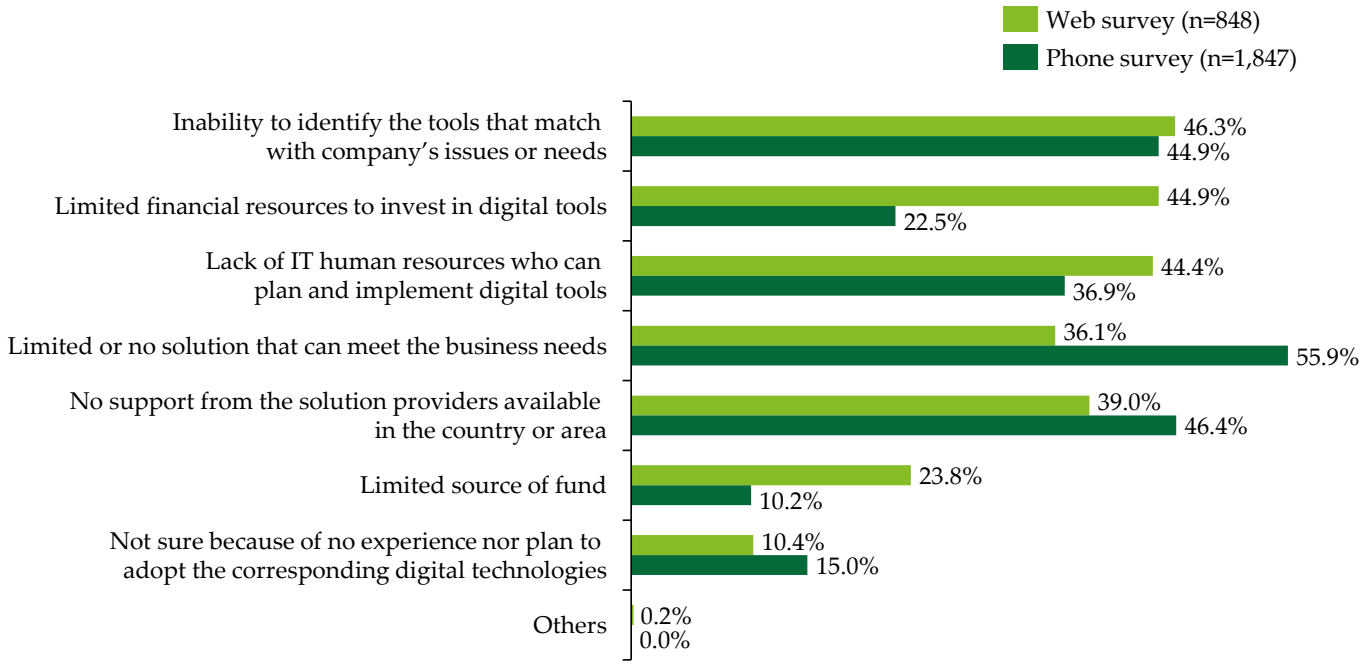
IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of respondents selecting the answer option in the corresponding row by the total number of responses of small and micro manufacturing companies. (Q27. What are the causes of difficulties in information gathering phase? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

According to Figure 9.9, the top three difficulty factors during the information gathering phase in both the web and phone surveys are, respectively, 'not knowing where to find the information or whom to consult with' (48.2% and 46.6%), 'limited IT knowledge due to a lack of internal IT human resources to understand the information' (46.9% and 47.3%), and 'inability to diagnose the company's issue that may require digital tools' (48.0% and 47.4%). It should be noted that 'limited information in local language' (47.0%) follows the top three challenges in the phone survey.

The findings from the web and phone surveys reveal significant disparities in ICT skills and business knowledge amongst micro and small companies that ASEAN support stakeholders need to address proactively in the information gathering phase. Furthermore, the surveys highlight the importance of using local languages in digital tool information to ensure better accessibility for companies.

Figure 9.10 shows the causes of difficulties in the adoption phase.

Figure 9.10. Causes of Difficulties in the Adoption Phase of Manufacturing Small and Micro Companies

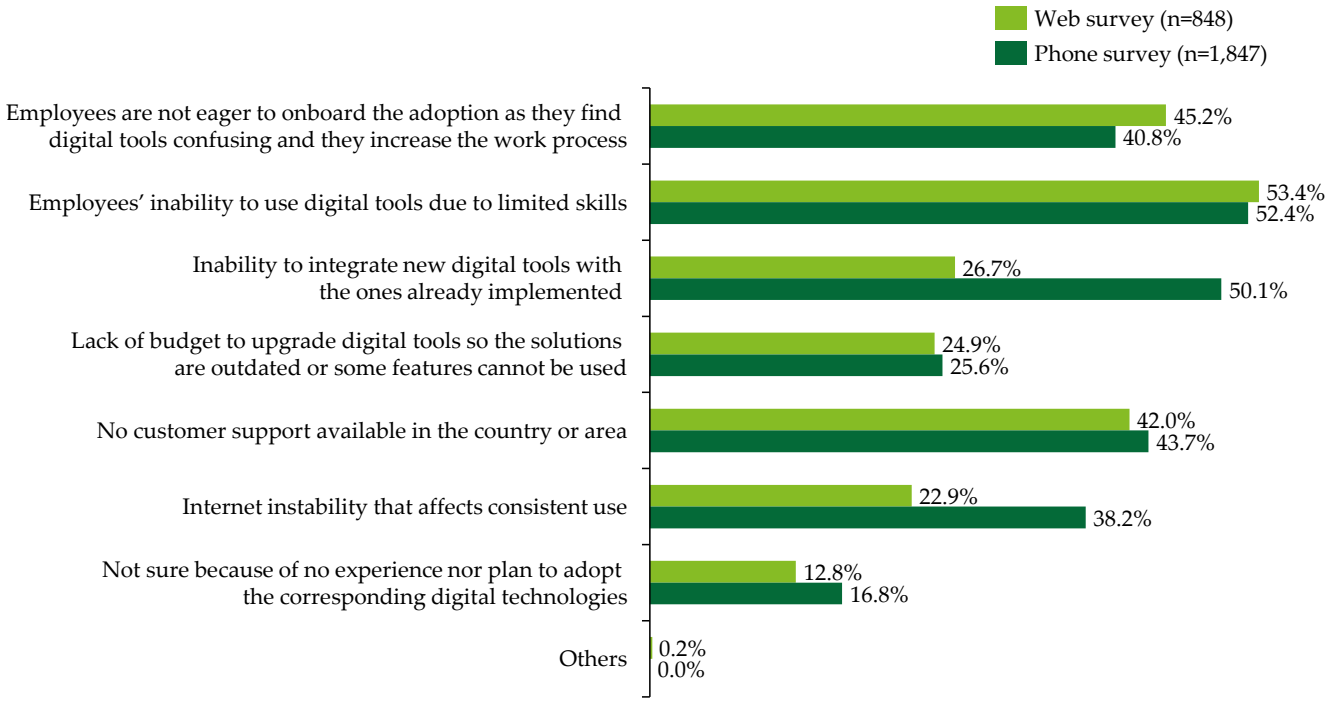


IT = information technology.
Notes: The percentage of each bar is calculated by dividing the total number of respondents selecting the answer option in the corresponding row by the total responses of small and micro manufacturing companies. (Q28. What are the causes of difficulties in adoption phase? [MULTIPLE CHOICE: choose all options that apply])
Source: Author.

During the adoption phase, the web survey shows that 'inability to identify tools that align with their specific issues or needs' (46.3%), 'limited financial resources to invest in digital tools' (44.9%), and 'lack of IT human resources who can plan and implement digital tools' (44.4%) are significant challenges. Meanwhile, the phone survey identifies the top issue as 'limited or no solution that can meet the business needs' (55.9%). Two other prominent concerns identified from the phone survey are 'no support from the solution providers available in the country or area' (46.4%) and 'inability to identify tools that align with their specific issues or needs' (44.9%). The combination of the web and phone surveys provides complementary insights into the gaps and needs during the adoption phase. These findings underscore the prevalence of limited business knowledge and ICT skills, which also impact the information gathering phase. Secondly, budgetary constraints pose a significant challenge. Therefore, it is crucial for ASEAN to consider providing financial support to alleviate the challenges. Lastly, customer support from solution providers is necessary to assist companies, especially those with limited digital skills (e.g. micro and small companies), in implementing the tools effectively.

Figure 9.11 shows the causes of difficulties in the post-adoption phase.

Figure 9.11. Causes of Difficulties in the Post-Adoption Phase of Manufacturing Small and Micro Companies



Notes: The percentage of each bar is calculated by dividing the total number of respondents selecting the answer option in the corresponding row by the total number of responses of small and micro manufacturing companies. (Q29. What are the causes of difficulties in the post-adoption phase? [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

During the post-adoption phase, the web and phone surveys shared the same top challenge: 'employees' inability to use digital tools due to limited skills'. The web survey reveals that 'employees are not eager to onboard the adoption as they find digital tools confusing and they increase the work process' (45.2%) is the second greatest challenge. In comparison, the phone survey shows a similar challenge of employees not eager to onboard the adoption at 40.8%. Meanwhile, in the phone survey, the respondents cited 'inability to integrate new digital tools with the ones already implemented' (50.1%) and 'no customer support available in the country or area' (43.7%) as the greatest challenges.

The recurring nature of these challenges across all three implementation phases and in both the web and phone surveys highlights a common underlying issue. There is a clear shortage of human resources within micro and small companies who possess the necessary understanding of digital tools' benefits, the ability to adapt them to their companies' unique circumstances, and the requisite IT skills for effective tool identification and implementation. These problems are exacerbated by these companies' limited number of employees and low digital literacy rates. Lack of accessible local customer support compounds the difficulties faced. To address these gaps, measures need to be implemented to support micro and small companies. This support can be provided via various avenues, such as improving internal capabilities through training programmes or

by offering external support through advisory services, assistance from digital solution providers, or collaboration with relevant public institutions. By bolstering these companies' human resources and digital skills and providing accessible support networks, support actors can empower them to overcome post-adoption challenges and use digital tools effectively.

Table 9.18 shows the digital tool implementation by country.

From a country perspective, the Philippines, Indonesia, and Cambodia have made significant progress, as evidenced by their high average rates of digital tool implementation across all categories. The Philippines ranks first at 91.2%, followed by Indonesia at 88.3% and Cambodia at 88.1%. On the other hand, the Lao PDR (63.5%) scored the lowest average rates.

The Philippines' packaged foods and apparel strengths reflect competitive labour costs and a large English-speaking workforce (Meyer et al., 2021). Indonesia boasts a diverse manufacturing sector, leveraging its large population as a sizeable domestic market and abundant natural resources to establish a well-developed manufacturing base for machinery and petrochemicals (Meyer et al., 2021).

Overall, ASEAN manufacturing companies can gain a competitive advantage by accelerating the adoption of digital tools, especially by embracing Industry 4.0 technologies early on. To do so, ICT and business knowledge capacity-building measures, financial support, local support, and information availability are crucial so that manufacturing players can harness their strengths and overcome these challenges, especially micro and small companies.

Table 9.18. Manufacturing Companies that Have Implemented at Least One Type of Digital Tool by Country (Web Survey)

Tool Category	BR (n=93)	CA (n=335)	ID (n=458)	LA (n=52)	MM (n=198)	MY (n=316)	PH (n=457)	SG (n=376)	TH (n=400)	VN (n=490)
Intra-company management	93 (100%)	334 (99.7%)	445 (97.2%)	48 (92.3%)	190 (96.0%)	315 (99.7%)	455 (99.6%)	358 (95.2%)	396 (99.0%)	483 (98.6%)
Procurement	92 (98.9%)	331 (98.8%)	408 (89.1%)	39 (75.0%)	178 (89.9%)	314 (99.4%)	447 (97.8%)	350 (93.1%)	351 (87.8%)	459 (93.7%)
Logistics	50 (53.8%)	325 (97.0%)	413 (90.2%)	31 (59.6%)	95 (48.0%)	234 (74.1%)	436 (95.4%)	320 (85.1%)	225 (56.3%)	293 (59.8%)
Sales & marketing	93 (100%)	331 (98.8%)	434 (94.8%)	46 (88.5%)	181 (91.4%)	316 (100%)	450 (98.5%)	362 (96.3%)	388 (97.0%)	474 (96.7%)
Overall company operation	35 (37.6%)	301 (89.9%)	373 (81.4%)	15 (28.8%)	102 (51.5%)	214 (67.7%)	411 (89.9%)	256 (68.1%)	110 (27.5%)	95 (19.4%)
Other advanced tools	6 (6.5%)	148 (44.2%)	354 (77.3%)	19 (36.5%)	27 (13.6%)	102 (32.3%)	303 (66.3%)	220 (58.5%)	78 (19.5%)	106 (21.6%)
Average	66.1%	88.1%	88.3%	63.5%	65.1%	78.9%	91.2%	82.7%	64.5%	65.0%

BR = Brunei, CA = Cambodia, ID = Indonesia, LA = Lao PDR, MM = Myanmar, MY = Malaysia, PH = Philippines, SG = Singapore, TH Thailand, VN = Viet Nam.

Notes: The table shows the percentage of companies implementing at least one digital tool within each tool category. The percentage for each row is calculated by dividing the number of respondents selecting at least one tool in the corresponding tool category for each of the following stages – already implemented (pre-pandemic period (before 2020)), already implemented (during pandemic restriction period (Jan 2020–Dec 2021)), and already implemented (post-pandemic restriction period (Jan 2022–now)) – by the relevant total population (n) in each column. (Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option])

Source: Authors.

5. Conclusion

This chapter has revealed the digital divide in ASEAN from an industry perspective. Agriculture lags other industries in the region in adopting digital technologies. This gap is particularly pronounced for adopting advanced emerging technologies. However, there are some bright spots, as agribusinesses are actively adopting digital tools for communication and other business functions, such as e-payments in sales, marketing, and procurement. The disparities in digital adoption result from significant gaps in ICT skills, business knowledge, and financial resources. In addition to internal capabilities, the digital divide is also influenced by external factors such as a company's supplier and customer base. This disparity is also evident across countries, with countries with greater innovation capacity generally having higher adoption rates of digital tools. Agriculture needs support to adopt digital technologies and move the industry forward effectively. The services industry has made remarkable progress in digital adoption compared with other industries. This indicates that the services sector recognises the importance of digital tools and technology in enhancing various aspects of its business. However, the survey results also shed light on persistent challenges facing services, such as improving ICT skills and business knowledge. In addition, it is critical to focus on closing financial gaps and developing digital human resources, especially in micro service enterprises. These enterprises often face unique challenges due to their limited resources and small scale of operations. Manufacturing shows similar levels of digital tool adoption to the average for all industries and tool categories in ASEAN. Manufacturing can gain a competitive advantage by accelerating the adoption of digital tools, primarily through the early adoption of Industry 4.0 technologies. To this end, funding, ICT and business knowledge capacity-building measures, local support, and access to information are crucial to enable manufacturers to leverage their strengths and overcome these challenges, especially micro and small companies.

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Chapter 10

Analysis of Current Activities within ASEAN

1. Introduction

This chapter provides an overview of measures that the Association of Southeast Asian Nations (ASEAN) is taking to close the digital divide in the ASEAN region, from both regional and national perspectives. Regional initiatives emphasise addressing gaps in information and communications technology (ICT) skills and business knowledge. Notably, all regional policies highlight capacity-building programmes, which have resulted in developing cutting-edge digital platforms and comprehensive training modules. Several initiatives – such as the ASEAN SME Academy, Go Digital ASEAN, Grow with Google, and the digitalisation of the agriculture sector conducted by Lazada – exemplify the commitment to bridge these identified gaps. It is encouraging to witness that the COVID-19 pandemic has been considered across most of these initiatives, confirming responsiveness to evolving challenges.

This chapter also delves into initiatives undertaken by individual ASEAN Member States (AMS) towards bridging the digital divide. These initiatives demonstrate high-level policies crafted by various AMS, collaboration with government stakeholders, and fruitful public–private partnerships (PPPs). Like the regional initiatives, AMS have taken proactive steps to address gaps in financing, ICT skills, and business knowledge. A comprehensive range of capacity-building initiatives encompasses training, creating digital platforms and online courses, and developing consultation services for digital adoption tools. Some AMS even extend financial incentives – such as grants and subsidies – to alleviate the capital costs associated with digital adoption tools. The alignment of AMS initiatives with regional efforts underscores a cohesive and united approach to approaching the digital divide within ASEAN.

Initiatives implemented regionally and in each AMS are helping bridge the digital gaps often found in micro, small, and medium-sized enterprises (MSMEs). These initiatives – focussing on enhancing ICT skills and business knowledge – are beacons of progress. Moreover, efforts to address financial and infrastructure gaps should not go unnoticed. While this chapter identifies room to improve these initiatives, building upon this momentum – while recognising the significance of cybersecurity concerns – is essential to fortify ASEAN's digitalisation landscape.

2. General Regional ASEAN Initiatives

This section presents high-level initiatives for regional development across ASEAN and provides an overview of how ASEAN drives its digitalisation efforts. It then presents specific initiatives that are being implemented based on those high-level initiatives.

2.1. Regional High-Level Policies

2.1.1. *ASEAN Economic Community Blueprint 2025*

In November 2015, ASEAN released the *ASEAN Economic Community Blueprint 2025*. Its primary objective is to create a deeply integrated and highly cohesive ASEAN economy that supports sustained high economic growth and resilience, even in the face of global economic shocks and volatilities (ASEAN, 2015a). The blueprint aims to achieve this by integrating AMS and addressing key regional economic and development challenges. A competitive, innovative, and dynamic ASEAN will emerge through the involvement of science and technology tools and methodologies to strengthen its competitiveness. These will enhance connectivity and sectoral cooperation under ICT initiatives. Strategic actions will advance the population's integration and empowerment by bolstering digital inclusion initiatives. The blueprint posits that these activities can develop a resilient, inclusive, people-oriented, and people-centred ASEAN. It also touches on increased internet broadband penetration and affordability by improving ICT infrastructure and connectivity, particularly in rural areas. It emphasises developing and promoting MSMEs; it mentions that more structured and targeted MSME programmes should be instituted to enhance MSME competitiveness within ASEAN. It recognises the importance of technology to increase MSME productivity as well as relevant financial support, which must involve identifying development donors.

2.1.2. *ASEAN Digital Integration Framework Action Plan 2019«2025*

ASEAN adopted the *ASEAN Digital Integration Framework Action Plan 2019–2025* (DIFAP) in 2019 to further develop the digital economy (ERIA, 2023). Its action plans target digital service providers and technology companies, financial institutions and payment service providers, trade facilitation agencies and customs authorities, workforce and human resources development agencies, innovation and start-up ecosystems, and regional MSMEs.

The DIFAP aims to leverage digital technologies to drive economic growth, bridge the digital divide, and enhance regional competitiveness (ASEAN, 2019a). It outlines five policy areas that will help overcome barriers to digital integration in ASEAN:

(i) Digital connectivity and affordable access. Enhancing digital infrastructure and expanding affordable access to internet services are crucial. The DIFAP posits that improved digital connectivity can help MSMEs gain better access to online platforms,

e-commerce, and digital markets, enabling them to reach broader customer bases and to expand their business opportunities.

(ii) Financial ecosystem. A robust financial ecosystem must be in place to support digital transactions and financial inclusion. By promoting digital payment systems, improving access to finance, and fostering collaboration between financial institutions and technology providers, the DIFAP aims to help businesses access the necessary financial services and resources to grow.

(iii) Commerce and trade. The DIFAP aims to reduce trade barriers, streamline customs procedures, and promote the interoperability of digital trade platforms. By simplifying trade processes and promoting digitalisation in trade-related activities, companies can benefit from increased efficiency, reduced costs, and improved access to regional and global markets.

(iv) Workforce transformation. The DIFAP emphasises the importance of developing human resources through workforce transformation. It aims to equip MSMEs and their employees with the necessary digital skills and knowledge to thrive in a digital economy by supporting capacity-building programmes, promoting digital literacy, and encouraging upskilling and reskilling initiatives.

(v) Business ecosystem. A conducive business environment must be fostered for digital innovation and entrepreneurship. The DIFAP aims to support start-ups and to create a supportive regulatory framework for emerging technologies.

2.1.3. *ASEAN Comprehensive Recovery Framework*

In November 2020, the *ASEAN Comprehensive Recovery Framework* was adopted to provide a consolidated exit strategy and recovery roadmap to address the socio-economic impacts of the COVID-19 pandemic on the region. Specifically, it aims to support the recovery, growth, and resilience of affected sectors (ASEAN, 2020a). One critical measure is facilitating access to finance by providing affordable options such as credit facilities, grants, and financial assistance programmes; another is promoting digital transformation and e-commerce adoption amongst firms, enabling them to expand their market reach, improve operational efficiency, and enhance competitiveness. The framework also supports developing digital skills and provides capacity-building programmes, training, technical assistance, and mentorships. Facilitating market access is also a focus; it aims to enhance intra-ASEAN trade and investment, promote regional integration, and explore opportunities for firms to participate in global value chains.

In addition, the framework recognises the importance of supporting MSMEs. It aims to foster MSME growth and to enhance their competitiveness by enabling MSMEs to access necessary financial support and market access. It equips MSMEs with the desired skills and relevant support to enhance human resources for the recovery from the pandemic.

2.1.4. *ASEAN Digital Masterplan 2025*

In January 2021, the *ASEAN Digital Masterplan 2025* was adopted, aiming to position ASEAN as a leading digital community and economy (ASEAN, 2021a). It aims to enable secure and transformative digital services, technologies, and ecosystems in ASEAN by targeting a wide range of beneficiaries in the region, such as MSMEs, individuals, and communities in rural areas lacking digital infrastructure; schools and community centres involved in digital skills training; and citizens and businesses utilising public and private digital services. It addresses regional firms' digitalisation challenges and fosters an inclusive digital environment to support their growth and competitiveness.

The plan incorporates various measures to enable MSMEs to thrive in the digital economy. First, the establishment of village internet centres and improved connectivity in rural areas will help bridge the digital divide and provide MSMEs in remote regions with access to digital services. Second, it proposes the creation of the ASEAN Digital Inclusion Resource Centre, a platform offering toolkits and resources for teaching basic digital skills. Additionally, digital finance modules will be developed to equip MSMEs with the skills and knowledge needed to leverage online banking and other digital financial technologies.

The plan also emphasises sharing best policies, practices, and case studies within the region, fostering knowledge exchange and empowering MSMEs with insights into successful strategies. Furthermore, it aims to enhance e-government services by learning from successful implementation, establishing monitoring systems, developing a common national portal, and creating a mobile-centric system that caters to the needs of mobile users.

2.1.5. *The Bandar Seri Begawan Roadmap: An ASEAN Digital Transformation Agenda to Accelerate ASEAN's Economic Recovery and Digital Economy Integration*

In October 2021, the *Bandar Seri Begawan Roadmap* (BSBR) was endorsed, outlining short-term steps for the digitalisation of ASEAN by leveraging various ongoing initiatives (ERIA, 2023). It was developed to accelerate digital transformation, promote economic recovery, and create an enabling environment for a robust digital economy in ASEAN, particularly in the aftermath of the COVID-19 pandemic (ASEAN, 2021b). Its targets include regional MSMEs, other industry players, customers, suppliers, and MSME business partners.

By endorsing the BSBR, AMS committed to implementing various measures and initiatives to achieve the following objectives:

(i) Enhanced digital connectivity. The BSBR aims to improve digital connectivity and to expand broadband access by providing regional firms with better internet connectivity, enabling them to leverage digital technologies, access global markets, and engage in e-commerce. Improved connectivity will enhance communication and

collaboration amongst companies, including MSMEs, their customers, suppliers, and business partners.

(ii) **A resilient and secure digital ecosystem.** A secure digital ecosystem must be developed that protects businesses from cyberthreats and fraud. By strengthening cybersecurity measures and implementing associated legal and regulatory frameworks, the BSBR commits to helping firms build trust and confidence in digital transactions and protect intellectual property and sensitive data.

(iii) **Digital literacy and skills development.** The BSBR emphasises that promoting digital literacy and skills development can empower firms by equipping them with the necessary knowledge and skills to navigate the digital landscape.

(iv) **Digital innovation and entrepreneurship.** The BSBR notes that these must be fostered to create an environment conducive to growth and innovation.

(v) **Regional cooperation and partnerships.** Enhancing regional cooperation and partnerships can create networking opportunities for firms. Collaboration with other AMS, industry players, and stakeholders facilitates knowledge sharing, business opportunities, and access to regional value chains.

All of these activities target both regional firms as well as MSMEs. For example, the BSBR mentions that improved digital literacy can help MSMEs leverage digital tools, adopt digital marketing strategies, and embrace emerging technologies, thereby enhancing their competitiveness. It also provides MSMEs with opportunities to innovate, develop new products and services, and explore digital business models by supporting start-ups and encouraging research and development in emerging technologies. The BSBR policy to foster collaboration within firms, including MSMEs, can enable them to expand their markets and reach.

2.2. Regional Initiatives Regarding Digitalisation

2.2.1. *ASEAN Strategic Action Plan for SME Development 2016–2025*

Date introduced. 2015.

Primary objectives. The primary objective is to promote the development of MSMEs in AMS. It aims to make these enterprises globally competitive, innovative, inclusive, and resilient by 2025. The plan aligns with the vision of a resilient, inclusive, people-oriented, and people-centred ASEAN as outlined in the *ASEAN Economic Community Blueprint 2025* (ASEAN, 2015b).

Major digital divide factors addressed. Firm internal factors – human resources, finance; firm external factor – microenvironment

Targeted groups. The plan targets MSMEs across AMS. It also addresses other stakeholders involved in supporting the growth and development of MSMEs, including

financial institutions, government agencies, entrepreneurship support organisations, and the broader business ecosystem.

Key measures. The plan encompasses five key measures to achieve its objectives:

(i) Promote productivity, technology, and innovation. MSMEs should adopt productivity-enhancing technologies and cultivate a culture of innovation to enhance their competitiveness and adaptability in the global marketplace. The plan recognises the significance of MSME business performance improvement when they align with other MSMEs or larger companies, such as multinationals.

(ii) Increase access to finance. To address financial gaps faced by MSMEs, financial inclusion must be promoted. Microfinancing programmes specifically designed for microenterprises provide these businesses with access to both conventional and alternative sources of finance.

(iii) Enhance market access and internationalism. The market reach of MSMEs must be broadened by leveraging e-commerce platforms so that they can overcome business knowledge gaps and gain better access to domestic and international markets.

(iv) Enhance policy and regulatory environment. To create an enabling environment for MSMEs, procedures must be simplified, administrative burdens must be reduced, and coordination must be improved amongst relevant government agencies. Streamlining regulations and fostering a favourable regulatory framework contribute to the ease of doing business for MSMEs.

(v) Promote entrepreneurship and human capital development. An entrepreneurial culture should be fostered by equipping entrepreneurs with the necessary skills and knowledge to succeed. Through training programmes, mentorships, and entrepreneurship education, MSMEs can enhance their business acumen and human capital.

2.2.2. *ASEAN Digital Integration Framework* and Regional Digital Trade Connectivity Project

Date introduced. 2020.

Primary objectives. These aim to optimise trade activities by reducing processing costs and eliminating the need for physical document handling. Through automation and digitisation, trade transactions are expected to become faster and more efficient, with an emphasis on establishing an end-to-end online process that is efficient and paperless (DISG, 2020). Businesses, including MSMEs, can benefit from increased productivity, cost savings, and improved competitiveness in the market. These are working to reduce trade barriers within ASEAN and globally by promoting platform interoperability and shared infrastructure, which can facilitate smoother communication and transactions between

different stakeholders, simplifying cross-border trade and enhancing business operations (DISG, 2020).

Major digital divide factors addressed. Firm internal factor – human resources; firm external factor – microenvironment

Targeted groups. These include local businesses (including MSMEs) and stakeholders in international trade.

Key measures. To achieve platform interoperability and to implement a shared infrastructure system amongst stakeholders worldwide, the ASEAN Business Advisory Council partnered with TradeWaltz and the United Kingdom–ASEAN Advisory Business Council to develop the Regional Digital Trade Connectivity project. The digitalisation app is expected to reduce the time and costs associated with trading activities for MSMEs. To ensure their effective participation, capacity-building initiatives and the involvement of MSMEs in the formulation of trade facilitation policies are key, so the project aims to provide MSMEs with the necessary support and assistance required (DISG, 2020).

2.2.3. *ASEAN Cybersecurity Cooperation Strategy 2021–2025*

Date introduced. 2021.

Primary objectives. The objectives are to address the increasing threat of cyberattacks in the digital economy and to promote economic progress and welfare standards. It aims to strengthen cybersecurity readiness, enhance regional coordination, build trust in cyberspace, promote capacity building, and foster international cooperation (ASEAN, 2021c).

Major digital divide factors addressed. Firm internal factor – human resources; firm external factor – cyberattacks

Targeted groups. The strategy targets various stakeholders, including AMS, local businesses (including MSMEs), and government agencies.

Key measures. The strategy works to advance cyber-readiness cooperation through collaboration, information sharing, and joint exercises amongst AMS. By strengthening regional cyber policy coordination, it aims to develop harmonised cyber policies and legal frameworks across the region to enhance cooperation in addressing cyberthreats and to facilitate a more cohesive regional cybersecurity landscape. Furthermore, it focusses on enhancing trust in cyberspace by establishing mechanisms for preventing and responding to cyber incidents, protecting personal data, and promoting responsible behaviour. Recognising their vulnerability, the strategy aims to bridge the knowledge gap by providing MSMEs with cybersecurity-related knowledge and skills. Through training programmes, workshops, and educational initiatives, MSMEs will gain knowledge of potential cyberattacks and learn effective ways to address them. This capacity building will empower MSMEs, making them more resilient in the face of evolving cyberthreats.

2.2.4. ASEAN SME Academy

Date introduced. 2016.

Primary objectives. Its primary objective is to enhance the capabilities of MSMEs in the ASEAN region, enabling them to become more competitive in domestic, regional, and global markets. By offering a centralised online platform with a wide range of training courses, the academy aims to equip MSMEs with the necessary skills and knowledge to thrive in the dynamic business landscape (US-ASEAN Business Council, 2023).

Major digital divide factors addressed. Firm internal factor – human resources

Targeted groups. The targeted group is MSMEs from various industries and sectors.

Key measures. The ASEAN SME Academy supports MSMEs through various measures. First, it provides an extensive online platform, hosting more than 110 training courses from 21 sources, including Fortune 500 companies, local businesses, and international organisations. The diversity of training materials ensures that MSMEs have a comprehensive learning experience, covering crucial areas such as marketing and business management, finance, legal aspects, logistics, and information technology. Over 7,000 SMEs have used these materials, equipping them with valuable skills and knowledge to enhance their business operations (US-ASEAN Business Council, 2023). In April 2022, the academy began introducing live training events as an additional feature, allowing participants to engage in interactive and real-time learning experiences, fostering a deeper understanding and practical application of the knowledge gained. Furthermore, the academy organises hybrid webinar events, which are accessible for free, expanding its reach and enabling wider participation amongst MSMEs. These initiatives aim to ensure that the training programmes are accessible to a diverse range of entrepreneurs and businessowners, fostering inclusivity and further amplifying its impact. More than 16,000 online visitors have accessed the academy's website since the relaunch, with 2,300 active users as of January 2023 (US-ASEAN Business Council, 2023).

2.2.5. Go Digital ASEAN

Date introduced. July 2020.

Primary objectives. The initiative, spearheaded by The Asia Foundation and endorsed by ASEAN, aims to provide digital skills and capabilities to MSMEs and the developing workforce to increase economic opportunities and to mitigate the negative impacts of the COVID-19 pandemic. Google.org funded the $3.3 million initiative (The Asia Foundation, 2022).

Major digital divide factors addressed. Firm internal factors – human resources, finance; firm external factor – cyberattacks

Targeted groups. The initiative focusses on empowering various target groups across ASEAN, including MSMEs, underemployed youth, women-led micro and small businesses,

ethnic minorities, people with disabilities, and rural communities in underserved regions.

Key measures. Comprehensive training and capacity building cover various aspects of digital transformation, including ICT skills, digital marketing, cybersecurity, financial literacy, and carbon footprint reduction, equipping trainees with the necessary knowledge and skills to navigate the digital economy, enhance their competitiveness, and adapt to the evolving business landscape (The Asia Foundation, 2022). A notable aspect is its tailored approach based on the specific needs of each AMS. While general industries are the focus in Brunei Darussalam, Indonesia, Malaysia, Myanmar, the Philippines, and Thailand, the agriculture and services sectors are emphasised in Cambodia, the Lao People's Democratic Republic (Lao PDR), and Viet Nam. Collaboration with local partners, governments, and youth volunteers is also key; these partners often have the experience needed in working with rural and disadvantaged communities. Their involvement has facilitated the delivery of the training programmes and support services, ensuring that the benefits of digital transformation reach even the most marginalised and underserved communities. Since its launch, over 200,000 individuals from rural regions and underserved communities have enhanced their digital participation (The Asia Foundation, 2023).

2.2.6. Asia-Pacific Remote Broadband Internet Satellite Project

Date introduced. 2019.

Primary objectives. The project aims to provide wide access to broadband internet connections in remote areas, where no or very limited internet coverage is currently available.[1] Through collaboration with the private sector, such as Kacific Broadband Satellites and Boeing Satellite Systems International, it seeks to improve the competitiveness of MSMEs, promote sustainable socioeconomic development, and ensure equitable access to opportunities.

Major digital divide factors addressed. Firm external factor – infrastructure

Targeted groups. Targeted groups include MSMEs and rural communities.

Key measures. Through the construction, launch, and operation of the Kacific1 satellite equipped with Ka-band technology, the project is delivering high-speed broadband internet access and mobile networks to between 99.1% to 99.9% of the population in 25 countries in the Asia-Pacific region, including Indonesia, Malaysia, Myanmar, and the Philippines. With a capacity of 50 gigabytes per second, the satellite boosts internet connectivity in the Asia-Pacific region (Kacific, 2021). Its hardware affordability further enhances accessibility, as the starting price for the necessary equipment is as low as $530 (Kacific, 2021).

[1] ADB, Regional: Asia-Pacific Remote Broadband Internet Satellite Project, https://www.adb.org/projects/53115-001/main

2.2.7. Grow with Google

Date introduced. 2015.

Primary objectives. The objectives are to enhance job opportunities, foster career advancement, and support the growth of MSMEs in ASEAN.

Major digital divide factors addressed. Firm internal factor – human resources; firm external factor – digital tool provision from the market

Targeted groups. This initiative targets individuals seeking job opportunities and career growth, MSMEs across various industries, and entrepreneurs and businessowners.

Key measures. Grow with Google provides free access to Google resources, products, and training programmes tailored to the needs of individuals and MSMEs in the ASEAN region. These programmes encompass various topics, including online business expansion, digital marketing, and customer engagement. Through online courses and certifications, participants can enhance their digital skills and gain valuable knowledge. Additionally, Grow with Google offers guidance and support to effectively utilise Google tools and technologies. Collaborations with private local partners and organisations further extend the reach of the programme. Since its inception, over 3 million MSME workers have been trained (Google, 2022). A survey conducted by Kantar Google Impact Research in 2021 across all AMS revealed positive outcomes resulting from participation in Grow with Google (Google, 2022). According to the report, for example, 80% of participants from Indonesia and 54% from Brunei Darussalam experienced increased customer engagement as a result of their involvement. Notably, 94% of Vietnamese MSMEs that participated in the programme were able to keep their businesses operating during the pandemic, thanks to the courses provided by Grow with Google. Additionally, the programme significantly enhanced MSME ability to effectively use digital technology in Myanmar.

3. Regional Industry-Focussed Initiatives

3.1. Agriculture, Fisheries, and Forestry

3.1.1. *ASEAN Guidelines on Promoting the Utilisation of Digital Technologies for the ASEAN Food and Agricultural Sector*

Date introduced. 2021.

Primary objectives. The objective is to assist individuals affected by digitalisation in the food and agriculture sector, including farmers, fishers, and other workers, as well as digital technology initiators, policymakers, and stakeholders. The guidelines aim to create a digital-friendly environment in the sector and to strengthen ICT capabilities to increase competitiveness, enhance food security, promote sustainability, and improve the overall well-being of the sector (ASEAN, 2021d).

Major digital divide factors addressed. Firm internal factors – human resources, finance; firm external factor – infrastructure

Targeted groups. The policy targets various groups involved in the food and agriculture sector, including MSMEs, policymakers and government agencies, academic institutions, and non-governmental organisations (NGOs).

Key measures. First, the guidelines emphasise the significance of farmers using agriculture science and technology services and leveraging ICT for various aspects such as production, market information, waste utilisation, agrometeorological solutions, and product traceability. By doing so, MSMEs can enhance their value chains, ensuring food security, safety, and improved nutrition. Second, the guidelines emphasise the importance of improving ICT infrastructure, particularly in rural areas, to enhance digital connectivity and to reduce affordability barriers. This will enable access to digital tools and platforms, promoting more efficient and inclusive market participation. Additionally, they advocate for financial and in-kind support mechanisms to provide MSMEs with the necessary capital to adopt these new technologies, covering initial costs and facilitating innovation within their operations. The guidelines highlight the significance of capacity-building programmes and agri-extension services tailored to the specific needs of different regions and users to gain the necessary skills and knowledge to effectively utilise digital technologies, boosting productivity and competitiveness. Regional partnerships and collaborations can facilitate knowledge sharing, innovation, and the extension of e-commerce in the food and agriculture sector as well. Private sector entities, universities, government agencies, and farmer organisations may help drive the promotion of digital literacy, familiarity, and practical application of digital technologies amongst the MSMEs.

3.1.2. *ASEAN Integrated Food Security (AIFS) Framework and Strategic Plan of Action on Food Security in the ASEAN Region (SPA-FS) 2021«2025*

Date introduced. The *ASEAN Integrated Food Security (AIFS) Framework* was introduced in 2010, while the *Strategic Plan of Action on Food Security in the ASEAN Region (SPA-FS) 2021–2025* is an extension of the previous plan and was introduced in 2020.

Primary objectives. The objectives of both documents are to ensure long-term food security and to improve the livelihoods of farmers in the ASEAN region. They aim to enhance agriculture productivity, promote sustainable food production practices, and facilitate cooperation and knowledge sharing amongst stakeholders (ASEAN, 2020b).

Major digital divide factors addressed. Firm internal factor – human resources

Targeted groups. The documents target various groups involved in the food and agriculture sectors, including MSMEs.

Key measures. Two critical measures outlined in the SPA-FS 2021–2025 are the creation of a technology portal and expansion of farmers' knowledge. The technology portal serves as a platform to disseminate new technologies and practices across different stages of

the agri-based and food value chains, allowing MSMEs to access innovative solutions and to improve productivity and efficiency. It also emphasises the adoption of environmentally sustainable practices and adherence to safety standards, enhancing the overall quality of products (ASEAN, 2020b). The plan focusses on expanding farmers' knowledge beyond traditional agriculture to include agribusiness and entrepreneurship. Through training programmes and resources, MSMEs can acquire ICT skills and business knowledge, bridging critical gaps in their understanding. By equipping MSMEs with diversified skills, it empowers them to explore value-added activities, such as processing and packaging, increasing their profitability and market competitiveness (ASEAN, 2020b).

3.1.3. Digitalisation of the Agriculture Sector by Lazada

Date introduced. Ongoing.

Primary objectives. The programme is conducted by Lazada, but it involves collaborations with government agencies and institutions such as the Federal Agricultural Marketing Authority in Malaysia; Trade Promotion Agency, Hai Duong Industry and Trade Department, and Hai Duong Agriculture and Rural Development Department in Viet Nam; and Ministry of Agriculture and Cooperatives in Thailand. The objective is to accelerate the digitalisation process within the agriculture sector by providing farmers with a platform to sell their crops online, offering better prices for farmers and efficient purchases for consumers. The programme aims to bridge the gap between farmers and consumers, enhance the sustainability of small businesses and traders, and support farmers in recovering from the impact of the COVID-19 pandemic (Lazada, 2020).

Major digital divide factors addressed. Firm internal factor – human resources

Targeted groups. The programme targets farmers and agriculture entrepreneurs.

Key measures. Lazada is partnering with local government agencies and institutions to onboard farmers and agriculture entrepreneurs onto the e-commerce platform. Lazada University also offers capacity-building programmes to newly onboarded farmers and entrepreneurs, which equip them with the necessary knowledge and skills to establish and to manage their digital stores effectively, access digital tools for online trading, and employ online marketing techniques. This training has addressed gaps in ICT skills and business knowledge amongst farmers, empowering them to establish and to manage their digital stores effectively, utilise online marketing tools, and navigate the e-commerce landscape (Government of Malaysia, Ministry of Communication and Digital, 2020).

3.2. Services

3.2.1. ASEAN Online Sale Day

Date introduced. 2020.

Primary objectives. The objective is to facilitate cross-border trade and investment, build

trust and confidence in e-commerce, and deepen cooperation among AMS to harness e-commerce as a driver of inclusive growth for the online retail business.

Major digital divide factors addressed. Firm internal factor – human resources; firm external factor – microenvironment

Targeted groups. While the ASEAN Online Sale Day targets various groups, including enterprises across AMS and customers in different AMS, its focus on MSMEs is particularly noteworthy.

Key measures. The event is coordinated by the ASEAN Coordinating Committee on E-Commerce, which ensures collaboration amongst AMS and aligns their efforts towards creating a conducive environment for cross-border e-commerce for the online retail business. Moreover, partnerships with prominent e-commerce platforms and start-up companies, such as Lazada and Grab, have strengthened the impact (Government of the Philippines, Ministry of Trade and Industry, 2022). The foremost achievement is the increased participation of MSMEs; the number of participants has risen significantly since its inception, with 200 in 2020, 350 in 2021, to 500 in 2022.[2] This growth demonstrates the attraction of ASEAN Online Sale Day for MSMEs seeking to expand their customer base beyond domestic markets. By providing an online platform for MSMEs to showcase and to promote their products and services, it offers them valuable market exposure and potential business opportunities. Furthermore, ASEAN Online Sale Day has supported MSMEs in recovering from the effects of the COVID-19 pandemic by boosting their online sales on a regional scale (Government of Indonesia, Ministry of Trade, 2021). Additionally, it plays a crucial role in bridging the knowledge gap amongst MSMEs, equipping them with the necessary resources and insights to navigate the e-commerce landscape effectively (Government of Indonesia, Ministry of Trade, 2021).

3.2.2. *ASEAN Tourism Strategic Plan 2016–2025*

Date introduced. 2015.

Primary objectives. The objective is to help achieve ASEAN's integration goal by promoting sustainable, inclusive, and competitive tourism growth. The plan aims to transform the ASEAN region into a quality tourism destination that offers unique experiences while contributing significantly to the socioeconomic well-being of the population (ASEAN, 2015c).

Major digital divide factors addressed. Firm internal factor – human resources

Targeted groups. The plan targets various groups within the tourism sector, including MSMEs.

Key measures. The strategic plan encompasses various measures to empower MSMEs

[2] ASEAN, ASEAN Online Sale Day on 8–10 August 2022, https://asean.org/asean-online-sale-day-on-8-10-august-2022/

and to foster their growth in the tourism industry. Capacity building lies at the heart of this effort, with the implementation of the relevant plan, *ASEAN Tourism Human Resources Development Plan.* Through training programmes, skills development initiatives, and knowledge-sharing platforms, the plan aims to enhance the capacity and capability of those working in the tourism sector (ASEAN, 2015c). Collaboration and coordination are also key. The ASEAN Tourism Resources Management and Development Network will collaborate with the SME Committee and other relevant regional bodies to design a comprehensive programme tailored for ASEAN MSMEs, which will help maximise benefits; foster their overall involvement in the tourism industry; and provide support in areas such as digital transformation, market access, and social media training.

3.3. Manufacturing

3.3.1. *Roadmap and Action Plan to Promote Smart Manufacturing Development in ASEAN*

Date introduced. 2020.

Primary objectives. The objective is to promote the adoption of smart manufacturing practices within ASEAN, with a focus on enhancing the competitiveness and innovation of the region's industries. The roadmap aims to align ASEAN with Industry 4.0 and to facilitate the transition towards a highly integrated, cohesive, competitive, innovative, and dynamic ASEAN community.

Major digital divide factors addressed. Firm internal factor – human resources; firm external factor – microenvironment

Targeted groups. It targets various stakeholders, including governments, industry associations, research institutions, and firms, including both large companies and MSMEs.

Key measures. First, it aims to promote awareness amongst stakeholders, especially MSMEs, about the benefits and possibilities of smart manufacturing. To achieve this, consultant groups and mentors provide guidance and training programmes for the firms. Additionally, national-level strategies are encouraged to facilitate research and development for new manufacturing technologies, process innovation, and supportive regulations and guidelines (ASEAN, 2020c).

4. National Initiatives

This section details various initiatives to bridge the digital divide, mainly regarding MSMEs, conducted by each AMS. The project team reviewed high-level policies in the 10 AMS (Table 10.1).

Table 10.1. High-Level Policy to Support MSME Digitalisation in ASEAN Member States

AMS	Policy
Brunei Darussalam	*Digital Economy Masterplan 2025*
Cambodia	*Small and Medium Enterprise Development Policy and Five-Year Implementation Plan 2020–2024*
Indonesia	*National E-Commerce Roadmap 2017–2019*
Lao PDR	*MSME Development Plan 2021–2025*
Malaysia	*SME Masterplan 2012–2020*
Philippines	*Micro, Small, and Medium Enterprise Development Plan 2017–2022*
Myanmar	
Singapore	*Digital Economy Framework for Action*
Thailand	*SME 4.0: SME Masterplan 2017–2021*
Viet Nam	SME Support Law

AMS = ASEAN Member State, Lao PDR = Lao People's Democratic Republic, SME = small or medium-sized enterprise.
Notes: For the Lao PDR and Myanmar, the information regarding high-level policies was obtained from the written interview documents provided by the project team. The Department of SME Promotion was interviewed in Lao PDR, while the members of Myanmar Women Entrepreneurs and Myanmar Computer Federation were interviewed in Myanmar. For other AMS, the project team obtained the information through desktop research. The references for Indonesia, Lao PDR, and Thailand are not available in English.
Source: Authors.

The initiatives in AMS focus on addressing financial, ICT skills, and business knowledge gaps in a proactive manner. Encouraging examples of support include providing grants for digital transformation activities, conducting capacity-building programmes to enhance MSMEs' ICT proficiency, and equipping them with the knowledge to embrace e-commerce platforms and to boost online sales. Moreover, efforts to improve internet connectivity infrastructure are key for AMS, as they aim to bridge the infrastructure gap and to promote inclusivity. While acknowledging the importance of language and culture, these areas are not the primary focus of the initiatives.

AMS have demonstrated a strong commitment to COVID-19 recovery, recognising its pivotal role in driving more rapid digitalisation. As the pandemic continues to impact MSMEs, the private sector is playing a vital role in providing support during these challenging times (ASEAN, 2022). Additionally, the growing concern of cybersecurity is being addressed mainly through capacity-building initiatives to enhance MSME

knowledge and resilience. E-government, however, is currently receiving less emphasis than other elements amongst AMS.

4.1. Brunei Darussalam

Brunei Darussalam has recognised the importance of digital technology and its potential to transform various sectors of the economy. The government has been taking proactive steps to foster a digital ecosystem that promotes innovation, entrepreneurship, and digital transformation. The digital economy in Brunei Darussalam encompasses a range of areas, including e-commerce, digital services, fintech, digital infrastructure, and digital skills development.

The *Brunei Digital Economy Masterplan 2025* is guiding Brunei Darussalam's digital transformation journey. Aligned with the vision of becoming a 'Smart Nation through Digital Transformation', the master plan aims to enhance Brunei Darussalam's digital economy by focussing on key priority areas and projects. Initiatives are designed to drive significant economic growth and development through digital transformation (Digital Economy Council, Brunei Darussalam, 2020).

Recognising the importance of robust digital infrastructure, Brunei Darussalam has undertaken efforts to improve internet connectivity and to expand broadband coverage across the country. These initiatives include enhancing network infrastructure, promoting broadband adoption, and leveraging emerging technologies such as 5G to support digital innovation (Digital Economy Council, Brunei Darussalam, 2020).

Brunei Darussalam is also emphasising digital skills development to ensure a future-ready workforce. Initiatives like the *Brunei ICT Industry Competency Framework* and Digital Upskilling Training Programme are working to enhance the skills of individuals and to nurture a tech-savvy workforce. The goal is to equip the population with the necessary digital skills to drive innovation and to participate in the digital economy (Digital Economy Council, Brunei Darussalam, 2020).

Entrepreneurship and innovation are being encouraged in the digital sector. Initiatives such as the PENJANA Scheme, a co-funding programme for local MSMEs, provides subsidised costs for pre-approved digital solutions.[3] The Brunei Innovation Lab promotes collaboration amongst the government, industry, and academia to develop innovative digital solutions. Additionally, the government is actively adopting digital technologies to improve public services and to enhance efficiency through initiatives like the e-Government National Centre and the ASEAN Chief Information Officers Forum are contributing to the digitisation of government services and a digital-first approach, leading to improved service delivery, efficiency, and citizen engagement.[4]

[3] AITI, PENJANA Scheme, https://www.aiti.gov.bn/msme-digital/penjana-scheme/

[4] E-Government National Centre, https://www.egnc.gov.bn/SitePages/Home_New.aspx

Brunei Darussalam has responded to the challenges posed by the COVID-19 pandemic by implementing specific measures to support MSMEs, including co-funding programmes for digital solutions, financial assistance, business advisory services, support for digitalisation, training and upskilling, and effective communication. These initiatives are helping MSMEs maintain their operations, enhance their digital capabilities, access financial resources, and adapt to the changing business environment. By providing these forms of support, Brunei Darussalam seeks to alleviate the impact of the pandemic on MSMEs and to enable their recovery and growth in the digital economy (Hamdan and Case, 2021).

4.2. Cambodia

Financial, ICT skills, and business knowledge gaps are the focus in Cambodia, with the COVID-19 pandemic also part of the MSME digitalisation effort. The *Small and Medium Enterprise Development Policy* and *Five-Year Implementation Plan 2020–2024* are still under development in Cambodia. To close the financial gap, the Ministry of Economy and Finance provides special tax schemes for digitalisation (UNESCAP, 2020). Some financial assistance initiatives are provided by Khmer Enterprise (i.e. a government trust fund) and various donors. Other initiatives, like a business development service from the Ministry of Economy and Finance and capacity-building programmes conducted by international donors, are helping address the business knowledge gap.

The Cambodia Academy of Digital Technology has three current initiatives addressing the ICT skills gap amongst MSMEs: knowledge-sharing sessions and capacity building in digitalisation, internship programmes, and an online consultation platform to seek advice on digital tools.[5] The Ministry of Posts and Telecommunications, collaborating with Huawei, also contributes to closing the MSME ICT skills gap through training and digital and technology awards in relation to rapid digitalisation trends (Huawei, 2022).

For the agriculture, fisheries, forestry, and services sectors, the government is sharing digital knowledge to increase digital adoption and to address the ICT skills gap. In the manufacturing sector, the Ministry of Industry, Science, Technology, and Innovation is conducting knowledge-sharing sessions as well.

4.3. Indonesia

Infrastructure, financial, ICT skills, and business knowledge gaps are the focus in Indonesia, with the pandemic and cybersecurity being other factors considered in the MSME digitalisation effort. The policy for MSME digitalisation in Indonesia is embedded in a national e-commerce roadmap. To close the infrastructure gap, improving communications infrastructure, logistics networks, and security to support the growth of the e-commerce industry is included. Subsidised soft loans and grants for business

[5] CADT, https://www.cadt.edu.kh/

incubators contribute to addressing the financial gap. The ICT skills and business knowledge gap is being addressed through a capacity-building programme for enhancing e-commerce knowledge and providing ready-to-use websites for MSMEs to increase online sales. Cybersecurity is addressed through a capacity-building programme to enhance MSME cybersecurity knowledge and to develop a national payment gateway to improve customer protection data.

To help close the ICT skills gap, the Ministry of Cooperatives and SMEs provides MSMEs with online training on adopting digital tools. It also provides training for MSMEs to check e-catalogue procurement and online tender submissions, helping address the business knowledge gap. Through the Digital Academy Indonesia initiative, the Ministry of Communications and Information Technology offers online and offline training for MSMEs to learn digital skills, with basic to advanced tools. The Ministry of Trade provides knowledge-sharing sessions and consultation services in digital adoption for MSMEs.

Two PPPs are aimed at boosting COVID-19 recovery efforts and address gaps in ICT skills and business knowledge. A partnership between the Ministry of Cooperatives and SMEs and Lazada addresses the business knowledge gap by helping with digital marketing and setting up e-commerce platforms for MSMEs (Rahman, 2020). Another partnership, between the Ministry of Investment and Gojek, contributes to addressing gaps in ICT skills and business knowledge by providing training on digital tools and business (*Antara News*, 2021).

There is also an industry-specific initiative focussing on manufacturing. The Ministry of Industry conducts digital training on advanced tools adoption to address the ICT skills gap, and digital marketing training to increase sales to address the business knowledge gap.

4.4. Lao People's Democratic Republic

Infrastructure, ICT skills, and business knowledge gaps are the focus in the Lao PDR, with the pandemic, cybersecurity, and e-government also acknowledged in the MSME digitalisation effort. Based on a written interview with the Department of SME Promotion, the *MSME Development Plan 2021–2025* is being implemented. This plan considers the impact of the pandemic and contributes to closing gaps in infrastructure, ICT skills, and business knowledge through various initiatives. The plan also includes cybersecurity improvement due to cyberattack threats to MSMEs.

The Department of SME Promotion has several initiatives to close ICT skills and business knowledge gaps, including workshops on digitalisation for MSMEs and start-ups as well as related events to increase the awareness of MSME digitalisation (e.g. start-up festivals, ICT awards, and digital weeks). To close the business knowledge gap, some initiatives include training on digital tools application for business operations and launching online tools to assist MSMEs in business operations. In addition, the Department of Import and Export of the Ministry of Industry and Commerce and the Lao National Chamber of

Commerce and Industry launched Plaosme, an e-commerce platform for MSMEs.[6] Plaosme, created with loan support from the Asian Development Bank, is managed by Barterfli Holdings, a private e-commerce service provider (UNESCAP and ADB, 2018). MSMEs can sell their goods and products to domestic and overseas customers through this platform. Online payment and logistics service features are included to ensure efficient transactions (ECCIL, 2020).

4.5. Malaysia

The Malaysia Digital Economy Corporation initiated the Malaysia Digital programme to drive the country's digital economy. It focusses on promoting digital transformation and technology adoption in various sectors, including MSMEs. The *SME Masterplan 2012–2020* aims to support and develop MSMEs in Malaysia by enhancing their competitiveness through access to financing, technology adoption, innovation, human capital development, market access, and regulatory improvements. While the Malaysia Digital programme focusses on the overall digital transformation of the economy, the plan specifically targets the growth and development of MSMEs. Together, these initiatives create a digitally enabled environment that supports the competitiveness and sustainability of MSMEs in Malaysia (National SME Development Council, 2012).

Digitalisation gaps in infrastructure, financial, ICT skills, and business knowledge are addressed through various initiatives. *SME Masterplan 2012–2020* implementation is coordinated under the SME Corporation Malaysia. It aims to improve internet connectivity within East Malaysia and Peninsular Malaysia to address the infrastructure gap. The Human Resource Development Fund and skilled labour salary subsidies contribute to addressing the financial gap. The ICT skills gap is being addressed by providing technical and management advisory services to support MSMEs adopting digital tools. Moreover, the business knowledge gap is being addressed through collaboration with the private sector to promote online sales through e-commerce (National SME Development Council, 2012).

The Ministry of Entrepreneur Development and Cooperatives and Malaysia Digital Economy Corporation are responsible for other initiatives in Malaysia that address financial, ICT skills, and business knowledge gaps. The Ministry of Entrepreneurship Development and Cooperatives is offering grants of up to $400,000 to facilitate integration of advanced digital tools, such as robotics and artificial intelligence (AI), into MSME business operations. In supporting MSMEs to accelerate digital tools adoption, the Malaysia Digital Economy Corporation provides 50% grants or up to $1,100, helping address the financial gap.

Towards the ICT skills gap, the Ministry of Entrepreneur Development and Cooperatives offers assistance in digital knowledge and skills development to MSMEs for utilising

[6] Plaosme, http://www.plaosme.com/about-plaosme

basic-level technologies. To address the business knowledge gap, the Malaysia Digital Economy Corporation offers online design courses for MSMEs to solve business pain points and to help achieve sustainable growth in the digital economy.

There are two PPPs in Malaysia that help address financial, ICT skills, and business knowledge gaps. The partnership of the SME Association of Malaysia, SME Corporation Malaysia, and Malaysia Digital Economy Corporation with Huawei provides funding for MSME digital adoption, advice, capacity building, and facilitation to enhance ICT skills and business knowledge (Malaysian Digital Economy Corporation, 2020). Furthermore, the partnership between the Ministry of Finance and Malaysia Digital Economy Corporation with Lazada provides loans for MSME digital adoption and human resources training related to ICT and business knowledge. Through those initiatives, MSMEs can obtain assistance in recovering from the pandemic as well, such as zero commissions and zero listing fees as sellers, fixed weekly payments, and online training programmes at Lazada University (Lazada, 2020).

4.6. Myanmar

A high-level policy to close the digital divide in Myanmar was not identified, although the Myanmar Women Entrepreneurs Network and Myanmar Computer Federation noted some initiatives. Initiatives from the Myanmar Women Entrepreneurs Network to address ICT skills consist of training courses on digital technology for women as MSME owners or workers. To address the business knowledge gap, the Myanmar Women Entrepreneurs Network assists young women in starting new businesses.

Concerning the impact of COVID-19 on several business players in Myanmar (including MSMEs), the Myanmar Computer Federation has implemented some initiatives to address the ICT skills gap and cybersecurity concerns. It organises training programmes to assist MSMEs in enhancing digital capabilities as well as a consumer protection programme and awareness raising of cyberattacks.

4.7. Philippines

In the Philippines, the focus is on financial, ICT skills, and business knowledge gaps, with the COVID-19 pandemic considered as well. A high-level policy through the *Micro, Small, and Medium Enterprise Development Plan 2017–2022* is coordinated under the Philippines MSME Development Council (MSMED Council, 2017). The plan provides seed funding for digital tool adoption, addressing the financial gap. The ICT skills gap is addressed by providing training on digital tool adoption. Initiatives to provide business consultancy on digital tool adoption, including establishing and promoting e-commerce for MSMEs, address the business knowledge gap.

The Bureau of Small and Medium Enterprise Development addresses ICT skills and business knowledge gaps through digital training (e.g. workshops and offline and online

training) and the development of an e-learning platform for MSMEs on basic and intermediate tools (e.g. e-mail, e-commerce platforms, and social media). The E-Commerce Office has an initiative regarding digital skills training and workshops (e.g. to maximise e-commerce platform usage and to develop digital marketing content). This initiative contributes to addressing the business skills gap. Bangko Sentral ng Pilipinas contributes to addressing the ICT skills gap by providing a digital literacy programme for supporting the use of digital payment systems.

There are two PPPs that address financial and business knowledge gaps. Considering MSMEs impacted by COVID-19, the Department of Trade and Industry partnered with First Circle for loan programmes, addressing the financial gap. Another partnership between the Philippine Chamber of Commerce and Industry with Zeald addresses the business knowledge gap by empowering MSMEs through human resources training and supporting digital and marketing activities.

4.8. Singapore

Launched in 2014, Smart Nation Singapore aims to leverage technology and data to create a more connected and technologically advanced society. It focusses on various areas such as transport, health care, education, urban planning, and public services. The initiative includes projects such as smart homes, smart mobility, digital government services, HealthTech, and data-driven urban planning.[7]

The initiative has laid the foundation for Singapore's digital transformation and has been followed by the *Digital Economy Framework for Action* (DEFA). The DEFA aims to establish the country as a leading global digital economy by implementing strategic initiatives and programmes. It is a strategic roadmap that outlines the nation's approach to leveraging digital technologies for economic growth, innovation, and societal advancement. The framework focusses on three key priorities: accelerating digitalisation across industries, integrating ecosystems to enhance competitiveness, and industrialising the infocomm media sector (IMDA, 2018a). To achieve these goals, the Infocomm Media Development Authority (IMDA) plays a crucial role in supporting businesses and organisations in embracing digital transformation and leveraging emerging technologies. The DEFA also recognises the importance of various enablers for digital transformation, including human resources development; research and innovation; physical and digital infrastructure; and governance, policies, and standards. Indeed, the country's innovation index ranking and growing start-up scene contribute to its digital success (IMDA, 2018a).

Singapore recognises the importance of robust digital infrastructure as the foundation for a thriving digital economy. The government has invested heavily in building world-class digital infrastructure, including high-speed broadband networks, data centres, and a nationwide fibre-optic network. This infrastructure supports seamless connectivity,

[7] Smart Nation Singapore, https://www.smartnation.gov.sg/

enables the efficient exchange of digital information, and facilitates the adoption of emerging technologies (IMDA, 2018a).

The DEFA emphasises cybersecurity to protect Singapore's digital ecosystem. The government has implemented robust cybersecurity measures and established agencies such as the Cyber Security Agency to ensure a secure digital environment. Initiatives include strengthening cybersecurity capabilities, promoting cybersecurity awareness and education, and fostering public–private collaboration to tackle cyberthreats effectively. Additionally, a scholarship was created to aid in the growth of national cybersecurity workforce (Cyber Security Agency of Singapore, 2022a).

Singapore created the *Digital Government Blueprint* that focusses on transforming public services through digitalisation. It aims to create a stakeholder-centric digital government that provides easy, seamless, and secure services to citizens and businesses. It emphasises user-centricity, co-creation, and the use of AI (IMDA, 2018a).

The *Services and Digital Economy Technology Roadmap* is integral to the DEFA. It provides an overview of Singapore's digital technology landscape, highlighting key shifts and technology trends. It focusses on Services 4.0, which leverages emerging technologies like AI and advanced interfaces to enable businesses to seize opportunities in end-to-end, frictionless, anticipatory, and empathic services. It emphasises integrating technology with human expertise, empowering workers to automate mundane tasks and to utilise emerging technologies in areas that require creativity, analytical thinking, emotional intelligence, and innovation (IMDA, 2018b). In addition, IMDA has launched several initiatives as part of the DEFA to support local firms in their digital transformation, including the implementation of a nationwide e-invoicing system, the launch of the Open Innovation Platform to crowdsource digital solutions, and the provision of digital project management services for SMEs through the SMEs Go Digital programme (IMDA, 2018a).

The SMEs Go Digital programme, under the DEFA, is designed specifically for MSMEs (IMDA, 2018a). It seeks to provide MSMEs with the necessary resources, knowledge, and tools to adopt digital solutions effectively. It offers a range of support measures, including financial assistance, training, and digital advisory services.[8] Through SMEs Go Digital, MSMEs gain access to a wide array of pre-approved digital solutions tailored to their specific industries. These solutions encompass areas such as e-commerce, digital marketing, financial management, customer relationship management, and productivity enhancement. By adopting these solutions, MSMEs can streamline their operations, improve customer engagement, and expand their market reach. Furthermore, the SMEs Go Digital programme offers grants to help MSMEs defray the costs of adopting digital solutions. These grants cover various aspects, such as digital consultancy, equipment, software, and training.

[8] IMDA, SMEs Go Digital, https://www.imda.gov.sg/how-we-can-help/smes-go-digital

Moreover, recognising the urgent need for support during the COVID-19 pandemic, SMEs Go Digital swiftly implemented measures to assist MSMEs in navigating the crisis and sustaining their operations. A few of the measures included:

(i) Digital resilience bonuses. This was introduced to encourage MSMEs in the food services and retail sectors to adopt digital solutions during the pandemic. Eligible businesses that adopted specific digital solutions in areas such as e-payments, inventory management, and online ordering received a one-time payout to defray implementation costs.

(ii) Remote working solutions. SMEs Go Digital supported MSMEs to implement remote working solutions. This included collaboration tools, video-conferencing platforms, and cloud-based productivity tools to ensure business continuity and productivity while adhering to safe distancing measures.

(iii) E-commerce support. Recognising the increased reliance on e-commerce during the pandemic, SMEs Go Digital aided MSMEs in establishing or enhancing their online presence. This involved guidance on setting up e-commerce platforms, digital marketing strategies, and logistics support to enable online sales and to reach a wider customer base.

(iv) Digital training and upskilling. SMEs Go Digital prioritised digital training and upskilling programmes to equip MSMEs with the necessary skills to navigate the digital landscape effectively. These initiatives included webinars, workshops, and online courses covering topics such as digital marketing, e-commerce, cybersecurity, and data analytics.

(v) Digitalisation advisory services. SMEs Go Digital provided advisory services to guide MSMEs in selecting the most suitable digital solutions based on their specific needs and goals. Expert consultants offered personalised advice and recommendations to help MSMEs make informed decisions and optimise their digital transformation efforts (IMDA, 2020).

4.9. Thailand

Financial, ICT skills, and business knowledge gaps are the focus in Thailand. COVID-19 recovery is also a factor. The *SME 4.0: SME Masterplan 2017–2021*, coordinated under the Office of SMEs Promotion (OSMEP), contributes to closing these gaps through soft loans for MSMEs provided by commercial banks, subsidies for digital adoption, and innovation vouchers for digitalisation. The ICT skills gap is addressed through the government agency and expert consultation programme for choosing digital tools. The initiative to provide training support on marketing, inventory, and logistics management to increase MSME participation in online sales contributes to addressing the business knowledge gap (OSMEP, 2017).

The Digital Economy Promotion Agency also implements several initiatives to address the financial, ICT skills, and business knowledge gaps. Grants, providing 60% (maximum B200,000) to MSMEs to adopt digital tools and 100% (maximum B10,000) for service or subscription fees for digital software, help address the financial gap. Consultation services on adopting digital tools are contributing to addressing the ICT skills gap. To address the business skills gap, training programmes for digital business help empower MSMEs. The Electronic Transactions Development Agency also provides consultation and training programmes to support adopting digital tools for MSMEs in compliance with e-transaction laws, helping address the business knowledge gap.

There are two identified PPPs in Thailand, the partnership between the Ministry of Commerce and Huawei and amongst the Ministry of Industry, Ministry of Commerce, and Alibaba. These partnerships have contributed to addressing gaps in ICT skills and business knowledge, including boosting the recovery from COVID-19. The Ministry of Commerce and Huawei partnered to develop digital courses for MSMEs. From the partnership amongst the Ministry of Industry, Ministry of Commerce, and Alibaba, an initiative emerged to enhance MSME e-commerce knowledge through a training programme.

4.10. Viet Nam

Financial, ICT skills, and business knowledge gaps are the focus in Viet Nam. The SME Support Law is the high-level policy for MSME digitalisation in Viet Nam, with implementation from January 2018 and coordination under the Agency for Enterprise Development (Zeldin, 2017). Initiatives include providing subsidies for loan interest and loan guarantees. The ICT skills and business knowledge gaps are addressed by providing free or low-cost training courses related to digitalisation for MSME workers. The Agency for Enterprise Development provides 50% of subsidised investment costs to address financial gaps as well as online and offline basic digital training and consultancy services to help address the ICT skills gap.

There are two identified PPPs in Viet Nam. The partnership between the Ministry of Industry and Trade with Alibaba conducts training to develop MSME digital skills, which contributes to addressing the ICT skills gap (*Viet Nam News*, 2021). Furthermore, to address the business knowledge gap, the Agency for Enterprise Development and Amazon conduct a training and support programme for MSMEs to export products using the Amazon Global Selling digital platform. Both initiatives also aim to help MSMEs to recover from the COVID-19 pandemic.

5. Conclusion

5.1. Addressing MSME Internal Factors

This chapter highlights opportunities for ASEAN to adopt policy that effectively addresses the MSME digital divide. By studying the strategies and initiatives implemented, several implications emerge that should be considered to bridge the digital divide.

5.1.1. Human Resources

ASEAN is emphasising the significance of human resources development within the region (ASEAN, 2020d). Strengthening regional human resources by improving ICT skills and business knowledge is a main focus. Most high-level regional policies, such as the *ASEAN Economic Community Blueprint 2025* and BSBR, mention this lack of knowledge. This chapter confirms the implementation of various measures, such as the *ASEAN Strategic Action Plan for SME Development 2016–2025,* to increase the effectiveness of these policies in dealing with the lack of knowledge. PPPs are also involved, such as through the ASEAN SME Academy and Go Digital ASEAN, as is the private sector (e.g. Grow with Google).

At the national level, AMS demonstrate a proactive approach to acquiring highly skilled human resources with proficient ICT and business acumen, as evidenced by their commitment to various capacity-building efforts (JICA, 2017). For example, Singapore has a robust ecosystem that supports the development of digital capabilities, particularly in addressing the lack of ICT skills and business knowledge amongst MSMEs through agencies such as IMDA. The most common initiative observed in AMS is capacity-building programmes, which are planned by the government and PPPs.

Although initiatives addressing human resources issues in digitalisation have been implemented both at the regional and national levels, the lack of ICT skills and business knowledge remains the biggest constraint noted amongst surveyed companies in the questionnaire conducted for this study.

5.1.2. Finance

Several high-level regional policies, such as *ASEAN Economic Community Blueprint 2025, ASEAN Digital Masterplan 2025,* and *ASEAN Strategic Action Plan for SME Development 2016–2025*, as well as industry-focused initiatives like the *ASEAN Guidelines on Promoting the Utilisation of Digital Technologies for the ASEAN Food and Agricultural Sector*, are addressing the financial gap in ASEAN. These initiatives serve as crucial steps towards bridging the region's digitalisation barrier caused by affordability concerns (ASEAN, 2021b).

To enhance these initiatives, ASEAN should develop comprehensive regional policies that encompass financial incentive schemes to promote digitalisation in the services and manufacturing sectors. By providing grants or subsidy schemes, ASEAN can empower

MSMEs to participate in capacity-building programmes and to adopt digital tools that enhance their digital capabilities.

Singapore has a robust ecosystem to address the financial gap amongst MSMEs. Public agencies, such as IMDA, provide financial assistance and grants to support businesses in adopting digital technologies. Initiatives like the SMEs Go Digital programme also offer funding to help SMEs digitalise their operations and improve their competitiveness. Several other AMS, including Brunei Darussalam, Cambodia, Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam, provide grants and subsidies to cover the capital costs for digital adoption tools.

ASEAN should leverage partnerships with multi-lateral development banks and other regional organisations to enrich finance within the region. Joint financing efforts can be provided, enabling the region to offer grants or subsidies to MSMEs. By supporting MSMEs through such funding schemes, ASEAN can foster an environment of inclusivity, ensuring that all businesses, regardless of their financial capacity, can engage in digital transformation and reap its benefits.

5.2. Addressing MSME External Factors

5.2.1. Infrastructure

Infrastructure investments require substantial financial resources, knowledge, and advanced technology. The chapter observed that significant strides have been made in addressing the infrastructure gap in general and within specific industries through high-level initiatives. Notably, the Asia-Pacific Remote Broadband Internet Satellite Project is an action-oriented initiative focussing on regional infrastructure improvement.

Singapore has made significant investments in developing strong digital infrastructure, which includes high-speed internet connectivity and advanced telecommunications networks. This infrastructure effectively addresses the infrastructure gap and enables seamless access to digital services for businesses and individuals. Other AMS, such as Brunei Darussalam, Indonesia, Lao PDR, and Malaysia, have also recognised the need to improve their ICT infrastructure in their high-level policies.

One initiative can involve increased public–private collaboration, as the Asia-Pacific Remote Broadband Internet Satellite Project has shown positive impact. The collaboration can be outlined as a partnership between multi-lateral development banks and other regional organisations. By actively engaging these entities, financing for infrastructure development may be secured. Further, by leveraging the expertise and resources of these institutions, ASEAN can foster an environment that supports infrastructure development, enabling the region to bridge the infrastructure gap and to create a solid foundation for digitalisation and economic growth.

5.2.2. Digital Tool Provision from the Market

Regional initiatives can identify and address MSME needs for language and specific cultural needs for solutions and products. From a regional perspective, the chapter observed that the *ASEAN Digital Masterplan 2025* recognises that the language requirement to operate digital tools presents a barrier to enhancing digitalisation efforts (ASEAN, 2021a). Grow with Google is an effort towards providing tailored products.

On the national level, no specific initiatives are identified that address the provision of tools from the market, such as needs of MSMEs regarding product and solution offerings in local languages. From the interview study, the absence of local language content for digital tools and applications represents a significant barrier to the widespread adoption of digitalisation.

As a unified regional association, ASEAN can play a role in developing a streamlined scheme that facilitates the connection between solution providers and MSMEs in the region. Leading solution providers can offer services and products that cater to the unique requirements of ASEAN MSMEs. This will empower MSMEs to take significant strides towards digitalisation. As Grow with Google is an example of the collaborative efforts with local governments, it is possible to foster private sector involvement in delivering services tailored to the specific needs of each AMS, including features based on the local business environment and language. This collaborative approach has the potential for future initiatives that effectively bridge language and cultural gaps by ensuring that private companies provide the necessary solutions to MSMEs. Additionally, it is crucial to lay a solid foundation for MSMEs to utilise the provided solutions effectively. This can be achieved by offering training programmes in the local language and presenting relevant case studies. These efforts will foster a supportive ecosystem that promotes MSMEs' successful adoption of digital solutions, ultimately contributing to their growth and prosperity.

5.2.3. Cyberattacks

ASEAN recognises the significance of cybersecurity and has taken steps towards enhancing it through some initiatives, like the BSBR as a high-level regional initiative and the *ASEAN Cybersecurity Cooperation Strategy 2021–2025.*

ASEAN does not have a centralised computer emergency response team (CERT) for the entire region. However, according to Cyber Security Agency of Singapore (2022b), the ASEAN Regional CERT is to be developed between 2023 and 2024, will facilitate coordination and information sharing between national-level CERTs, and will develop partnerships with industry and academia. National CERTs, such as SingCERT in Singapore, CyberSecurity Malaysia in Malaysia, and ID-SIRTII in Indonesia, already serve to enhance cybersecurity resilience, provide incident response coordination, and promote information sharing and capacity building within their countries (ASEAN, 2021a). They

collaborate with various stakeholders, including government agencies, critical infrastructure sectors, industry, academia, and international CERTs, to protect their countries' cybersecurity and to foster regional collaboration in addressing cyberthreats.

Singapore demonstrates a strong commitment to cybersecurity and has implemented a comprehensive framework to address cybersecurity concerns within the nation. These proactive measures play a crucial role in mitigating cybersecurity risks. However, it is worth noting that initiatives specifically targeting cybersecurity improvement are currently only found in Brunei Darussalam, Indonesia, Lao PDR, and Singapore. This highlights the need for broader action within the ASEAN region to address cybersecurity concerns.

To address the cybersecurity concerns amongst MSMEs in ASEAN, ASEAN should consider implementing various potential initiatives, such as capacity-building programmes or knowledge transfer from Singapore to other AMS to enhance cybersecurity awareness and practices throughout the region, targeting local businesses, including MSMEs, government agencies, and relevant stakeholders Additionally, ASEAN can explore the expansion of capacity-building initiatives related to cybersecurity with current efforts like Go Digital ASEAN as online learning programmes. This can involve developing comprehensive human resources training programmes to equip MSMEs with the necessary skills to counter cyberattacks. By empowering MSMEs with cybersecurity knowledge and resources, ASEAN can effectively address the digitalisation challenges of inadequate cybersecurity. Another potential avenue for enhancement is the inclusion of financial incentive schemes specifically designed for cybersecurity improvements in industry-focussed sectors.

5.2.4. E-Government

The *ASEAN Digital Master Plan 2025* recognises the importance of regional e-government initiatives. To bridge the digital divide in the region, ASEAN should continue to promote e-government initiatives along with country-level efforts to ensure that MSMEs enjoy an online business environment and are incentivised to go digital for more efficient operations. In implementing these initiatives, cooperation amongst AMS is desirable, such as knowledge sharing with Singapore to countries that are lagging behind in their efforts.

Indeed, at the national level, Singapore's *Digital Government Blueprint* is playing a vital role in transforming public services through digitalisation. By prioritising user-centricity, co-creation, and the use of AI, Singapore aims to create a responsive and efficient digital government that delivers seamless and secure services to citizens and businesses. Through ongoing efforts and collaboration between government agencies and stakeholders, Singapore continues to evolve as a leading digital government, setting benchmarks for user experience and innovation in public service delivery.

To date, there has been a lack of observable e-government improvement initiatives in AMS.

Research conducted by the United Nations identified 7 AMS amongst the top 100 countries in the global e-government development index. These countries include Singapore (ranked 12), Malaysia (53), Thailand (55), Brunei Darussalam (68), Indonesia (77), Viet Nam (86), and the Philippines (89) (ASEAN, 2022). To enhance their e-government services, AMS with a lower e-government index ranking should consider establishing partnerships with AMS that have achieved higher rankings to facilitate the transfer of knowledge and best practices.

5.2.5. Microenvironment

To promote the digitalisation of ASEAN MSMEs, creating a market mechanism that mutually facilitates digitisation amongst regional companies is crucial. Efforts should be made to create a market environment that allows companies to participate more actively in the digital economy and to enjoy digital business.

ASEAN recognises the importance of the digital economy in the region. Like the BSBR, DIFAP, *ASEAN Digital Integration Framework*, and Regional Digital Trade Connectivity Project, some of the high-level policies at the regional level are actively engaged in rulemaking, such as cross-border transactions and harmonisation of data standards for the composition of the region's digital economy. In addition, the service and manufacturing sectors are working to improve the convenience and efficiency of cross-border transactions within the region.

ASEAN should continue to promote the development of the region's digital economy into a more participatory environment for MSMEs. To this end, countries such as Singapore, which have already made progress in the digitalisation of business within the region, should be aware of efforts to support countries that have not yet made progress and create a mechanism for MSMEs in the region to see the benefits of participating in the digital economy.

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Chapter 11

Various MSME Digitalisation Activities in Other Regions and Countries

1. Introduction

This chapter details various initiatives to promote digitalisation and to bridge digital gaps for micro, small, and medium-sized enterprises (MSMEs) in the Association for Southeast Asian Nations (ASEAN) region. These initiatives address key challenges that MSMEs face in digitalisation, such as infrastructure gaps, funding shortages, limited information, poor information and communications technology (ICT) skills, and meagre business knowledge.

Whether targeted at specific sectors or MSMEs, digitalisation initiatives play a crucial role in tackling unique challenges and opportunities within specific sectors. However, broader strategies are essential for addressing common digitalisation issues, such as internet infrastructure, cybersecurity, data privacy, and digital-related skills. These strategies – applicable across various industries and types of companies – leverage multiple resources and tackle these shared challenges by providing policy, guidelines, and framework examples.

This chapter examines several regional programmes in the European Union (EU) that are working to close the digital gaps: the Digital Single Market, Data Governance Act, European Digital Innovation Hubs (EDIHs), and Enterprise Europe Network (EEN). These initiatives prioritise MSMEs as key beneficiaries due to their significant impact on overall economic and social prosperity.

This chapter also highlights national programmes. These initiatives focus on improving digital infrastructure, expanding internet access, providing financial support, and offering digital skills training to MSMEs. Additionally, public–private collaborations, such as Vodafone's Business.connected platform in the United Kingdom (UK), support MSMEs in adopting digital change and staying safe online.

Inter-regional and cross-country support programmes, such as the EU4Digital Initiative and the EU–United States (US) Trade and Technology Council (TTC), have been implemented to bridge infrastructure and connectivity gaps between developed and less developed regions or countries. These initiatives work to improve access to the digital world for MSMEs and to promote economic growth and social inclusion.

Industry-specific digitalisation strategies are critical in addressing industry-specific contexts, requirements, and objectives. They can provide specialised resources and tailored actions that align with the characteristics and needs of a particular industry. This chapter presents industry-specific efforts for the agriculture, services, and

manufacturing sectors. For agriculture, the EU's Common Agricultural Policy (CAP), European Innovation Partnership Agricultural Productivity and Sustainability Network, and Smart Villages, are working to close infrastructure gaps to promote rural development for the creation of a digitally advanced and inclusive environment benefiting MSMEs. Furthermore, smart agriculture is being promoted, exemplified by initiatives such as SmartAgriHubs. These endeavours involve providing MSMEs with technical assistance and funding support to develop smart agriculture solutions while enabling small agri-businesses to enhance their ICT skills and business knowledge to adopt smart agriculture tools.

For the services sector, enhancing e-commerce capabilities stands out amongst various trading initiatives, which simultaneously addresses financial and infrastructure gaps by providing financial assistance to MSMEs for acquiring innovative technologies and digital tools. Examples include the Digital Trading Online Voucher in Ireland and Denmark's MSME Digitalisation and Exports Programme. In less digitally advanced segments (e.g. small retailing) or regions (e.g. Africa), other initiatives focus on promoting the adoption of basic to intermediate digital solutions through infrastructure development, ICT skills training, and business knowledge support.

For manufacturing, a dual digital and green transition objective is highlighted. Collaboration is seen amongst MSMEs (e.g. the TRE-E Consortium in Italy) or on a larger regional scale (e.g. European Institute of Innovation and Technology [EIT] Manufacturing by the European Commission) between both private and public sectors to enhance MSME competitiveness and sustainable development through ICT skills training, business development support, and funding.

The EU stands out due to its continued efforts to close digital gaps, enabled by its robust regional resources and mechanism, and its commitment to inclusive and sustainable digital growth of MSMEs.

2. General Case Studies

This section covers some programmes launched and implemented at the regional or national level to promote the digitalisation of MSMEs. In addition, initiatives undertaken by more developed nations to assist less digitally advanced ones are discussed. Most of these programmes are collaborative efforts between the public and private sectors, aiming to address multiple digital gaps and comprehensively tackle various challenges that MSMEs, regardless of industry, face during their digitalisation journey.

2.1. Regional Programmes

MSMEs, representing 99% of all businesses in the EU, form the backbone of the regional economy.[1] Recognising their pivotal roles, the EU is committed to empowering MSMEs of all sectors in digital transition and development. Their efforts are targeted to two main areas: enhancing awareness and acceptance of digital technologies, and building digital capacity and community.

2.1.1. Digital Single Market

Region and/or country. EU

Date introduced. 6 May 2015

Primary objectives. The Digital Single Market aims to create a unified and thriving digital economy within the EU. This policy seeks to remove barriers to cross-border online activities, enhance competitiveness, and ensure fair access to digital goods and services. Amongst its many objectives, it targets the growth and empowerment of MSMEs operating within the EU (EC, 2015).

Major factors addressed. Firm internal factors – human resources, finance; firm external factors – infrastructure, cyberattacks, microenvironment

Targeted groups. Beneficiaries include consumers; businesses, especially MSMEs and start-ups; researchers and innovators; content creators and rights holders; and public administrations.

Key measures. The Digital Single Market first aims to address inadequate broadband coverage by improving access across Europe, which ensures that MSMEs can connect to digital services and expand their market reach. This has also allowed MSMEs to tap into a broader European customer base, leading to increased growth potential. Second, the strategy emphasises developing digital skills by recommending mandatory courses in digital technologies in schools and providing training opportunities for MSMEs and their employees. This equips businesses with the necessary knowledge to thrive in the digital realm, improves their competitiveness, and enables them to leverage digital tools and platforms for business success. Third, tax harmonisation and access to financing are promoted to create a fair, competitive environment for MSMEs and to provide them with the necessary resources to adapt to digital transformation (EC, 2015). Moreover, a consistent framework for consumer protection and online sales has enhanced consumer trust in digital transactions. As a result, MSMEs have benefited from increased customer confidence, leading to higher online sales and improved business performance. Lastly, a stable and secure regulatory environment has been created for MSMEs, ensuring that their operations in the digital realm are protected and compliant; key issues include

[1] EC, Internal Market, Industry, Entrepreneurship and SMEs, https://single-market-economy.ec.europa.eu/smes_en

cybersecurity, data protection/e-privacy, and the fairness and transparency of online platforms.[2]

2.1.2. Data Governance Act

Region and/or country. EU

Date introduced. 23 June 2020

Primary objectives. The act, adopted by the European Commission in November 2020, is legally binding for EU countries. It aims to foster the availability of high-quality data for public and private sector use while promoting trust in data sharing and facilitating data-driven innovation.[3]

Major factors addressed. Firm internal factor – human resources; firm external factors – cyberattacks, microenvironment

Targeted groups. The policy targets various groups such as EU citizens, technology providers, and businesses, including MSMEs.

Key measures. The Data Governance Act strives to make more data available and to facilitate data sharing across sectors and EU countries to harness the potential of data for European citizens and businesses, including MSMEs. With good data management and sharing, industries can create innovative products and services, making many sectors of the economy more efficient and sustainable (e.g. agriculture data can lead to precision farming, new agri-food products, and rural area services). To create trustworthy data-sharing systems, the EU has implemented four broad sets of measures: (i) facilitate the reuse of certain public sector data that cannot be made available as open data; (ii) ensure that data intermediaries function as trustworthy organisers of data sharing or pooling within common European data spaces; (iii) provide the right tools and conditions to enable citizens and businesses to make their data available for the benefit of society while ensuring that their data will be handled by trusted organisations based on EU values and principles; and (iv) facilitate data sharing, particularly to enable data to be used across sectors and borders, and enable the right data to be found for the right purpose. The act has empowered MSMEs by providing access to high-quality data previously limited to larger organisations, enabling MSMEs to make data-driven decisions, innovate, and compete effectively in the market (SMEunited, 2021). It has also encouraged innovation amongst MSMEs by facilitating data sharing and promoting trust. They can now tap into new data sources; leverage advanced analytics; and develop innovative products, services, and business models. The act has boosted collaboration amongst MSMEs, research institutions, and governments, helping create data-sharing ecosystems, foster knowledge

[2] EU, Single Market, https://european-union.europa.eu/priorities-and-actions/actions-topic/single-market_en

[3] EC, Data Governance Act Explained, https://digital-strategy.ec.europa.eu/en/policies/data-governance-act-explained

exchange, and drive collective innovation. The act has also strengthened the data economy within the EU, attracting investments, encouraging entrepreneurship, and supporting the growth of digital businesses including MSMEs (SMEunited, 2021).

2.1.3. *SME Guide on Information Security Controls*

Region and/or country. EU

Date introduced. 1 March 2022

Primary objectives. Its objectives include enhancing information security, providing practical guidance, promoting awareness, fostering a culture of security, and supporting the overall cybersecurity strategy of the EU.

Major factors addressed. Firm external factors – cyberattacks, microenvironment

Targeted groups. While MSMEs, including start-ups, are the primary target group, other beneficiaries include business associations, industry-specific networks, and information security service providers.

Key measures. Critical aspects of information security are addressed for MSMEs, including conducting risk assessments and implementing risk management strategies, developing comprehensive security policies, establishing governance structures, and ensuring access controls and user awareness. The guide also emphasises secure network and system configurations, incident response planning, business continuity management, and compliance with legal requirements such as the General Data Protection Regulation (Small Business Standards, 2022). The guide is helpful for MSMEs in building their technical capacity in cybersecurity and being better protected while pursuing sustainable digital transformation (Small Business Standards, 2022). MSMEs implementing the recommended practices will see improved information security across their operations. By adhering to the guide, they strengthen their defences against cyberthreats, reducing the risk of data breaches, financial losses, and reputational damage. Furthermore, it enhances cybersecurity awareness amongst MSMEs, increasing their understanding of common threats, secure practices, and importance of regular updates and user awareness programmes.

2.1.4. European Digital Innovation Hubs

Region and/or country. EU

Date introduced. 2018

Primary objectives. The objective is to foster the digitalisation of businesses, with a particular focus on MSMEs, by providing them with access to digital technologies, expertise, and innovation support services. EDIHs promote collaboration amongst businesses, research institutions, and technology providers to drive digital innovation and

adoption.[4]

Major factors addressed. Firm internal factors – human resources, finance; firm external factor – digital tool provision from the market

Targeted groups. These include MSMEs, start-ups, research organisations, universities, technology providers, and regional and local authorities.

Key measures. EDIHs provide technology and innovation support, facilitate networking and collaboration, and offer capacity-building and skills development programmes. Through these activities, EDIHs have supported MSMEs in adopting cutting-edge digital technologies, improving their competitiveness and enhancing their innovation capacity. By offering access to testing facilities, expert guidance, and innovation workshops, EDIHs have effectively enabled MSMEs to integrate digital innovations into their operations.[5] EDIHs also assist MSMEs in accessing funding opportunities. By guiding MSMEs through the complex landscape of funding programmes and connecting them with potential investors, EDIHs have increased the financial resources available to support their digital transformation initiatives. Third, they provide regulatory and legal advice, which has helped MSMEs navigate the complexities of data protection, cybersecurity, intellectual property rights, and regulatory compliance related to digital technologies.[6] As a result, MSMEs have witnessed increased efficiency, improved competitiveness, and the creation of new business opportunities. [7] Originally, EDIHs numbered 136, with most hubs operational by January 2023. A second call has been launched to further strengthen the network, resulting in an additional 15 hubs, which are anticipated to be operational by mid-2023.

2.1.5. Enterprise Europe Network

Region and/or country. EU

Date introduced. 2008

Primary objectives. The European Europe Network (EEN) facilitates internationalisation, fosters innovation, and provides personalised business advice and support services to MSMEs.

Major factors addressed. Firm internal factors – human resources, finance; firm external factor – microenvironment

[4] EC, European Digital Innovation Hubs, https://digital-strategy.ec.europa.eu/en/activities/edihs

[5] EC, The Digital Programme, https://digital-strategy.ec.europa.eu/en/activities/digital-programme

[6] EC, AI5Production, https://european-digital-innovation-hubs.ec.europa.eu/edih-catalogue/ai5production

[7] EC, The Digital Programme, https://digital-strategy.ec.europa.eu/en/activities/digital-programme

Targeted groups. Its services are extended to MSMEs, start-ups, research organisations, technology providers, clusters of business networks, and regional authorities.

Key measures. The EEN has a wide array of support services tailored to the needs of MSMEs, including market intelligence, partner search, funding access, intellectual property advice, and innovation management assistance. The network also aids internationalisation efforts by guiding MSMEs through market-entry strategies, trade regulations, and customs procedures. Moreover, the EEN fosters collaboration and partnerships through networking events, matchmaking initiatives, and industry-specific conferences. Information resources and training programmes are offered to empower MSMEs with knowledge on EU regulations, funding opportunities, and business strategies.[8]

2.1.6. Digital Volunteers Pilot Programme

Region and/or country. EU

Date introduced. 2021

Primary objectives. It aims to foster collaboration amongst digital volunteers and MSMEs, address the digital skills gap, and promote inclusivity and diversity in digital transformation efforts.

Major factors addressed. Firm internal factor – human resources

Targeted group. The programme targets MSMEs, non-governmental organisations (NGOs), start-ups, and educational institutions.

Key measures. Digital volunteers (i.e. large companies from EU countries) serve as mentors for MSMEs. They assess MSME needs and challenges in their digital journeys; provide digital upskilling for MSME employees and tailored assistance in digitalising their business activities through various areas (e.g. website development, e-commerce, social media marketing, and data analytics); share knowledge through webinars and workshops; and utilise evaluation mechanisms to monitor progress.[9]

2.1.7. Talent for Growth Task Force

Region and/or country. EU and US

Date introduced. December 2022

Primary objectives. Its objectives are to enhance cooperation between the EU and US and to create an enabling environment for the growth of MSMEs. By facilitating knowledge exchange, identifying best practices, and developing joint initiatives, the task force aims

[8] EC, Enterprise Europe Network, https://een.ec.europa.eu/about-enterprise-europe-network
[9] EU, Digital Volunteers, https://digital-skills-jobs.europa.eu/en/about/digital-volunteers

to address common challenges that MSMEs face.

Major factors addressed. Firm internal factors – human resources, finance; firm external factor – digital tool provision from the market

Targeted groups. Although MSMEs constitute the primary targeted group, the initiatives and programmes also benefit entrepreneurs, start-ups, educational institutions, and training providers.

Key measures. The task force works to share the best practices and lessons learned between the EU and US. By identifying successful models and strategies, MSMEs from both can learn from each other's experiences and implement innovative solutions. Moreover, collaborative training programmes are designed to enhance the skills and capabilities of MSMEs by equipping them with the necessary knowledge and tools to navigate the evolving business landscape and to capitalise on emerging opportunities. It organises networking events, workshops, and conferences to facilitate cross-border collaboration and to enable MSMEs to establish valuable partnerships.[10] The task force also assists MSMEs in accessing resources such as funding opportunities, business support services, and mentorship programmes, enabling them to scale their operations and expand into new markets.

2.1.8. Digital Economy and Society Index

Region and/or country. EU

Date introduced. 2014

Primary objectives. Its objectives are to measure and to monitor the digital performance of EU countries. The Digital Society and Economic Index seeks to identify areas that require improvement in digital infrastructure, digital skills, and digital public services in each country. By doing so, it aims to foster digitalisation, enhance competitiveness, and promote the growth of the digital economy and society across the EU.

Major factors addressed. Firm external factor – microenvironment

Targeted groups. The index targets multiple groups, including MSMEs, individuals, and public services.

Key measures. The index determines the digital performance of countries by assessing various dimensions: (i) connectivity, by evaluating the availability and quality of broadband infrastructure, broadband coverage, and deployment of high-speed broadband technologies; (ii) human capital, by examining a population's digital skills, including digital literacy and the availability of ICT specialists; (iii) use of internet services, by assessing internet usage amongst individuals, e-commerce activities, and the digitalisation level of

[10] EC, EU–US Trade and Technology Council, https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/stronger-europe-world/eu-us-trade-and-technology-council_en

businesses; (iv) integration of digital technology, such as the adoption of digital tools by businesses, e-commerce sales, and digitalisation of public services; and (v) digital public services, by analysing the availability and quality of e-government services, online administrative procedures, and digital interaction between citizens and the government.[11] The index is expected to help enhance policy development by providing policymakers with valuable data and insights into a country's digital performance, allowing policymakers to identify areas that require improvement and to develop targeted policies to support MSMEs and other stakeholders. It also aims to facilitate the digital transformation of MSMEs by highlighting their digital strengths and weaknesses; encouraging the adoption of digital technologies and practices; and enabling MSMEs to enhance their competitiveness, efficiency, and access to markets. Moreover, the index promotes digital inclusion by assessing the digital skills of individuals; countries can identify gaps in digital literacy and develop initiatives to bridge the digital divide, ensuring that individuals can fully participate in the digital economy and society. Lastly, it encourages the digitalisation of public services, resulting in more efficient and accessible e-government services.

2.1.9. eGovernment Benchmark

Region and/or country. EU

Date introduced. 2012

Primary objectives. It aims to assess and to promote the digital transformation of public administrations across EU countries. It seeks to improve the delivery of online services, enhance the user experience, and foster transparency and efficiency in government-citizen interactions.

Major factors addressed. Firm external factor – e-government

Targeted groups. While it focusses on evaluating the digital services provided by public administrations, it also indirectly benefits various groups, including MSMEs.

Key measures. The benchmark evaluates various dimensions of e-government, including user-centricity, transparency, cross-border mobility, and online service availability. It examines how digital technologies streamline administrative processes, enhance service accessibility, and facilitate citizen engagement. The benchmark also focusses on the availability of cross-border services, aiming to enable MSMEs to operate across the EU easily (EC, 2023).

[11] EC, The Digital Economy and Society Index (DESI), https://digital-strategy.ec.europa.eu/en/policies/desi

2.1.10. European Structural and Investment Funds

Region and/or country. EU

Date introduced. 2014

Primary objectives. They aim to foster economic and social cohesion amongst EU countries. To reduce regional disparities and to promote sustainable development, the European Structural and Investment Funds (ESIF) encompass various funds, including the Cohesion Fund, European Agricultural Fund for Rural Development, European Maritime and Fisheries Fund, European Regional Development Fund, and European Social Fund.[12]

Major factors addressed. Firm internal factor – finance; firm external factors – infrastructure, microenvironment

Targeted groups. While the ESIF benefit various groups, MSMEs are amongst the targeted beneficiaries.

Key measures. The ESIF implement several financial measures to support MSMEs in achieving their full potential, including grants, loans, and other funding instruments. These can be utilised to invest in infrastructure, equipment, research and development, and market expansion. MSME skills development and workforce training initiatives are also supported to enhance the capabilities of MSME employees and to strengthen their competitiveness in the labour market.[13] Additionally, the ESIF fund projects that provide MSMEs with business support services such as advisory services, mentoring, training, and networking opportunities, to enhance their competitiveness, facilitate market entry, and improve business management practices.

2.1.11. European Investment Fund

Region and/or country. EU

Date introduced. 1994

Primary objectives. Its primary objective is to enhance access to finance for MSMEs, which often face difficulties in obtaining traditional bank loans due to their size, limited collateral, or risk profile. The European Investment Fund (EIF) works closely with financial institutions, such as banks, venture capital funds, and guarantee institutions, to help them provide financing. By sharing the risks associated with MSME lending, the EIF encourages financial intermediaries to increase their lending activities and to expand support for small businesses.

[12] EC, 2014–2020 European Structural and Investment Funds, https://commission.europa.eu/funding-tenders/find-funding/funding-management-mode/2014-2020-european-structural-and-investment-funds_en

[13] *Ibid.*

Major factors addressed. Firm internal factor – finance; firm external factor – infrastructure

Targeted groups. The EIF's support extends to many groups, including MSMEs. Furthermore, the EIF supports start-ups and high-growth potential companies, research and innovation projects, social enterprises, and impact-driven organisations. It also emphasises women-led enterprises, MSMEs in underrepresented sectors or regions, and those in need of microfinance support.

Key measures. Its measures are designed to address the challenges that MSMEs face in accessing finance and to promote their growth and development. The EIF provides various financial instruments, including equity investments, guarantees, loans, and microfinance support. By tailoring these instruments to meet the specific needs of different MSMEs at different stages of development, the EIF ensures that a diverse range of businesses can benefit from its support. These financial instruments provide MSMEs the necessary capital to invest in their growth, innovation, and expansion. In addition, the EIF engages in risk-sharing partnerships with financial institutions. By assuming a portion of the potential losses incurred by the partner institution, the EIF incentivises financial intermediaries to provide funding to MSMEs with limited collateral or higher-risk profiles, encouraging financial institutions to increase lending activities and to expand support for MSMEs. The EIF also invests in venture capital funds that focus on providing equity financing to high-growth potential MSMEs and start-ups, helping foster entrepreneurship, job creation, and economic growth. Furthermore, it offers guarantees to financial institutions to mitigate risk and to enhance the creditworthiness of MSMEs. By reducing collateral requirements and improving the terms and conditions of loans, the EIF enables banks and other lenders to offer financing to MSMEs that may otherwise struggle to access capital. Lastly, the EIF actively manages financial instruments under various EU programmes, such as Horizon 2020, the European Fund for Strategic Investments, and ESIF. Through these programmes, the EIF leverages additional resources to support MSMEs and to foster economic development across the EU. By managing and allocating funds under these programmes, the EIF ensures that MSMEs can benefit from a wider range of financial support options and opportunities.[14]

2.2. National Programmes

MSMEs are essential to national competitiveness and prosperity. Therefore, countries also have strategies and plans to foster MSME digital transformation. Key actors can be government or private sector players. Some are broader initiatives to solve the infrastructure gap, improve accessibility, and create a strong foundation for digital development. Others are more customised to solve MSME-specific obstacles in

[14] EIF, https://www.eif.org/

digitalisation, such as the lack of funding to adopt digital devices or inadequate ICT skills and business knowledge.

2.2.1. Digital New Deal

Region and/or country. South Korea

Date introduced. July 2020

Primary objectives. First, it aims to foster digital transformation and innovation within the economy. South Korea is seeking to enhance productivity, competitiveness, and overall economic resilience by embracing cutting-edge technologies and digital solutions. Second, the policy addresses the digital divide, ensuring equal opportunities for all citizens and businesses to thrive in the digital era. Lastly, it seeks to promote economic recovery and sustainable growth by harnessing the power of technology.

Major factors addressed. Firm internal factors – human resources, finance; firm external factor – infrastructure

Targeted groups. While the primary focus is on MSMEs, the policy also supports other key groups such as start-ups, government agencies, and public institutions.

Key measures. One central measure is expanding access to high-speed internet. Through infrastructure development and improved connectivity, it aims to provide reliable and high-speed internet access to all citizens, including underserved areas., ensuring that MSMEs and individuals can harness the full potential of digital technologies. Furthermore, the policy emphasises the development of smart cities. By integrating advanced technologies such as internet of things (IoT), artificial intelligence (AI), and big data analytics, smart city initiatives enhance efficiency, sustainability, and the overall quality of life, creating an environment conducive to business growth and enabling MSMEs to leverage intelligent infrastructure and gain a competitive edge. It also emphasises digital training and support; MSMEs and individuals are offered various programmes and resources to enhance their digital skills and capabilities. Training, consulting services, and financial support are provided to facilitate the adoption of digital technologies. Moreover, the policy fosters innovation through funding and support programmes, encouraging the growth of start-ups and tech-driven businesses (Government of South Korea, Ministry of Science and ICT, 2020) .

2.2.2. Programme to Support Micro and Small Enterprises (Pronampe)

Region and/or country. Brazil

Date introduced. May 2020

Primary objectives. The objective is to provide financial support and assistance to MSMEs. It aims to help these businesses overcome economic challenges, access capital, and maintain their operations during times of crisis, such as the COVID-19 pandemic.

Major factors addressed. Firm internal factor – finance; firm external factor – macroenvironment

Targeted groups. It targets MSMEs across various sectors of the economy. However, the programme can also benefit self-employed individuals, professionals, and informal workers who meet the eligibility criteria as well.

Key measures. Pronampe has incorporated two key measures to support MSMEs in Brazil. First, it provides loan guarantees to financial institutions, encouraging them to offer credit at favourable terms and lower interest rates to eligible MSMEs. The programme established loan conditions, such as longer repayment periods and lower interest rates than standard commercial loans, reducing the financial burden on MSMEs. Additionally, Pronampe allocated a specific percentage of funds from financial institutions to be exclusively directed towards MSMEs, ensuring priority access to credit for these businesses. Implementing Pronampe has significantly benefited MSMEs in Brazil, particularly during the COVID-19 pandemic. It increased access to credit, enabling MSMEs to cover essential expenses, retain employees, and adapt their operations to the changing market conditions. This has contributed to job preservation and stability within the economy. Additionally, Pronampe has facilitated business resilience by supporting MSMEs in implementing necessary safety measures, investing in digitalisation, and exploring new business models. These efforts have helped MSMEs navigate the economic downturn caused by the pandemic and to remain competitive.[15]

2.2.3. E-Governance Initiatives

Region and/or country. Kenya

Date introduced. Early 2000s

Primary objectives. The objectives include promoting digital transformation and innovation in government services, enhancing accessibility and efficiency in public services delivery, bridging the digital divide and fostering inclusivity, and stimulating economic growth with a particular focus on supporting MSMEs.

Major factors addressed. Firm internal factor – human resources; firm external factors – e-governance, infrastructure, microenvironment

Targeted groups. While the e-governance initiatives encompass various stakeholders, MSMEs have been a key focus. The initiatives also target citizens, including underserved and marginalised communities, as well as government entities and employees.

Key measures. Four critical measures have been implemented to facilitate MSME growth through the initiative. First, Huduma Kenya decentralises public services provision and offers a wide range of government services in one location. There are currently 60 Huduma centres nationwide where individuals can seek these services. Second, the

[15] Bank do Brasil, Pronampe, https://www.bb.com.br/site/pro-seu-negocio/credito/pronampe/

government is prioritising education and aligning it with the digital economy transformation. Notable initiatives include the Digital Literacy Programme that integrates digital technologies into public primary schools, equipping future entrepreneurs with essential digital skills. The third key measure is related to infrastructure; the government has developed projects to improve services delivery and to prepare the country for the digital economy. For instance, the Konza Technopolis serves as a technology hub, fostering innovation, attracting investment, and providing a conducive environment for MSMEs in the technology sector to thrive. The fourth key measure targets digital inclusion. Pasha Centres extend services to underserved areas, providing MSMEs in remote regions with access to information, financial services, and government support. The Kenya Open Data Initiative makes government data available for analysis and decision-making, empowering MSMEs with valuable insights (Wafula, Odima, Khisa, 2020).

2.2.4. Help to Grow: Digital Programme

Region and/or country. UK

Date introduced. January 2022

Primary objectives. The objectives include boosting productivity and growth of MSMEs, supporting digital transformation and adoption of digital technologies, providing access to affordable software solutions, and enhancing digital skills and knowledge amongst businesses.

Major factors addressed. Firm internal factors – human resources, finance; firm external factor – digital tool provision from the market

Targeted groups. The key beneficiaries are MSMEs. Initially, businesses with at least five employees were eligible, but it was later expanded to include businesses with just one employee.

Key measures. Key measures include discounts of up to £5,000 on approved software solutions, including e-commerce, customer relationship management, and digital accounting software; free and impartial advice through an online platform to help businesses identify technology needs, evaluate options, and implement new technologies; and one-on-one advice on technology adoption for MSMEs. The programme has broadened its reach by expanding eligibility, benefiting up to 1.2 million businesses. Adopting software solutions resulted in a demonstrated increase in productivity by an average of 18%. This boost in productivity showcased the tangible benefits of the programme and its positive influence on MSME growth and performance (OECD, 2021).

2.2.5. Financial Assistance for Digitalisation and Tax Credit Scheme for Industry 4.0 Training

Region and/or country. Italy

Date introduced. The policy was introduced as part of the government's post-pandemic recovery plan. The specific date of introduction was not detected within the research.

Primary objectives. The policy aims to promote the digitalisation of businesses and to accelerate post-pandemic recovery by supporting and incentivising MSMEs in their digital transformation efforts. It aims to foster the adoption of Industry 4.0 technologies and practices, positioning Italian businesses for increased competitiveness and growth in the digital era.

Major factors addressed. Firm internal factor – finance; firm external factor – macroenvironment

Targeted groups. The policy primarily targets MSMEs. However, the tax credit scheme for Industry 4.0 training may also benefit employees and individuals seeking to enhance their skills in emerging technologies.

Key measures. The first key measure is financial assistance for digitalisation; €13.4 billion has been allocated for digitalisation initiatives. This funding aims to support MSMEs in adopting digital technologies, improving their operational efficiency, and expanding their market reach. The second key measure is the tax credit scheme for Industry 4.0 training. A 50% tax credit on labour costs is offered to MSMEs, which applies to employees who undergo training related to Industry 4.0 topics. By incentivising training programmes, the policy encourages businesses to upskill their workforce and to embrace emerging technologies, fostering a culture of innovation and adaptability.[16]

2.2.6. Digital Boost

Region and/or country. New Zealand

Date introduced. Late 2020

Primary objectives. It seeks to bridge the ICT skills gap, enhance business knowledge, and promote digital engagement to foster economic growth and innovation. The programme aims to support MSMEs in adopting digital tools and practices for operational efficiency, resilience, and growth by providing a range of initiatives and resources.

Major factors addressed. Firm internal factors – human resources, finance; firm external factor – digital tool provision from the market

Targeted groups. They include MSMEs across various sectors.

[16] EC, Italy's Recovery and Resilience Plan, https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility/italys-recovery-and-resilience-plan_en

Key measures. The Digital Boost Spotlight Series showcases real-life case studies of successful digital transformations by small businessowners, which offer valuable insights and guidance, inspiring other entrepreneurs to embark on their own digital transformation journeys. Complementing this, the Digital Boost Educate platform provides free access to over 500 video tutorials, live workshops, and expert support, equipping businessowners and employees with essential digital skills, knowledge, and confidence. Second, to help MSMEs prioritise their digital transformation efforts, the Digital Boost Checkable initiative offers personalised digital action plans. Leveraging innovative technologies such as AI, natural language processing, and data analytics, this extension of Digital Boost Educate enables businessowners to have informed discussions with technology providers, advisors, and lenders, leading to more effective decision-making and implementation of digital solutions. In addition, recognising the importance of support at the initial stages, the Digital Facilitation Scheme funds business intermediaries to provide facilitated learning support to groups of small businesses. This scheme encourages collaboration and enables businesses to navigate digital transformation challenges collectively. Moreover, the Digital Boost Alliance Aotearoa brings together the government and larger-scale private sector organisations to inspire MSMEs, offering specific services and resources to facilitate their digital transformation journeys. By August 2022, 23% of businesses reported a revenue increase after using Digital Boost. Furthermore, 80% of Digital Boost businesses now have websites, indicating improved online presence and visibility. Feedback from programme participants has been encouraging, with 89% intending to continue using the platform, and 79% recommending it to other businesses.[17]

2.2.6.1. Business.connected

Region and/or country. UK

Date introduced. 2021

Primary objectives. The objective is to empower MSMEs by bridging the infrastructure, ICT, and business knowledge gaps. The programme aims to boost productivity and growth amongst MSMEs by providing them with the necessary tools, knowledge, and resources to thrive in the digital age.

Major factors addressed. Firm internal factor – human resources; firm external factor – digital tool provision from the market

Targeted groups. These include a wide range of MSMEs, spanning various sectors and industries. From sole traders and small businessowners to entrepreneurs and individuals seeking to establish an online presence, the programme aims to cater to the diverse

[17] Government of New Zealand, Ministry of Business, Innovation and Employment, Digital Boost, https://www.mbie.govt.nz/business-and-employment/business/support-for-business/digital-boost/

needs of businesses and individuals looking to enhance their digital capabilities.

Key measures. The programme offers a range of online training resources, including workshops, webinars, and e-learning modules, which cover crucial topics such as online business management, digital marketing, and cybersecurity. The programme has partnered with industry leaders like Builder.ai, Cisco, JPMorgan Chase, Sage, and Samsung to ensure the quality of contents and to allow MSMEs to access expertise and insights from renowned companies in various domains. Business.connected also provides free one-on-one advisory services through V-Hub advisors from Vodafone, who specialise in digital topics and are available to guide MSMEs on building a digital presence, creating websites, enhancing digital security, and implementing remote working strategies. The programme also offers exclusive digital solutions leveraging partnerships with companies like Sage, providing MSMEs with free subscriptions to their accounting software. This solution streamlines invoicing, digitising accounting records, and complying with digital tax requirements. Since its launch, over 100,000 MSMEs have benefited from the programme.[18]

2.2.6.2. Digital India

Region and/or country. India

Date introduced. 1 July 2015

Primary objectives. It aims to transform the country into a digitally empowered society and knowledge economy. It seeks to leverage the power of ICT and digital connectivity to bridge the digital divide, provide e-governance services, and promote digital literacy and innovation across the nation.

Major factors addressed. Firm internal factors – human resources, finance; firm external factors – infrastructure, e-government

Targeted groups. The policy targets a wide range of groups, including MSMEs, government organisations, educational institutions, and rural and underprivileged communities.

Key measures. By establishing initiatives like the National Optical Fibre Network and BharatNet, the policy aims to provide high-speed internet access even in rural areas, enabling MSMEs to leverage digital tools and platforms for business growth, expand their market reach, and access a broader customer base. It also promotes e-governance and the digitalisation of government services. MSMEs can utilise online platforms for various registrations, clearances, and licensing processes, reducing bureaucratic hurdles and enhancing efficiency. Additionally, the policy encourages the use of digital payments and financial inclusion, providing MSMEs with secure and convenient digital payment options,

[18] Vodafone, business.connected, https://www.vodafone.co.uk/business/sme-business/business-connected

reducing reliance on cash-based transactions, and promoting financial inclusion. To ensure that MSMEs can fully leverage digital technologies, the policy emphasises skills development and digital literacy. Programmes like Pradhan Mantri Gramin Digital Saksharta Abhiyan aim to enhance digital literacy amongst MSMEs and to enable them to use digital tools, platforms, and online marketplaces effectively. By developing digital skills, MSMEs can adapt to the digital era, streamline operations, and explore new growth opportunities. Furthermore, it fosters innovation; supports start-ups; and promotes a digital ecosystem that nurtures entrepreneurship by providing access to funding, incubation centres, mentoring, and other support mechanisms. It encourages MSMEs to adopt innovative technologies, business models, and practices that drive growth, competitiveness, and sustainability.[19]

2.3. Interregional and Cross-Country Support Programmes

As a part of the globalisation process, more developed regions or countries have been trying to boost their bilateral and regional relations with developing or less developed countries. One key area where more digitally developed regions or countries can deliver the most impact is helping with infrastructure and connectivity gaps to enhance the accessibility of MSMEs as well as the wider public to the digital world.

2.3.1. EU4Digital Initiative

Region and/or country. EU and Eastern Partnership countries (i.e. Armenia, Azerbaijan, Belarus, Georgia, Moldova, and Ukraine)

Date introduced. 2016

Primary objectives. The objective is to deepen and strengthen the relations amongst the EU, its member countries, and Eastern Partnership countries by promoting digital transformation and harmonising digital markets. The specific objective related to MSMEs is to support their growth and competitiveness by leveraging digital technologies and creating an enabling environment for their participation in the digital economy.

Major factors addressed. Firm internal factor – human resources; firm external factors – infrastructure, cyberattacks, microenvironment

Targeted groups. It targets various stakeholders, including MSMEs, governments and policymakers, regulatory authorities, business support organisations, civil society organisations, academic institutions, and ICT industry and services providers.

Key measures. By improving digital infrastructure, the EU4Digital Initiative has enabled MSMEs in remote areas to overcome geographical barriers and to access digital tools and platforms for their business operations and market expansion. Another critical aspect is the improvement of the legal and regulatory frameworks related to the digital economy.

[19] Digital India, https://digitalindia.gov.in/

By promoting transparent and business-friendly regulations, the initiative has created an enabling environment for MSMEs to operate, innovate, and compete in the digital market. Reducing regulatory burdens has enhanced the ease of doing business and fostered MSME participation in e-commerce activities. Moreover, the EU4Digital Initiative has focussed on enhancing digital skills amongst MSMEs through training programmes, capacity building, and knowledge-sharing activities. By improving MSME digital literacy and capabilities, the initiative has empowered them to leverage digital technologies more effectively for business growth, innovation, and competitiveness. This increased digital skills development has also contributed to bridging the digital divide amongst MSMEs and ensuring equal opportunities for participation in the digital economy. In addition to skills development, the initiative has encouraged the establishment and growth of e-commerce platforms and online marketplaces, which provide MSMEs with new avenues for sales and market access, both domestically and internationally. By facilitating online trade, MSMEs can expand their customer base and increase their sales, contributing to their growth and sustainability. A cybersecurity initiative has also promoted coordinated cybersecurity efforts and capacity building amongst MSMEs to address the growing challenges of cyberthreats. By supporting the development of cybersecurity strategies and providing guidance on best practices, the initiative has helped MSMEs protect their digital assets and ensure the continuity of their business operations.[20]

2.3.2. EU–US Trade and Technology Council

Region and/or country. EU, US, Jamaica, and Kenya

Date introduced. December 2022

Primary objectives. The EU–US TTC initiatives aim to support MSMEs in Jamaica and Kenya by promoting digital technologies, strengthening digital competencies amongst teachers, expanding school connectivity, and bridging gaps in last-mile connectivity. The overall goal is to drive economic growth, enhance educational opportunities, foster innovation, and ensure digital inclusion in these countries.

Major factors addressed. Firm internal factor – human resources; firm external factor – infrastructure

Targeted groups. The initiatives target various groups beyond MSMEs, including teachers, educators, students, and individuals and communities.

Key measures. In Jamaica, with the government and other stakeholders, the TTC aims to strengthen digital competencies amongst teachers and to promote the use of digital technologies by MSMEs. This effort will help equip educators with the necessary skills to effectively leverage technology in the classroom and enhance the overall quality of education. By supporting MSMEs in adopting digital tools, the TTC intends to foster

[20] EU4Digital, The EU4Digital Initiative, https://eufordigital.eu/discover-eu/the-eu4digital-initiative/

innovation and competitiveness in the Jamaican business landscape. The TTC plans to expand reliable and trustworthy public wi-fi infrastructure in the New Kingston neighbourhood of Jamaica's capital city. This initiative will begin to expand the service nationwide, ensuring widespread access to the internet, which will bridge the digital divide and provide opportunities for individuals, businesses, and communities to participate fully in the digital economy. Furthermore, the TTC recognises the importance of rural broadband connectivity and plans to support improvements in this area. By partnering with regional suppliers, the TTC aims to enhance broadband access and connectivity options for residents in rural areas of Jamaica, which will help promote digital inclusion and ensure that individuals in remote locations have equal access to educational and economic opportunities.[21]

In Kenya, the TTC will support the implementation of Kenya's national digital masterplan, which outlines the country's vision and strategy for digital transformation over the next decade. The TTC's initial focus is expanding school connectivity and bridging gaps in last-mile connectivity. By conducting a study on scalable solutions for school connectivity, the TTC intends to identify effective approaches to ensure that all schools in Kenya have access to reliable internet connectivity. Establishing fibre-optic connections to schools in remote areas is another key step in bringing high-speed internet to regions lacking sufficient infrastructure. Additionally, the TTC plans to develop a policy roadmap for affordable, secure, trustworthy, and meaningful connections in Kenya. This roadmap will help guide the country's digital connectivity efforts and ensure that connectivity solutions are accessible, reliable, and supportive of sustainable growth. Moreover, the TTC will provide training options to develop the next generation of digital professionals, equipping individuals with the skills needed to thrive in the digital age. Lastly, the TTC will offer technical assistance to help Kenya update its Information and Communications Act and 5G Strategy. This assistance will help Kenya create an enabling environment for digital innovation and ensure the country remains at the forefront of technological advancements.[22]

2.3.3. Smart Africa

Region and/or country. Africa

Date introduced. 2013

Primary objectives. It aims to accelerate Africa's digital transformation by leveraging ICT. Specifically, the initiative aims to foster socio-economic development, improve governance and services delivery, and transform African economies into knowledge-based economies. One of the key goals is to support and empower MSMEs by providing

[21] EU–US Trade and Technology Council, https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/stronger-europe-world/eu-us-trade-and-technology-council_en

[22] *Ibid*.

them with access to digital tools and resources.

Major factors addressed. Firm internal factors – human resources, finance; firm external factor – infrastructure

Targeted groups. The targeted groups include MSMEs, governments, and civil society organisations.

Key measures. First, infrastructure development is prioritised to expand and to improve ICT infrastructure, ensuring reliable and affordable connectivity for MSMEs. With increased internet access, MSMEs can leverage digital platforms and e-services, leading to enhanced market access and improved efficiency in their operations. Moreover, the initiative emphasises skills and capacity building for MSMEs. Through training programmes, mentorship initiatives, and vocational training, MSMEs are equipped with the necessary digital literacy and entrepreneurial skills, enabling them to effectively leverage digital technologies, streamline their processes, and make informed decisions, leading to increased productivity and competitiveness. Additionally, Smart Africa collaborates with financial institutions, establishes partnerships, and promotes innovative financing mechanisms. This includes venture capital funds, angel investor networks, and crowdfunding platforms tailored to MSME needs. By facilitating access to finance, MSMEs can overcome funding barriers and invest in digital tools, marketing strategies, and business expansion.[23]

3. Industry-Focussed

3.1. Agriculture, Fisheries, and Forestry

This section examines the cases concerning policies and initiatives the EU and independent actors implemented to promote digital agriculture and to close digital gaps amongst agriculture, fisheries, and forestry MSMEs. Two main themes emerge from these cases: an emphasis on rural development to establish a digitally advanced and inclusive environment that supports the growth of citizens and businesses, particularly MSMEs; and smart agriculture facilitation focussing on assisting MSMEs in developing smart agriculture solutions, while also benefiting small agri-businesses that can utilise these digital tools.

3.1.1. Common Agriculture Policy

Region and/or country. EU

Date introduced. 1962

Primary objectives. The policy supports the agriculture sector and ensures the provision of high-quality and affordable food for EU citizens. It aims to provide a unified policy on

[23] Smart Africa, https://smartafrica.org/

agriculture within the EU. Its overarching objective is to support farmers in maintaining a fair standard of living, stabilise agriculture markets, promote sustainable farming practices, and contribute to rural development.

Major factors addressed. Firm internal factor – finance; firm external factors – infrastructure, microenvironment

Targeted groups. While its primary focus is on farmers and rural development, the policy indirectly benefits MSMEs involved in the agriculture value chain.

Key measures. The CAP implements three key measures to support MSMEs and foster their development within the agriculture sector. First, it provides farmers with financial safety nets, ensuring stable incomes. This stability indirectly benefits MSMEs by enhancing farmers' purchasing power and stimulating demand for inputs, services, and products. Second, market measures establish rules to counter price volatility and to create a predictable environment for MSMEs operating in the agriculture supply chain. These measures, such as market interventions and private storage aid, facilitate stable market access for MSMEs. Furthermore, its rural development pillar focusses on modernising and enhancing the competitiveness of farms and rural areas. Through investments in connectivity, infrastructure, innovation, and environmental protection, the policy fosters an enabling environment for MSMEs in rural areas. This support contributes to MSME growth, diversification, and adoption of digital technologies, unlocking their potential within the agriculture value chain.[24]

3.1.2. European Innovation Partnership Agricultural Productivity and Sustainability Network

Region and/or country. EU

Date introduced. The network was established as part of the CAP. The network was introduced to promote innovation and knowledge exchange in the agriculture sector.

Primary objectives. The objective is to connect research and practice; promote innovation; and foster smart and resilient agriculture, forestry, and rural sectors while ensuring food security. It aims to enhance productivity, sustainability, and competitiveness in European farming and forestry.

Major factors addressed. Firm internal factors – human resources, finance; firm external factor – infrastructure

Targeted groups. The network engages various stakeholders, including but not limited to National CAP Networks, researchers, and MSMEs.

Key measures. One of the key approaches is through funding innovation projects. The

[24] EC, Common Agricultural Policy, https://agriculture.ec.europa.eu/common-agricultural-policy_en

network provides financial support for these projects through sources such as rural development programmes and Horizon 2020. By offering funding opportunities, the network enables MSMEs to access the resources and expertise necessary to develop and to implement innovative solutions. Collaboration and knowledge exchange are also at the heart of the network, as it brings together partners with complementary knowledge and expertise, encouraging them to collaborate on innovation projects. This collaboration facilitates the exchange of ideas, best practices, and research findings, allowing MSMEs to benefit from the collective wisdom of various stakeholders. By connecting research and practice, the network ensures that innovations are practical, applicable, and relevant to the needs of MSMEs. The network also focusses on developing and adapting solutions to address the specific challenges MSMEs face in the agriculture sector. Projects within the network aim to create new products, practices, processes, and technologies that enhance productivity, competitiveness, and sustainability. Additionally, existing solutions are tested and adapted to suit novel geographical and environmental contexts. By providing access to advanced solutions, the network helps MSMEs improve their productivity and competitiveness, bridging infrastructure, ICT, and business knowledge gaps within the sector.[25]

As an example, the Software Wineries Grape Quality and Price Project in Spain aims to enhance the sustainability and competitiveness of the cooperative wine sector in Castile-La Mancha, Spain. It is developing software, enabling winegrowers to achieve the best grape quality and to establish unified criteria. By implementing this software, the project seeks to facilitate vineyard zoning, harvest planning, and positioning of the cooperative wineries in Castile-La Mancha as a global reference point. The software will also provide a platform for managing a wide range of data and information related to vine cultivation. It will enable the differentiation of grape quality and streamline the settlement process for farmers. By leveraging this software, the project aims to improve the overall efficiency and productivity of the cooperative wine sector. The project receives funding from the Rural Development Programme 2014–2020 for Operational Groups, as Article 56 of Regulation 1305 and 2013 defines. It has a total budget of €250,000, which supports the research and development activities necessary to develop and implement the software solution.[26]

3.1.3. Smart Villages

Region and/or country. EU

Date introduced. The initiative has gained momentum recently, with various projects and initiatives being implemented since 2015. The specific introduction date may vary depending on individual projects within different EU countries.

[25] *Ibid.*
[26] *Ibid.*

Primary objectives. The objective is to enhance the resilience and digital transformation of rural communities by leveraging local strengths and opportunities. It aims to bridge the digital divide between rural and urban areas, promote inclusive growth, and improve the quality of life in rural regions. It seeks to involve the local community and utilise digital tools to create sustainable and innovative solutions for rural development.

Major factors addressed. Firm internal factors – human resources, finance; firm external factors – infrastructure, microenvironment

Targeted groups. The initiative targets various stakeholders, including rural communities, MSMEs, and local authorities.

Key measures. The initiative incorporates three key measures to support MSMEs and to facilitate digital transformation in rural areas. First, it focusses on improving internet connectivity in rural regions. By investing in broadband infrastructure and exploring innovative technologies like satellite internet and wireless connectivity, the initiative ensures reliable and high-speed internet access for residents, businesses, and MSMEs. This connectivity is crucial for MSMEs to leverage digital tools, access markets, and connect with customers. The second key measure emphasises digital skills and capacity building tailored to the needs of MSMEs and the local community. These programmes enhance digital literacy, teach ICT skills, and promote the adoption of digital tools and services. By enhancing digital skills, MSMEs are empowered to embrace digital technologies, engage with online platforms, and explore new business opportunities. Third, it supports MSMEs by establishing digital intermediaries and support systems. Digital hubs, co-working spaces, and incubators are being created to provide resources, mentorship, networking opportunities, and access to funding. These platforms foster local innovation and enable MSMEs to develop and scale their businesses, resulting in economic growth and job creation in rural areas. (Juan and McEldowney, 2021).

An example of a successful project is Digital Villages Germany. This project involved municipal associations participating in an open innovation competition; the winning project focussed on various aspects of the local digital ecosystem, including infrastructure, technical platforms, domain-specific applications, societal needs and skills, and organisational systems. The project achieved significant milestones, such as establishing common digital platforms for local goods supply, communication, mobility, and e-government. The DorfFunk app served as the main information and communication hub, while the BestellBar platform facilitated online sales for local small vendors. Within the first 3 months of operation, impressive statistics were recorded, indicating the project's positive impact on the region's digital development (European Network for Rural Development, n.d.).

3.1.4. SmartAgriHubs

Region and/or country. EU

Date introduced. 2020

Primary objectives. The objectives are to help digitalise European agriculture and to create an innovation ecosystem that promotes excellence, sustainability, and success in the agri-food sector. The project aims to address the digitalisation challenges faced by MSMEs, foster collaboration and knowledge exchange, and enhance the accessibility of appropriate digital tools for farmers and small agri-businesses.

Major factors addressed. Firm internal factors – human resources, finance

Targeted groups. SmartAgriHubs targets various groups within the agri-food sector, specifically MSMEs working on smart agriculture solutions.

Key measures. SmartAgriHubs implement several key measures that form the foundation of its support for MSMEs and the broader agri-food sector. Competence centres serve as the foundation, providing expertise and infrastructure to support digital innovations. EDIHs act as intermediaries, connecting the competencies available at competence centres with the demands, ideas, and funding within the network. Through innovation experiments, ideas, concepts, and prototypes are further developed, tested, and introduced into the market. The Innovation Maturity Model ensures the effectiveness and maturity of innovation services. Lastly, the Innovation Portal serves as a central platform for knowledge exchange, fostering collaboration and information sharing among stakeholders.[27]

In France, SmartAgriHubs opened a call to eligible MSMEs for technological development and commercialisation support. Emphasis was placed on projects relevant to farmers' needs and their digitalisation journey. Five MSMEs were selected: Advansee, Aptimiz, Baboa, My Bacchus, and Tekxia. Each of these companies offers innovative solutions in the agriculture sector: (i) Advansee specialises in bug traps with advanced video technologies to identify pests, reducing potential crop threats; (ii) Aptimiz provides a sensor-based solution that tracks the time and location of farmers or workers and developed software that analyses the data to enhance work conditions and efficiency; (iii) Baboa provides comprehensive farm management software suitable for all types of farms; (iv) My Bacchus offers smart sensors used in vinification to measure various parameters such as temperature, pH, and carbon dioxide, which are connected to software for data analysis and to facilitate vine tracking for traceability compliance; and (v) Tekxia developed MobiProtec, a connected camera that can be easily installed and removed and is integrated with a self-sufficient mobile platform powered by batteries and solar energy. With support from SmartAgriHubs, each of these products from MSMEs can go through testing phases for the development and relevancy of their solutions. They can

[27] SmartAgriHubs, https://www.smartagrihubs.eu/about

meet with farmers or groups of farmers to gather their opinions about the solutions or to implement pilots of these products in real situations.[28]

3.1.5. Digital Agri Hub

Region and/or country. Global focus, particularly on low- and middle-income countries

Date introduced. 2021–2022

Primary objectives. The hubs, hosted by Wageningen University and Research in the Netherlands, serve as independent entities focussed on tracking and promoting the development of the digital agriculture sector in low- and middle-income countries. The objectives are to bridge the infrastructure gap and to promote inclusive digital solutions for development, particularly in low- and middle-income countries. They aim to improve access to digital technologies for MSMEs and small-scale producers by focussing on digital agriculture solutions.

Major factors addressed. Firm internal factor – human resources; firm external factors – digital tool provision from the market, microenvironment

Targeted groups. They include MSMEs in the agriculture sector; small-scale producers in low- and middle-income countries; and stakeholders involved in digital agriculture solutions, such as entrepreneurs, innovators, investors, policymakers, and researchers.

Key measures. Digital Agri Hubs employ three measures. First, they collect global data on digital agriculture solutions to monitor progress and to provide valuable insights into the impact of digitalisation on the sector. These data are then compiled and published through an online database, enabling stakeholders to access and to utilise the knowledge for informed decision-making. Second, the hubs assess innovative digital solutions and promote effective business and governance models. They act as a knowledge broker, facilitating stakeholder cooperation, community building, and networking. They aim to foster stakeholder collaboration through matchmaking initiatives and to accelerate agriculture's digitalisation. Another goal is to deploy digitalisation for agriculture transformation, benefiting small-scale producers and improving livelihoods. Third, the hubs provide capacity-building programmes, training, knowledge exchange, and learning opportunities to enhance digital literacy and skills amongst MSMEs and stakeholders.[29]

3.2. Services

This section explores six cases within the services industry, highlighting various initiatives to address existing gaps.

[28] *Ibid.*
[29] Digital Agri Hub, https://digitalagrihub.org/web/guest

3.2.1. Trading Online Voucher Scheme

Region and/or country. Ireland

Date introduced. 2021

Primary objectives. Its objective is to assist small businesses in Ireland in establishing an online presence. By offering financial support for training and access to online retail platforms, the programme aims to bridge the gaps in financial, infrastructure, ICT, and business knowledge for eligible businesses. The goal is to help these businesses expand their reach, improve their competitiveness, and enhance their growth prospects in the digital marketplace.

Major factors addressed. Firm internal factors – human resources, finance; firm external factor – infrastructure

Targeted groups. While the programme targets small businesses with fewer than 10 employees, a turnover of less than €2 million, and limited or no e-commerce presence, it may also benefit microenterprises and start-ups.

Key measures. The programme offers financial assistance of up to €2,500 to eligible businesses, enabling them to invest in their digital capabilities. This financial aid can be utilised for training in areas such as website development, digital marketing, and search engine optimisation. By providing access to low-cost online retail platforms, the programme also facilitates the establishment of e-commerce channels for businesses to expand their reach and tap into new markets (OECD, 2021).

3.2.2. SME Digitalisation and Exports Programme

Region and/or country. Denmark

Date introduced. 2020

Primary objectives. The objective is to support the digital transition of MSMEs in Denmark. It aims to enhance their e-commerce capabilities, bridge financial and infrastructure gaps, develop ICT skills, and improve business knowledge. By providing grants and resources, the programme seeks to facilitate the adoption of digital technologies, promote e-export capacity, and enable integration into new international markets.

Major factors addressed. Firm internal factors – human resources, finance; firm external factors – infrastructure, digital tool provision by the market

Targeted groups. The programme targets a wide range of businesses, including MSMEs and start-ups across various sectors and industries.

Key measures. The programme comprises two key measures. First, grants are provided to co-finance consulting services, enabling businesses to implement new e-commerce solutions, enhance e-export capacity, and integrate digital sales strategies for international markets. This measure addresses the knowledge gap and ensures that

businesses receive professional guidance tailored to their specific needs. Second, the programme offers grants for technology acquisition, allowing MSMEs to invest in advanced tools and digital solutions. By acquiring these technologies, businesses can streamline operations, improve efficiency, and enhance their competitive advantage. This measure encourages businesses to embrace innovation and stay ahead in the digital landscape. The allocation of approximately 920 grants, totalling around DKK91 million, has provided crucial financial support to numerous businesses, helping them initiate or expedite their digital transformation efforts (OECD, 2021).

3.2.3. TRADE4MSMES

Region and/or country. Global (led by the Informal Working Group on MSMEs, a coalition of 94 World Trade Organization members)

Date introduced. 2021

Primary objectives. It aims to facilitate the participation of MSMEs in global trade by providing them with resources and tools. The initiative recognises the challenges faced by MSMEs in accessing international markets and seeks to bridge the gaps in infrastructure, ICT skills, and business knowledge related to international trading and e-commerce.

Major factors addressed. Firm internal factor – human resources; firm external factor – infrastructure

Targeted groups. The targeted groups include MSMEs, policymakers, and researchers.

Key measures. One of the notable components is the digital library, in which MSMEs can access curated content on the challenges and opportunities that they face in international trade, helping them make informed decisions. Additionally, the initiative focusses on the intersection of digital technologies and trade, showcasing relevant research, studies, and news. This includes exploring the impact of blockchain on MSMEs and readiness assessments for cross-border paperless trade. The TrainForTrade Programme equips MSMEs in developing countries with the trade knowledge and skills necessary for leveraging international trade and e-commerce opportunities. Another useful tool the initiative offers is WIPO IP Diagnostics, which helps businesses assess intellectual property-related issues that may affect their transactions. This tool assists MSMEs in understanding and managing intellectual property concerns, safeguarding their innovations and intellectual assets in international trade.[30]

[30] Trade4MSMEs, https://trade4msmes.org/

3.2.4. Chèque France Num

Region and/or country. France

Date introduced. 2021

Primary objectives. The objective is to support the digitalisation efforts of MSMEs in France. By providing financial assistance and bridging infrastructure gaps, the initiative aims to help these businesses transition to digital platforms and solutions.

Major factors addressed. Firm internal factor – finance; firm external factor – infrastructure

Targeted groups. The initiative targets MSMEs operating in various sectors, including retailers, crafters, and hotel and restaurant professionals.

Key measures. The cornerstone of the Chèque France Num initiative is the provision of a lump sum voucher of €500 to eligible companies. This voucher serves as a catalyst for digital transformation by easing the financial burden associated with adopting digital solutions. To qualify, businesses must have fewer than 11 employees and an annual turnover of less than €2 million, excluding taxes. The voucher can be utilised to purchase or subscribe to digital solutions from providers based in France or EU countries. It covers a range of digital themes, including sales and promotion, management, customer relations, and support for overall digitalisation efforts. The initiative has yielded significant achievements and impacted the digitalisation landscape for MSMEs in France. With an estimated 110,000 eligible companies, the initiative has successfully generated substantial interest and uptake amongst businesses. Over 30,000 companies have already applied for the voucher, underscoring the programme's relevance and the pressing need for digital support within the MSME community.[31]

3.2.5. mPOS

Region and/or country. Latin America

Date introduced. Not specified

Primary objectives. The primary objective is to promote the adoption of e-payments amongst MSMEs and industries with mobile cashiers

Major factors addressed. Firm external factor – digital tool provision from the market

Targeted groups. The targeted groups include MSMEs and industries with mobile cashiers.

Key measures. The key measures include fostering collaboration between card networks, acquirers, and payment service providers to develop mobile point-of-sale (mPOS) solutions using tap-to-phone or tap-on-phone technology; leveraging the region's high

[31] Retis, The Chèque France Num: 500 Euros to Help Your Company with Its Digitisation Expenses, https://www.retis-consult.com/en/france-num-cheque/

smartphone penetration to transform NFC-enabled smartphones into mPOS devices; simplifying the payment process by eliminating the need for traditional point-of-sale terminals and reducing associated costs; and providing training and support to merchants and mobile cashiers on using mPOS technology effectively. This drives the transition from cash-based transactions to e-payments and enhances financial inclusion by offering customers a wider range of payment options. Moreover, mPOS technology has proven instrumental in industries with mobile cashiers. The ability to accept payments on the go streamlines operations, improves efficiency, and enhances the customer experience. With mPOS, delivery agents, waiters, and other mobile service providers can seamlessly process transactions, eliminating the need for dedicated point-of-sale terminals. This has contributed to improved business efficiency and expanded opportunities for digital commerce in the region (Payments & Commerce Market Intelligence and Kushki, 2023).

3.2.6. Single Market Programme

Region and/or country. EU

Date introduced. It was introduced as part of the EU's recovery efforts in response to the COVID-19 crisis.

Primary objectives. It supports the recovery and resilience of the EU economy, particularly in the context of the COVID-19 crisis. It seeks to strengthen the single market, boost competitiveness, and foster digital transformation across various sectors, including tourism.

Major factors addressed. Firm internal factors – human resources, finance

Targeted groups. The programme targets a wide range of stakeholders, including MSMEs operating in the tourism sector; other businesses and organisations involved in tourism, such as technology providers, digital ecosystem players, and stakeholders; and European countries seeking support for their economic recovery efforts.

Key measures. The open public call, SMARTER AOE – 202301, offers financial support for the digital transformation of tourism sector MSMEs. It encompasses a broad range of eligible activities, such as implementing digitalisation and marketing tools, engaging expert mentors, participating in specialised training courses, and covering project-related travel and accommodation costs. By funding these activities, the programme empowers MSMEs to enhance their digital capabilities, expand their market reach, and optimise their operations. Another initiative, the DigiTOUR project, focusses on boosting the tourism sector in Europe through digital tools and innovation. It aims to improve the digital maturity, skills, and capacities of at least 138 tourism sector MSMEs by focussing on upskilling initiatives, capacity building, collaboration, and cooperation amongst MSMEs, digital ecosystem players, and technology providers. The project offers ongoing mentoring and tutoring support, facilitates networking, and provides vouchers to enhance digital tool knowledge and foster innovative ideas and partnerships. Through these measures, the

programme empowers tourism sector MSMEs to leverage digital technologies, adapt to changing market dynamics, and foster innovation in their operations.[32]

3.2.7. Tourism Transition Pathway and Agenda for 2030

Region and/or country. EU

Date introduced. It is a long-term strategy; the specific timeline for developing and implementing various measures within the agenda may vary.

Primary objectives. The objective is to support the digitalisation and sustainable development of the tourism sector in the EU. The policy aims to foster positive impacts of tourism on localities and residents, improve collaboration amongst tourism actors, enhance service management and provision, increase the accessibility of tourism services, promote authentic local experiences, facilitate monitoring and data collection on tourism impacts, and personalise the tourism experience through innovative digital solutions.

Major factors addressed. Firm internal factors – human resources, finance; firm external factor – infrastructure

Targeted groups. The policy targets tourism stakeholders, including MSMEs, destinations, local communities, residents, and visitors. However, the benefits of the policy extend to a wider range of actors within the tourism ecosystem, such as larger enterprises, tourism associations, government bodies, and NGOs.

Key measures. Three key measures were implemented to support tourism MSMEs and to achieve the objectives of the *Tourism Transition Pathway* and *European Agenda for Tourism 2030*. First, the creation of a digital tools and practices inventory stands out as a valuable resource. MSMEs can access successful examples, enabling them to develop their own digital solutions or adopt suitable tools from the inventory. Second, the EU provides capacity-building and training programmes tailored to the needs of MSMEs. These initiatives enhance digital skills, improve service management capabilities, and promote sustainable and responsible tourism practices among MSMEs. Third, the EU also offers funding and financial support through grants, loans, and investment programmes, empowering MSMEs to implement digital solutions and foster their competitiveness.[33]

[32] EC, The Digital Transition of Tourism, https://single-market-economy.ec.europa.eu/sectors/tourism/eu-tourism-transition/digital-transition-tourism_en

[33] EC, Tourism Transition Pathway – Co-Creation and Co-Implementation Process, https://single-market-economy.ec.europa.eu/sectors/tourism/eu-tourism-transition/tourism-transition-pathway_en

3.3. Manufacturing

A broad and robust domestic manufacturing base plays a vital role in successful economic development. To take a closer look at Europe, despite being recognised as leaders in various manufacturing sectors such as machinery and pharmaceuticals, European manufacturing companies have faced ongoing challenges with intensified competition, particularly from Asia and the US. This section explores two initiatives to support European manufacturing enterprises, especially MSMEs, overcoming infrastructure, ICT skills, and business knowledge gaps. These initiatives aim to enhance competitiveness and enable a successful transition to digital and green manufacturing.

3.3.1. European Institute of Innovation and Technology (EIT) Manufacturing

Region and/or country. EU

Date introduced. 2019

Primary objectives. The objective is to provide tailored services and support to MSMEs within the EU. It aims to address the infrastructure, ICT skills, and business knowledge gaps of these MSMEs, enabling them to thrive and to succeed in the digital and green transformation of the manufacturing sector.

Major factors addressed. Firm internal factors – human resources, finance; firm external factor – infrastructure

Targeted groups. It targets MSMEs in the manufacturing sector. However, it also encompasses other stakeholders such as start-ups, corporations, universities, research institutes, and industry leaders who collaborate with MSMEs to foster innovation, skills development, and environmental sustainability.

Key measures. First, through the European Institute of Innovation and Technology (EIT) Manufacturing, MSMEs are granted with access to innovative technologies from across Europe, enabling them to leverage advanced tools, processes, and systems for their manufacturing operations. Second, tailored open innovation services are provided to address industrial challenges faced by MSMEs. Through collaboration with partners, experts, and researchers, MSMEs can develop innovative solutions and improve their competitiveness. Third, EIT Manufacturing offers MSMEs opportunities to access new business ventures as system integrators, expand their market reach, and engage in collaborative commercial activities. Additionally, co-investment opportunities in Industry 5.0 start-ups and support for consortia building and co-funding for innovation projects empower MSMEs to undertake ambitious ventures and to achieve sustainable economic and societal impact.[34]

[34] EIT Manufacturing, https://www.eitmanufacturing.eu/who-we-are/

3.3.2. TRE-E Consortium

Region and/or country. Italy

Date introduced. July 2013

Primary objectives. The objective is to foster digitalisation in the Italian manufacturing industry, specifically within the lifts sector. The initiative aims to promote collaboration amongst competitors; leverage emerging technologies; and enhance operational efficiency, maintenance practices, and service delivery. By establishing an industrial IoT platform, the initiative sought to extend the lifecycle of lifts, optimise energy consumption, and contribute to Europe's green transition.

Major factors addressed. Firm internal factor – human resources; firm external factor – infrastructure

Targeted groups. The targeted group is MSMEs operating in the Italian lifts sector. The consortium brought together 18 MSMEs, which initially formed the core members. However, the initiative has also had a broader impact on other stakeholders, including lift providers, users, maintenance teams, and secondary service providers.

Key measures. The TRE-E Consortium established a joint training centre in 2015, first focussed on staff training but quickly transforming into an innovation hub for the entire ecosystem. This centre became a breeding ground for ideas and collaboration amongst participating SMEs. In late 2017, the consortium initiated IoT research to address the diverse applications in the lifts sector, aiming to enhance maintenance practices for old mechanical elevators and modern wi-fi-enabled lifts by pooling data and spare parts. This data-driven approach allowed for predictive or preventative maintenance and improved service efficiency. Starting in 2019, it focussed on standardisation in data formats and connectivity. By establishing an industrial IoT platform, lift providers, users, maintenance teams, and secondary service providers could efficiently share information and access critical measurements, administrative data, and historical data. Integrating emerging technologies like AI and blockchain further enhanced operational efficiency and improved service delivery. Through the industrial IoT platform, MSMEs managing lifts gained access to important measurements and data, enabling predictive or preventative maintenance, and improving service efficiency. This not only extended the lifecycle of lifts but also contributed to reducing energy consumption, aligning with Europe's green transition objectives. Furthermore, the consortium successfully managed the entire installed base of nearly 40,000 lifts, showcasing its scalability and management capabilities. By leveraging digitalisation and IoT technologies, the TRE-E Consortium demonstrates the potential of MSME ecosystems in achieving sustainable digitalisation and fostering innovation (OECD, 2021).

4. Conclusion

This chapter highlights opportunity for the ASEAN region to learn from experiences outside of the region and to adopt policy items that effectively address the digital divide amongst MSMEs. By considering these policies, ASEAN is poised to make significant progress in bridging the digital divide and promoting digital inclusion within the region. By studying these strategies and initiatives, several lessons emerge.

4.1. Addressing MSME Internal Factors

4.1.1. Human Resources

Talent development is pivotal in effectively bridging digital gaps, particularly in ICT skills and business knowledge. Active engagement of the public in pursuing careers in technology and providing MSMEs with access to skilled professionals are vital components of this transformative process. Moreover, the resounding success of talent development hinges upon the enthusiastic participation of diverse stakeholders, including businesses, educators, and NGOs, each contributing their expertise and assuming distinct roles. Challenges exists, especially for management, middle management, and general employees.

From a regional perspective, the EU has been increasing awareness and providing learning opportunities widely. For example, the EU4Digital Initiative recognises the importance of digital skills for MSMEs. Alongside infrastructure improvement, the initiative supports capacity-building programmes to enhance digital literacy and skills amongst MSMEs. Also, the Talent for Growth Task Force initiative in the EU and US exemplifies a remarkable effort in inter-country or inter-regional collaboration for digital talent development, offering invaluable insights. This initiative encompasses actionable steps such as sharing best practices, policies, tools, and data for talent development through comprehensive skills training. It also emphasises facilitating exchanges and placements in technology-related fields across borders while tailoring messages and outreach efforts to bridge the information gap and to effectively communicate the numerous benefits and access to jobs in the technology sector, particularly to underrepresented communities.

Another commendable practice observed within the EU is establishing a robust regional network of local digital hubs, encompassing general industry initiatives like the EDIHs and industry-specific endeavours such as SmartAgriHubs. These hubs serve as exemplary models by providing tailored support to address various digital gaps, adapting to specific contexts and objectives. The central idea behind these hubs is strategically integrating a local presence with the advantages offered by a pan-regional network. By maintaining a local presence, these hubs effectively deliver solutions to MSMEs in their preferred languages while operating within the local innovation ecosystem. They act as vital connectivity points, enabling MSMEs to access comprehensive hardware and software support for successful digitalisation. Furthermore, the local approach streamlines MSME

access to public initiatives and tailored support programmes that cater to their specific needs, offering face-to-face assistance and guidance. Simultaneously, the extensive coverage of the regional network facilitates knowledge exchange, collaboration, and community building. It empowers the delivery of specialised services across the region, ensuring that MSMEs can benefit from the diverse expertise available in different locations. This comprehensive approach facilitates a thriving ecosystem where MSMEs can harness the full potential of digitalisation and drive sustained growth.

4.1.2. Finance

To proactively bridge digital gaps, it is imperative to foster diverse funding programmes and financial assistance mechanisms that cater to the specific needs of MSMEs in their digitalisation endeavours. These forms of support encompass various avenues, including grants, financial instruments (e.g. loans, guarantees, and equity), subsidies, trust funds, prizes, public procurement contracts, and tax reductions. Each funding form should be designed to target different types of companies and to address their unique requirements within the digital sphere.

To ensure clarity and ease for potential recipients, the availability of multiple funding streams, each tailored to specific purposes within the digital realm and related areas, is paramount. These funding sources should work in synergy rather than overlap, complementing each other seamlessly. For instance, within the EU, various funding programmes allocate resources to drive smart and digital tourism. Notably, the Digital Europe Programme, Single Market Programme, and Horizon Europe offer distinct support and relevance to tourism-focussed MSMEs. The Digital Europe Programme bolsters critical digital capabilities, including creating and governing data spaces for tourism, cultural heritage, and mobility. The Single Market Programme aims to enhance the resilience and recovery of EU countries from the COVID-19 pandemic, providing funding for capacity building, smart tool development, and commercial matchmaking for tourism sector MSMEs. As a research and innovation funding programme, Horizon Europe supports exploring novel approaches and practices for smart, sustainable, accessible, and inclusive tourism.

To facilitate MSME access to the appropriate funds or financial support, ensuring information transparency and providing guidance services are vital. This includes offering technical assistance in crafting funding proposals and facilitating networking opportunities to connect MSMEs with potential funders or investors. Such measures maximise the alignment between programme objectives and digital needs of MSMEs, fostering a seamless and efficient funding ecosystem.

International cooperation plays a pivotal role in supporting less digitally developed countries in undertaking large-scale infrastructure development projects that necessitate substantial budgets. Advanced economies, such as the EU and US, have played instrumental roles by sharing technological expertise, exchanging best practices, and

offering financial assistance to propel these initiatives forward. This collaborative approach empowers countries to embark on transformative projects, accelerating their digital advancement and narrowing the digital divide.

4.2. Addressing MSME External Factors

4.2.1. Infrastructure

In today's digital era, access to reliable and high-speed internet connectivity is essential for the growth and competitiveness of MSMEs. The EU Digital Single Market has driven digital integration and harmonisation across EU countries. The implications of improving internet infrastructure within this framework are through enhanced connectivity, cross-border expansion, and harmonised regulations. Upgrading internet infrastructure enables MSMEs to access fast and reliable connectivity, eliminating barriers to digital innovation and expanding their market reach. Improved internet infrastructure facilitates cross-border trade and e-commerce, allowing MSMEs to access a larger customer base across EU countries. Businesses can seize new growth opportunities and increase their competitiveness by breaking down digital barriers.

The EU4Digital Initiative focusses on extending EU Digital Single Market benefits to Eastern Partnership countries. It offers valuable insights into the implications of improved internet infrastructure for MSMEs in these regions through connectivity boosts, cross-border collaboration, and digital skills development. The initiative emphasises enhancing digital connectivity by investing in internet infrastructure development. By improving connectivity, MSMEs gain access to faster and more reliable internet connections, enabling them to leverage digital technologies more effectively. Improved internet infrastructure enables MSMEs to engage in cross-border collaboration and trade. With enhanced connectivity, businesses can establish partnerships, access new markets, and benefit from knowledge exchange and innovation transfer, fostering their growth and expansion.

Improved internet infrastructure is critical in bridging the digital divide for MSMEs, enabling them to thrive in the digital economy. Drawing insights from the EU Digital Single Market and the EU4Digital Initiative, enhanced connectivity offers numerous impact for MSMEs, including expanded market access, cross-border collaboration opportunities, streamlined regulatory frameworks, and improved digital skills. By prioritising investments in internet infrastructure, policymakers can empower MSMEs, catalyse innovation, and foster economic growth in a digitally interconnected world. Governments and stakeholders must continue working towards bridging the digital divide and providing MSMEs with the necessary tools and resources to succeed in the digital era.

4.2.2. Digital Tool Provision from the Market

Several cases are observed of efforts to enable MSMEs to access and to utilise the necessary digital tools. For example, efforts provide MSMEs with discounted software that

allow them to digitalise their operations. Like Business.connected, this is done by working with private companies participating in government-sponsored initiatives and leveraging their technology and expertise. Those initiatives provide software that is needed regardless of industry (e.g. accounting software). Those like Digital Agri Hubs target specific industries and gather and publish information on global solutions on a single website. While it is important to provide more generic tools to advance the digitalisation of MSMEs without limiting them to specific industries or other MSME attributes, the efforts to target specific industries contribute to the digitalisation of those industries.

Since such information is provided online, there is a disadvantage in that beneficiaries are limited to companies that can access the information online. Providing information offline can be effective as well by offering products and solutions in places MSMEs can visit. At these hubs, such as EDIHs, MSMEs can also experience the hardware that is equipped with the software. This contributes to improving awareness by providing experiences to MSMEs without knowledge or interest in the hardware. If MSMEs that do not have an online environment or are unable or unwilling to access online information can experience digital tools onsite, this can foster a positive image of MSMEs going digital.

4.2.3. Cyberattacks

Two cases were observed in the EU's efforts to improve cybersecurity: the Digital Single Market and *SME Guide on Information Security Controls*. The Digital Single Market provides the EU countries with rulemaking on corporate data governance. EU countries are following it to support domestic companies, including MSMEs, to be prepared to enter the online economy, which includes preparation for cyberattacks. In addition, the EU has prepared the *SME Guide on Information Security Controls* for MSMEs and is promoting preparation for cyberattacks. The EU is expanding its support to Eastern Partnership countries in conjunction with the realisation of a digital single market in the region. As part of this effort, the EU4Digital Initiative is promoting the transfer of the experience and knowledge that the EU has accumulated in rulemaking in the region to Eastern Partnership countries.

4.2.4. E-Government

The survey did not identify any advanced e-government promotion measures at the regional level to which ASEAN should look. Like various ASEAN Member States, individual countries are implementing their own measures related to e-government; the case from Kenya was identified as an effort to bring MSMEs on board with e-government. Promoting the digitalisation of MSMEs, which constitute a large part of the industry, and implementing e-government is essential to ensure that MSMEs have access to these digitalised services.

4.2.5. Microenvironment

The EU Digital Single Market initiative harmonises regulations to create a consistent regulatory framework for digital operations. This streamlines compliance processes for MSMEs and encourages their participation in cross-border digital activities. On a broader scale, regional policies and frameworks have successfully addressed digital concerns that extend beyond national boundaries, effectively minimising potential risks and dismantling barriers for MSMEs to thrive in the digital sphere. An example is the EU Data Governance Act, which ensures consistency and legal certainty, and fosters seamless cross-border data transfers. This legislation strengthens data protection measures and bolsters enforcement mechanisms across all EU countries. By implementing a unified and transparent data governance approach, accompanied by simplified procedures, MSMEs are empowered to navigate the digital landscape and to compete on equal footing. As a result, MSMEs develop trust and confidence in embracing the online economy, as they readily access the necessary support systems and resources that facilitate their growth and success.

To maximise the positive impact of regional policies, it is crucial to prioritise their inclusivity and align them with the unique requirements of MSMEs across all countries. Moreover, continuously evaluating and adapting these policies in response to evolving digital landscapes and emerging challenges will ensure their enduring relevance and efficacy.

While a regional framework offers numerous advantages, it is equally important for countries to maintain the flexibility necessary to address national concerns while adhering to the core principles of a regional act. This flexibility enables the implementation of supplementary measures or regulations that cater to local needs, as long as they harmoniously align with and strengthen the overarching regional governance framework. This approach fosters an atmosphere of cooperation and collaboration amongst countries, facilitating the seamless implementation and enforcement of regional laws while duly respecting individual national contexts. Through the case observations from other regions and countries, this can be achieved through some initiatives, such as promoting a digital single market, strengthening cybersecurity, sharing best practices of MSME digitalisation, and improving e-government services that highlight the advantages and potential of digital technologies.

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Chapter 12

Policy Recommendations

1. Introduction

Based on the questionnaire analysis and case reviews, this chapter provides the policy recommendations that the Association of Southeast Asian Nations (ASEAN) could introduce to close the digital divide amongst micro, small, and medium-sized enterprises (MSMEs) in the region. The policy recommendations are provided to address each factor causing the digital divide observed through this survey from the dimensions of MSMEs' internal and external factors.[1]

2. MSMEs' Internal Factors

2.1. Human Resources

2.1.1. Challenges Identified

2.1.1.1. Business capability of business owners

- Lack of business and ICT knowledge and/or experience

Technology adoption decisions amongst MSMEs are closely tied to the owners and key decision-makers managing the business (Ramayah et al., 2009). In the web survey, most companies (89.5%) are managed by owners, while owners do not manage the remaining 10.6%. This pattern is particularly prevalent in small and micro companies, with 96.3% of small companies and 99.0% of micro companies managed by owners. The phone survey shows a similar pattern, with 99.8% of small companies and 100% of micro companies managed by owners. The lack of owners' business or information and communication technology (ICT) knowledge can slow the progress of MSMEs' digitalisation. In addition, differences in business and ICT knowledge are derived from differences in their education and experience due to the learning and management environment of the business owners.

Looking at current efforts in ASEAN, specific cases targeting business owners to address their lack of business and ICT knowledge have not been observed. On the other hand, some learning opportunities for MSMEs to acquire business knowledge were observed (e.g. the ASEAN SME Academy and Go Digital ASEAN). These initiatives provide learning programmes via online platforms – targeting a wide range of human resources, including

[1] MSMEs' external factors do not include the specific measures focusing on the coronavirus disease (COVID-19) pandemic because all policy items are intended to address the current state of the digital divide, partially caused by the COVID-19 pandemic.

business owners – and are undertaken in cooperation with the private sector.

2.1.1.2. Middle management and regular employees equipped with business and ICT skills

- Lack of human resources to deal with digitalisation

The World Economic Forum stated that more than half of all employees will require significant reskilling and upskilling by 2025 to meet the demands of digital transformation (World Economic Forum, 2023). It also noted that the skills gap is most significant in ASEAN, where only 18% of the workforce has sufficient digital skills. Therefore, ASEAN needs to address the skills gap to enable MSMEs to adopt digital technologies successfully.

As the questionnaire indicates, there is a lack of personnel with ICT skills to gather information and implement digital tools. Efforts to complement these business and ICT skills are under way within ASEAN, with online learning opportunity programmes being a key initiative (e.g. the ASEAN SME Academy and Go Digital ASEAN). The ASEAN Member States (AMS) have also recognised the importance of ICT skills in MSMEs and offer learning programmes to equip MSME staff with ICT skills.

- Lack of awareness of digitalisation

Lack of interest in digitalisation amongst employees is one of the challenges for MSMEs in achieving digitalisation. The questionnaire revealed that employees find digital tools difficult and even consider them to have negative aspects that increase their workload.

The questionnaire results indicate that employees do not understand the benefits produced by the implementation of digital tools, such as increased efficiency and sophistication of their work, and their negative impression of such tools may be hindering the digitalisation of MSMEs. The survey did not observe any specific efforts in ASEAN aimed at improving employees' awareness of MSMEs or providing information on learning or collaboration opportunities with companies and/or relevant stakeholders online.

- Inaccessibility of the necessary information

To proceed with digitalisation, MSMEs need access to information on implementing and fully utilising digital tools. However, the questionnaire showed that a significant number of respondents were unaware of where to find the information or whom to consult. It should be noted that micro and small companies were more concerned about this than medium-sized companies. Cases of efforts to provide information to MSMEs in ASEAN were identified on existing online platforms and in some AMS (e.g. Infocomm Media Development Authority in Singapore).

2.1.2. Policy Recommendations

To address the lack of business and ICT knowledge and/or experience of business owners, and the lack of awareness of digitalisation amongst middle management and regular employees, the following policy recommendations are proposed:

(a) Provision of guidance and assessment tools for MSMEs to go digital

By offering guidance and assessment tools, ASEAN can empower MSMEs to embrace digital transformation and enhance their competitiveness in the global market by supplementing their lack of business and ICT knowledge.

ASEAN could adopt a structured approach to guide MSMEs in their digital transformation process. This could include four key steps: assessment, action plan creation, implementation, and review. The digital assessment tool proposed in this study would serve as the foundation for this process, providing insights and guidance for MSMEs to embark on their digitalisation journey effectively.

The digital assessment tool and accompanying action plan should encompass the following elements:

(1) Understanding the stages of digitalisation

The assessment tool should enable MSMEs to evaluate their current digitalisation stage accurately. Such a tool could include a framework or questionnaire that assesses various aspects, such as digital infrastructure, online presence, data management, customer engagement, and internal processes. It could also define the stages of digitalisation for each industry and the tools that need to be implemented for MSMEs to step up a digitalisation stage.

(2) Developing a vision for digitalisation

MSMEs need to envision the future state of their digitalisation journey. The assessment tool should prompt businesses to visualise their desired digital outcomes, including improved operational efficiency, enhanced customer experience, expanded market reach, and innovative business models.

(3) Identifying digitalisation challenges

The assessment tool should help MSMEs identify the specific challenges they face in their digital transformation efforts. This may include resources, skills, technology adoption, cybersecurity, or market competition constraints. By understanding these challenges, MSMEs can prioritise their focus areas and seek appropriate support.

(4) Creating an action plan

Based on the assessment results, the tool should guide MSMEs in developing a comprehensive action plan for their digital transformation. This plan should outline specific goals, strategies, and timelines for implementing digital initiatives, including technology adoption, skills development, process optimisation, and customer

engagement.

One example from another region highlighting the effectiveness of digital transformation initiatives for small businesses is the Digital Boost program for small businesses implemented in New Zealand. This program encompasses key initiatives, including Digital Boost Checkable, an extension of the Digital Boost Educate platform. The Digital Boost Checkable tool offers customised Digital Action Plans tailored to small business owners' specific needs and objectives. This tool enables MSMEs to engage in informed discussions with technology tool providers, digital and business advisers, and lenders by providing personalised approaches. It empowers business owners to improve their understanding of the digital solutions and strategies that align with their unique requirements (New Zealand Ministry of Business, Innovation and Employment, n.d.).

In essence, the Digital Boost Checkable tool supports MSMEs in their digital transformation journey by covering the four key steps of digitalisation: assessment, action plan creation, implementation, and review. This comprehensive approach allows MSMEs to assess their current stage of digitalisation, envision their future goals, identify challenges, and develop actionable plans. By going through these steps, MSMEs can navigate the complexities of digital transformation more effectively (New Zealand Ministry of Business, Innovation and Employment, n.d.).

To implement this support initiative in ASEAN, China, Japan, and the Republic of Korea (henceforth, Korea) (CJK) could contribute to ASEAN's efforts in supporting MSMEs with digitalisation by providing guidance and assessment tools.

(1) Public sector efforts

CJK governments could collaborate with each other and AMS to develop and examine diagnostic tools designed for MSMEs to embark on their digitalisation journey. This collaboration could involve sharing best practices, experiences, and expertise in assessing the digital readiness of MSMEs. By working together, CJK could contribute valuable insights to help ASEAN develop effective diagnostic tools that cater to the unique needs and challenges of MSMEs in the region.

(2) Collaboration in research and development

CJK could collaborate with AMS in research and development (R&D) efforts to create innovative guidance and assessment tools for MSMEs. Joint research projects and partnerships between CJK and ASEAN research institutions could be established to develop cutting-edge tools that align with MSMEs' needs and characteristics. By pooling resources and expertise, CJK and ASEAN could create comprehensive and user-friendly tools that assist MSMEs in their digital transformation journey.

For example, the Korea SMEs and Startups Agency provides business health check-up and technical assistance services. This online tool allows MSMEs to conduct self-diagnosis. Based on the diagnosis results, MSMEs can request advice and support measures from experts (Korea SMEs and Startups Agency, n.d.). Meanwhile, in Japan, the

Small and Medium Enterprise Agency provides online tools for local MSMEs to diagnose their challenges and seek expert advice (Small and Medium Enterprise Agency, n.d.). The knowledge and methods gained through these efforts will enable CJK to assist ASEAN.

(b) Sharing the best practices of MSMEs' digitalisation journey

MSMEs need help to address the lack of awareness and knowledge about available digital tools and limited access to technical support. Many MSMEs in the region are still operating with traditional business models and have yet to realise the benefits of digitalisation. This trend is generally observed throughout the segments in the questionnaire. As a result, they are at risk of being left behind in the rapidly evolving digital landscape.

Promoting and sharing best practices is crucial to help MSMEs in ASEAN overcome the challenges they face in digitalisation. This could include providing guidance and support to MSMEs on using digital technologies effectively and sharing success stories and case studies to inspire and motivate MSMEs.

One example of an initiative to promote and share best practices for digital transformation is the European Digital Innovation Hubs (EDIHs) programme. This programme is designed to help European businesses, particularly small and medium-sized enterprises (SMEs), take advantage of digital technologies and innovations. A key aspect of the EDIHs programme is its emphasis on promoting and sharing best practices for digital transformation amongst MSMEs. EDIHs are local ecosystems that bring together companies, researchers, and technology providers to provide services and expertise related to digital transformation. These services include training, consulting, and access to technology, amongst other things (European Commission, n.d.-a).

While traditional EDIHs often have a physical presence, such as innovation centres or technology hubs, the concept of EDIHs has evolved to include virtual or digital platforms. These virtual EDIHs leverage digital technologies to connect and support businesses, including MSMEs.

The European Union (EU) has been promoting the establishment of EDIHs – both physical and virtual. These hubs aim to support businesses, especially MSMEs, in their digital transformation journey by providing access to digital technologies, expertise, and innovative support (European Commission, n.d.-a).

ASEAN has implemented several initiatives and platforms to foster knowledge sharing and collaboration amongst businesses, focusing on supporting MSMEs in their digital transformation journeys. Two notable initiatives in this regard are the ASEAN SME Academy, which serves as a valuable resource hub for MSMEs seeking to enhance their capabilities in various areas (ASEAN SME Academy, n.d.), and the Digital Innovation and Sustainable Economy Centre of the Economic Research Institute for ASEAN and East Asia (ERIA), which serves as a virtual and physical platform for policymakers, businesses, and academic professionals to transform to digitally driven sustainable economic growth across the region (ERIA, 2023).

ASEAN could leverage existing initiatives, such as the ASEAN SME Academy and the Digital Innovation and Sustainable Economy Centre, to showcase inspiring success stories of MSMEs that have undergone successful digital transformations. These success stories could highlight the experiences, challenges, and strategies that MSMEs employ from different industries, countries, and locations – urban or rural. Sharing these digital transformation stories could motivate, guide, and inspire other MSMEs embarking on digital journeys.

In conclusion, ASEAN could explore establishing regional programmes or initiatives that enable sharing of resources amongst member countries, adding value to the overall ecosystem. This could involve working with technology providers, research institutions, and other organisations to provide MSMEs with the tools and support they need to succeed in the digital economy. When sharing information in the region, it is desirable to align the information with the challenges and needs involved in the digitalisation of different segments, such as by industry, rural or urban location, and company size.

CJK could offer valuable assistance to support ASEAN in promoting and sharing best practices of MSMEs' digitalisation journeys. First, ASEAN could draw inspiration from the existing information-sharing schemes implemented by CJK governments in their respective countries. These schemes have proven effective and could serve as models for developing similar mechanisms in the ASEAN region. For example, in Japan, the Small and Medium Enterprise Agency provides case studies on its website of MSMEs that have implemented digital tools successfully as a result of utilising the diagnostic tools that it provides (Small and Medium Enterprise Agency, n.d.).

One potential approach is for CJK to collaborate with AMS that are already establishing domestic information-sharing platforms, e.g. SMEs Go Digital in Singapore. By forming a partnership, they could collectively study and analyse the best practices of these platforms and identify effective strategies for sharing information.

This collaboration could involve knowledge exchange, joint research projects, and workshops where experts from CJK and AMS come together to discuss and explore various information-sharing mechanisms. By leveraging the expertise and experience of all parties involved, ASEAN could develop robust and tailored strategies for promoting and sharing best practices in MSMEs' digitalisation.

CJK could also offer technical support, training programmes, and capacity-building initiatives to assist AMS in enhancing their information-sharing capabilities. This could include providing resources such as funding, technological infrastructure, and expertise to help AMS establish information-sharing platforms and disseminate valuable knowledge on MSMEs' digitalisation effectively.

By fostering close collaboration between CJK and ASEAN, both regions could benefit from exchanging ideas, experiences, and expertise, ultimately facilitating the digital transformation of MSMEs in ASEAN and promoting regional economic growth.

To address the lack of human resources to deal with digitalisation, and the lack of awareness of digitalisation amongst middle management and regular employees, the following policy recommendation could be considered:

(c) Talent development (i.e. training, coaching, and mentoring)

The questionnaire reveals that MSMEs need more human resources to take the lead in the digitalisation journey within firms and to implement and fully utilise digital tools. The development of human resources is important in supporting MSMEs' digital transformation journey. The skills gap in ASEAN is one of the significant challenges that MSMEs face in their digital transformation journey, and this is observed through the questionnaire results.

To ensure effective digital transformation in MSMEs, it is crucial to reinforce reskilling and training initiatives targeting all layers of human resources – business owners, middle management, and regular employees. The following approaches could be adopted:

(1) Improving the business capability of MSMEs' owners

(i) Business management training:

- Provide comprehensive business management training programmes designed for MSMEs' owners. These programmes should cover various aspects of business, including strategic planning, financial management, marketing, and operations.
- Emphasise the integration of digital technologies and tools into business processes and decision-making.

(ii) Mentorship and coaching:

- Establish mentorship and coaching programmes under which experienced entrepreneurs and industry experts can guide and support MSMEs' owners. This would allow them to gain insights into and practical advice on navigating the digital landscape, identifying growth opportunities, and overcoming challenges.
- Foster a network of mentors and mentees within ASEAN to facilitate knowledge sharing and peer-to-peer learning.

(2) Improving the business and ICT skills of middle management and/or regular employees

(i) Skills development programmes:

- Implement skills development programmes focusing on business and ICT skills for middle management and regular employees. These programmes could include training modules on digital literacy, project management, data analysis, cybersecurity, digital marketing, e-commerce, and cloud computing.
- Ensure that the training is practical, hands-on, and relevant to the specific roles

and responsibilities within the organisation.

(ii) Internal training and knowledge sharing:

- Encourage a culture of continuous learning within MSMEs by promoting internal training programmes and knowledge-sharing initiatives.
- Encourage middle management and regular employees to share their expertise and experience with digital tools and technologies.
- Foster cross-departmental collaboration and encourage employees to take on digital transformation projects to enhance their skills and contribute to the organisation's growth.

(iii) Collaboration and educational institutions:

- Establish partnerships with educational institutions, such as universities and vocational training centres, to develop specialised programmes tailored to the needs of MSMEs.
- Collaborate with these institutions to offer internships, apprenticeships, or on-the-job training opportunities, allowing middle management and regular employees to gain practical experience and update their skills in real-world business environments.

Recognising the varying measures implemented across AMS, it is important to prioritise strengthening digital education, particularly ICT education, in primary and secondary schools. While it is optional for MSME CEOs to have higher education degrees, ensuring a minimum level of digital readiness for most of the population is crucial. Drawing on successful case studies, such as Singapore and Malaysia where ICT education in primary and secondary schools includes teaching PC and tablet usage and programming, sharing knowledge and best practices within the region is vital. This should be widely incorporated into the curriculum of educational institutions.

ASEAN could focus on training trainers to address the need for more educators, particularly in rural and island areas. However, this presents significant financial and human resources challenges for some countries. To overcome this, developed AMS and urban areas within each country could train educators. By dispatching human resources with expertise in digital transformation and teaching methodologies, they could train local educators and build their capacity to deliver effective digital education in MSMEs.

As mentioned earlier, EDIHs are one of the key initiatives of the EU to support SMEs on their digital transformation journey. EDIHs are one-stop shops that provide SMEs with access to digital technologies, expertise, and support services to help them adopt and integrate digital technologies in their operations. Under this initiative, 50% of the funding is provided by the EU and the other 50% is provided by member states, associated countries, their regions, and/or private sources (European Commission, n.d.-c). Under this initiative, for example, in the Netherlands, the Dutch Smart Industry Hub is an EDIH that

supports SMEs in the manufacturing sector to implement Industry 4.0 technologies such as artificial intelligence, robotics, and the internet of things. The hub provides access to digital expertise, technologies, test facilities, and funding and networking opportunities. Another example is the Spanish Digital Innovation Hub, an EDIH that provides SMEs access to various digital technologies and services, such as big data analytics, cloud computing, and cybersecurity. The hub also provides training and mentoring programmes to help SMEs develop digital skills and capabilities.

In conclusion, ASEAN could support MSMEs' digitalisation by reinforcing reskilling and training efforts. This includes increasing awareness, providing hands-on learning experiences, offering financial support for tool adoption, strengthening digital education in primary and secondary schools, and implementing a train-the-trainer approach. By investing in human resources and building digital capabilities from an early stage, ASEAN could create a skilled workforce that drives MSMEs towards successful digital transformation and ensures the region's competitiveness in the digital economy.

CJK could contribute significantly to ASEAN's talent development efforts towards MSMEs' digitalisation. Since CJK are collaborating with ASEAN to provide some comprehensive talent development programmes, such as the ASEAN Plus Three Cooperation Work Plan, 2023–2027, ongoing efforts should be encouraged between ASEAN and CJK through close communication to meet the desired efforts to address the challenges in MSMEs in ASEAN (e.g. the ASEAN Plus Three Cooperation Work Plan, 2023–2027).

(1) Developing educational programmes for digital talent

- Reskilling programmes

  CJK could collaborate with ASEAN to develop specialised reskilling programmes targeting MSME management and employees. These programmes could focus on equipping MSME management and employees with the necessary digital skills and knowledge to drive digital transformation within their organisations. By sharing its expertise in reskilling initiatives, CJK could assist ASEAN in designing effective training programmes tailored to the needs of MSMEs.

- Primary and secondary education

  CJK could support ASEAN in developing educational programmes that cultivate digital talent from an early age. They could share their experiences in implementing comprehensive ICT education programmes within their educational institutions and assist ASEAN in establishing similar programmes. CJK could also collaborate with ASEAN to build digital education curricula in primary and secondary schools, ensuring that students are equipped with the necessary digital skills to meet future workforce demands.

  A reference case is China's National Curriculum Standards for Compulsory Education in Information Technology (Chinese Ministry of Education, 2022). ASEAN could draw insights from China's national standards for ICT education,

which outline the essential knowledge and skills that students should acquire. Collaborative efforts could be undertaken to adopt and implement similar standards within AMS.

Another case includes the GIGA School Initiative in Japan, which aims to provide digital devices and connectivity to schools nationwide. ASEAN could explore the implementation of a similar initiative, leveraging Japan's experience and knowledge to ensure digital access and resources for students (Japanese Ministry of Education, Culture, Sports, Science and Technology, n.d.).

(2) Dispatching experts for digital talent development

- Digital teacher exchange programmes

  CJK could consider dispatching teachers with expertise in digital education to ASEAN's primary and secondary educational institutions. These teachers could provide expertise and guidance in digital education, helping ASEAN schools incorporate digital literacy and ICT skills in their curricula. Exchange programmes could facilitate knowledge transfer, promote best practices, and enhance the capabilities of ASEAN educators in delivering quality digital education.

  By developing educational programmes and dispatching experts for digital talent development, CJK could support ASEAN in building a skilled workforce to drive MSMEs' digitalisation. Collaborative efforts could be undertaken to adapt successful initiatives, such as China's national curriculum standards and Japan's GIGA School Initiative, to the ASEAN context. Through these endeavours, CJK could contribute to the digital transformation of MSMEs in ASEAN and foster a future-ready workforce.

To address the inaccessibility of the necessary information, the following policy recommendations could be considered:

(d) Online platform to support MSMEs to go digital

Introducing supporters who are dedicated to mentoring and assisting the companies in implementing and reviewing the actions outlined in the assessment tool and action plan could significantly enhance effectiveness and outcomes. ASEAN could establish online platforms that connect supporters and MSMEs seeking assistance to facilitate effective support for MSMEs. These platforms would serve as a central hub for registration, enabling supporters and MSMEs to provide their information and preferences, facilitating better matching. They could offer a comprehensive line-up of available support options, including mentorship, advisory services, training programmes, and funding opportunities. Furthermore, the platforms could provide online assessment tools and action plan templates, empowering MSMEs to conduct self-assessments and develop customised action plans. Valuable resources such as information on common obstacles and practical tips for digital transformation could also be made available.

The involvement of diverse stakeholders is crucial to ensure comprehensive support for MSMEs. Key participants in both online and offline platforms include:

(1) Government

Government agencies at various levels, such as local governments and other public representatives, could play a pivotal role in providing policy guidance, regulatory frameworks, and financial support. Their involvement ensures alignment with national digitalisation strategies and enables collaboration with other stakeholders.

(2) Companies

Companies of all sizes, including large enterprises, start-ups, and digital solution providers, could contribute by sharing expertise, resources, and mentorship opportunities. Engaging private companies that have successfully undergone digital transformation could provide valuable insights and real-world examples.

(3) Individual supporters

These may include industry experts, business advisers, mentors, consultants, or professionals willing to offer guidance and support to MSMEs. Their knowledge and experience could prove instrumental in helping MSMEs navigate challenges and identify growth opportunities.

As this study has observed, ASEAN already has online platforms to support MSMEs (e.g. the ASEAN SME Academy). Those online platforms could connect individuals and organisations to assist MSMEs in implementing and reviewing their digital transformation plans with further expansion of the current functionality. ASEAN could leverage this initiative to facilitate such connections in the following ways:

(1) Expert networks

ASEAN could establish networks of digital transformation experts, consultants, and professionals with expertise in assisting MSMEs. These experts could contribute as instructors or mentors within the ASEAN SME Academy, guiding and supporting MSMEs on their digital transformation journey.

(2) Online communities

ASEAN could foster online communities or discussion forums on online platforms where MSMEs could interact with digital transformation experts, share experiences, and seek advice.

(3) Matchmaking services

ASEAN could develop a matchmaking platform or database on the online platform to connect MSMEs with professionals, consultants, or service providers specialising in digital transformation. MSMEs could submit their requirements, and the platform could recommend suitable experts or service providers based on their needs.

Building an online platform that caters to a diverse range of stakeholders is crucial. To ensure inclusivity, the platform should provide services in both local languages and English, allowing for broader accessibility and engagement. By incorporating stakeholders from different sectors, regions, and backgrounds, the platform could foster a collaborative ecosystem that supports the specific needs of MSMEs in ASEAN.

In addition to fostering networking and connection via an online platform, CJK could assist ASEAN to support MSMEs with digitalisation by developing and implementing an online platform that provides online courses.

(1) Expertise in an online learning platform

CJK have extensive experience and expertise in developing and operating online learning platforms, such as the National Online Cloud Classroom, which began during the pandemic (Chinese Ministry of Education, 2020), and Korea's Community of 10,000 Representative Teachers, which encourages teachers to share ideas and information about online education (Korean Ministry of Foreign Affairs, 2020). CJK could share their knowledge and best practices in building robust, user-friendly, and effective online platforms for educational purposes. By collaborating with ASEAN, CJK could provide technical guidance, offer insights on platform design and functionality, and assist in selecting appropriate technologies for the online learning platform.

(2) Content creation and curation

CJK could contribute to creating and curating high-quality digital courses relevant to the needs of MSMEs in ASEAN. This could include sharing existing online courses or partnering with ASEAN educational institutions and industry experts to develop new courses tailored to MSMEs' digitalisation requirements. CJK could also provide expertise in instructional design and pedagogical approaches that maximise the effectiveness of online courses.

Overall, CJK could support ASEAN in assisting MSMEs with digitalisation by developing and implementing an online platform that provides online courses or by expanding existing online platforms. By collaborating with CJK, ASEAN could enhance its online learning ecosystem, providing MSMEs with valuable digital skills and knowledge and enabling them to thrive in the digital economy.

(e) Facilitating offline business networking and community-building

In addition to online platforms, ASEAN should consider establishing offline platforms that bring together stakeholders from various community segments. Such platforms could facilitate face-to-face interactions, knowledge sharing, and networking opportunities.

As the questionnaire reveals, some respondents have yet to utilise any support from the public and private sectors. An offline community could cover those MSMEs not involved in any support ecosystem. MSMEs are vital for the economic growth of Southeast Asia, but they need more access to markets and resources. Facilitating offline business

networking and community-building could help address these challenges and support the growth of MSMEs in the region.

Offline business networking and community-building offer several advantages for MSMEs. They enhance collaboration by fostering partnerships and knowledge sharing amongst businesses. Additionally, they provide access to resources and markets by facilitating resource pooling and market intelligence sharing. Furthermore, these activities promote knowledge exchange and capacity building, enhancing MSMEs' capabilities and competitiveness.

The EU has implemented successful initiatives supporting MSMEs through networking and community-building. For example, the Enterprise Europe Network offers a network of business support organisations that provide matchmaking services, innovation support, and access to funding opportunities. The Enterprise Europe Network brokerage events bring together MSMEs, entrepreneurs, and experts for collaboration and technology transfer. Moreover, the EU promotes cluster development to foster collaboration and innovation amongst MSMEs, research institutions, and stakeholders (European Commission, n.d.-b).

ASEAN could adopt several approaches to support MSMEs through networking and community-building. One approach is establishing dedicated regional MSME networking platforms that connect businesses and that support organisations, investors, and policymakers for matchmaking and knowledge sharing. Another approach is to leverage existing networks such as chambers of commerce, industry associations, and business incubators to facilitate networking activities. ASEAN could also promote cluster development to encourage collaboration, innovation, and resource-sharing amongst MSMEs in specific industries.

To support MSMEs through networking and community-building initiatives, ASEAN should foster an enabling environment through supportive policies, regulatory frameworks, and financial incentives. Investing in digital infrastructure and platforms is crucial to facilitate virtual networking and knowledge exchange. Additionally, providing targeted training and capacity-building programmes will equip MSMEs with the necessary skills for networking and collaboration. By implementing these recommendations, ASEAN could empower MSMEs and drive their growth and development.

CJK could play a vital role in assisting ASEAN with facilitating offline business networking and community-building for MSMEs in their digitalisation efforts.

(1) Staffing the hub

CJK could contribute to staffing the offline business networking hubs established by ASEAN. They could provide advisers, experts, and mentors with industry knowledge, experience, and expertise in digitalisation. These professionals could guide and support MSMEs, helping them navigate the digital landscape, identify opportunities, and address

challenges. CJK could collaborate with ASEAN in recruiting and deploying qualified personnel to these hubs.

(2) Support for CJK's private sector participation

CJK could encourage and facilitate the participation of their private sector companies in the offline business networking hubs established by ASEAN. This could involve providing opportunities for CJK companies to showcase their products, services, and technologies through product trials, demonstrations, and exhibitions within the hubs. By actively engaging with MSMEs in ASEAN, CJK companies could gain insights into the local market, understand the needs of MSMEs, and foster meaningful collaborations.

(3) CJK private companies joining business networking

CJK private companies could actively participate in business networking events and activities organised within the hubs. They could join matchmaking sessions, industry-specific communities, and networking events where they could connect with MSMEs in ASEAN. These platforms could help address the challenges faced by CJK companies in establishing connections and building relationships with MSMEs in ASEAN. By leveraging these networking opportunities, CJK companies could explore potential partnerships, collaborations, and business opportunities in the ASEAN market.

By staffing the hub with knowledgeable professionals, supporting CJK private sector participation, and encouraging CJK companies to join business networking, CJK could assist ASEAN in fostering offline business networking and community-building for MSMEs. These efforts could enhance collaboration, knowledge exchange, and business opportunities, driving the digitalisation and growth of MSMEs in ASEAN while providing CJK companies with a platform to expand their presence in the ASEAN market.

2.2. Finance

2.2.1. Challenges identified

- Lack of budget to implement the digital tools

Both the web and phone surveys revealed that some respondents indicated a lack of funds to implement digital tools, especially in the tool adoption phase. In the web survey, 'limited financial resources to invest in digital tools' ranked second amongst all the answer options. This suggests that a more comprehensive approach is needed to advance the digitalisation of MSMEs.

While many respondents cited lack of funding as one of the major challenges in implementing digital tools, the number of respondents who had received assistance was comparatively low. The survey result revealed that many companies which received public or private financial support successfully adopted digital tools, indicating the effectiveness of financial support in digitalising companies. The questionnaire also revealed issues that governments should emphasise encouraging digital adoption by addressing the issue of

limited funds to invest in digital tools. The data suggest the importance of ASEAN's inclusive finance initiatives in digitalising MSMEs.

While the questionnaire results indicate a lack of funding for MSMEs' digitalisation, existing ASEAN initiatives aims to address these challenges. Some high-level regional policies address the financial development gap in ASEAN (e.g. the ASEAN Economic Community Blueprint 2025, ASEAN Digital Masterplan 2025, and ASEAN Guidelines on Promoting the Utilization of Digital Technologies for ASEAN Food and Agricultural Sector). The study observed national efforts in AMS to address domestic financial issues hindering MSMEs' digitalisation.

To provide wider and more inclusive financial support for MSMEs to implement digital tools, ASEAN could leverage partnerships with stakeholders such as multilateral development banks, other regional organisations, and the private sector.

2.2.2. Policy recommendation

To address the lack of budget for MSMEs to go digital, the following policy recommendation could be considered:

(f) Providing financial assistance for digital tool implementation

ASEAN could employ several financial assistance measures to support MSMEs by collaborating with multilateral development banks and other regional organisations to develop sufficient budget pools, and with the private sector to provide MSMEs with incentives to purchase products or solutions at a discounted price, including the following:

(1) Subsidies

AMS could directly subsidise MSMEs to alleviate financial burdens and foster growth. These subsidies could include grants, low-interest loans, or reimbursements for certain business expenses.

(2) Tax breaks

ASEAN could encourage AMS to introduce tax incentives, such as reduced tax rates or exemptions, to promote investment and facilitate the growth of MSMEs. These incentives could significantly benefit MSMEs by reducing their tax burden and freeing up capital for business expansion.

(3) Credit facilities

ASEAN could establish credit facilities and loan programmes tailored to MSMEs. Such facilities would provide easier access to credit, enabling MSMEs to secure financing for business operations, expansion, or investment in new technologies.

ASEAN's financial assistance measures aim to address the specific needs and challenges of MSMEs. The assistance targets could include the following:

(1) Purchase of tools and equipment

Provide financial support to MSMEs to acquire the necessary tools, equipment, and machinery required for their operations. This assistance would enable MSMEs to enhance productivity, improve product quality, and meet market demand effectively.

(2) Training and skills development

ASEAN has emphasised the importance of skills development and capacity building for MSMEs (OECD, 2021). Financial assistance supports training programmes, workshops, and skill enhancement initiatives. These efforts help MSMEs upgrade their workforce, improve efficiency, and adapt to changing market trends.

(3) Business development and market access

For business development activities, such as market research, product promotion, and participation in trade exhibitions or fairs, financial assistance could be extended to MSMEs. This support would facilitate MSMEs' access to new markets, enhance competitiveness, and promote export opportunities.

In terms of an inclusive regional financial programme, the EU could provide a benchmark. The EU has implemented various successful financial assistance programmes for MSMEs, such as European structural and investment funds, the European Investment Fund, and Horizon 2020, which offer valuable insights for ASEAN.

To support ASEAN's efforts towards MSMEs' digital transformation through financial assistance, CJK could leverage their experience in supporting local MSMEs from the financial perspective, such as Korea's intensive Support Fund Plus programme for local MSMEs affected by the coronavirus disease (COVID-19) (Korean Ministry of SMEs and Startups, 2021).

CJK could consider the following ways to support ASEAN:

(1) Bilateral financial resource support

CJK could utilise government funds and establish bilateral assistance programmes with individual AMS. These programmes could provide financial resources to support MSMEs in digital transformation efforts. Through these agreements, CJK could allocate funds to AMS, enabling them to provide targeted financial assistance to MSMEs.

(2) Knowledge transfer for comprehensive financial assistance

CJK has extensive experience and expertise in supporting the digitalisation of MSMEs. They could share their knowledge and best practices with ASEAN, enabling the region to provide comprehensive financial assistance to MSMEs. This knowledge transfer could include strategies for identifying funding gaps, designing appropriate financial support programmes, and implementing effective mechanisms to ensure the efficient allocation of resources.

(3) Learning from CJK's initiatives

ASEAN could learn from the successful initiatives implemented by CJK to bridge the financing gap between regions and company locations. For example, CJK has implemented various financial support measures to assist companies in rural areas in digitalising their businesses. ASEAN could study these measures and adapt them to suit the needs and circumstances of AMS. This could include providing targeted financial support to MSMEs in rural or underdeveloped regions in ASEAN to help them embrace digital technologies.

By leveraging bilateral assistance, knowledge sharing, and learning from CJK's initiatives, ASEAN could enhance its ability to provide financial assistance and support MSMEs in their digital transformation journey. Collaboration between ASEAN and CJK could lead to a more comprehensive and effective approach to addressing the financing challenges faced by MSMEs in the region.

3. MSMEs' External Factors

3.1. Infrastructure

3.1.1. Challenges identified

- Lack of a stable internet environment

Internet penetration plays a crucial role in shaping the development of MSMEs in Southeast Asia. According to the Digital 2022 Global Overview Report (We Are Social and Hootsuite, 2022), the average internet penetration rate in the ASEAN region is 70%, with some countries having higher rates, such as Malaysia and Singapore. The Philippines and Thailand had the highest share of new digital consumers during the pandemic (until the first half of 2021), at 20% and 18% (ADB, 2021). While the ASEAN region has made significant progress in expanding its internet infrastructure and providing access to the internet, a significant digital divide persists amongst AMS.

The importance of internet access and the high need amongst MSMEs is indicated in both the web and phone surveys. Many rural areas in ASEAN have limited internet infrastructure, hindering MSMEs' access to digital technologies and services. As the questionnaire shows, a certain number of MSMEs in rural areas are lagging in terms of internet coverage. Expanding internet penetration could provide several benefits for MSMEs in ASEAN.

In line with the questionnaire data, in most of the high-level ASEAN policies, improving internet connectivity is one of the key guiding principles of MSME support in ASEAN and important initiatives discussed in MSME digitalisation. Regional initiatives include working with the private sector to provide internet connectivity through new technologies, e.g. the Asia-Pacific Remote Broadband Internet Satellite Project. National initiatives to improve internet connectivity were also observed in some AMS, such as Brunei and Malaysia.

3.1.2. Policy recommendations

To address the lack of a stable internet environment, the following policy recommendations may be considered:

(g) Expansion of internet infrastructure

ASEAN should prioritise improving inclusive internet access throughout the region. Emphasis should be placed on targeting countries with the least developed infrastructure to bridge the digital divide.

To maximise the impact, ASEAN should consider data on internet penetration rates to identify less developed countries where infrastructure development could have a significant impact. While urban areas may have relatively advanced infrastructure, attention should be paid to rural areas, including islands, which experience limited connectivity and low internet penetration rates.

Infrastructure investment in least developed countries is often challenging for countries to finance due to the scale of investment required. Therefore, ASEAN should explore mechanisms to promote investment in infrastructure development as a regional alliance.

ASEAN should leverage regional financial institutions, such as the Asian Development Bank (ADB) and the ASEAN Infrastructure Fund, to mobilise resources for infrastructure development projects. Collaboration with donor countries and international organisations could provide additional financial support, technical expertise, and knowledge sharing. Additionally, the coverage of public–private initiatives such as the ongoing Asia-Pacific Remote Broadband Internet Satellite Project could be expanded. By investing in physical infrastructure and promoting public–private partnerships (PPPs), AMS could create a conducive environment for MSMEs to thrive and contribute to the region's economic growth and development.

Examples from other regions, such as the EU, demonstrate effective strategies for expanding internet infrastructure to support MSMEs. The Digital Single Market strategy in the EU aims to create a seamless and interconnected digital market across member states. The strategy includes measures such as investment in broadband infrastructure, reducing cross-border barriers, and promoting e-commerce and digital entrepreneurship. These measures have helped MSMEs in the EU to access new markets and grow their businesses through digital technologies (European Commission, 2015).

CJK could help ASEAN in its efforts to support MSMEs with digitalisation by expanding basic internet infrastructure based on their experience. Potential ways to support CJK include the following:

(1) Provision of technology for the installation of new internet lines

CJK could contribute by providing technology for installing new internet lines in ASEAN. This could include sharing public infrastructure technology and best

practices with AMS. To facilitate this, relevant human resources with expertise in internet infrastructure could be dispatched from CJK to assist ASEAN in planning, designing, and implementing new internet lines. Additionally, bilateral programmes between CJK and ASEAN could be established to provide relevant infrastructure support, including funding and technology transfer, to enhance internet connectivity in ASEAN.

(2) Collaboration with CJK private companies to introduce new line connection technology

CJK private companies could collaborate with ASEAN to introduce innovative line connection technologies. Insights could be drawn from successful initiatives like Starlink in Southeast Asia, which aims to provide global broadband coverage using satellite communication. CJK could share their experience and expertise with ASEAN in deploying satellite-based internet connection services. Collaborations with companies like Hongyan Sat, which specialises in satellite communication, could be explored to implement efficient and reliable internet connectivity solutions in remote areas of ASEAN where traditional infrastructure is lacking.

(3) Offering advanced technologies for cross-national circuit connectivity

The private sector in CJK could offer advanced technologies that enable connectivity over a wide area within ASEAN. They could provide services utilising cutting-edge technologies for cross-national circuit connectivity. This might include solutions like fibre-optic networks, 5G connectivity, or emerging technologies like low Earth orbit (LEO) satellite systems. CJK companies could offer commercial or beta versions of these technologies to ASEAN, enabling MSMEs to access improved connectivity for their digitalisation efforts. By leveraging the expertise and resources of the CJK private sector, ASEAN could accelerate the development of its internet infrastructure and support the digital transformation of its MSMEs.

In summary, CJK could contribute to ASEAN's goal of supporting MSMEs with digitalisation by providing technology, expertise, and infrastructure for new internet connections, collaborating with CJK private companies to introduce new line connection technologies, and offering advanced technologies for cross-national circuit connectivity. Such collaborations could enhance internet infrastructure in ASEAN and empower MSMEs with the tools they need to thrive in the digital economy.

(h) Provision of high-speed connectivity

It is important to clarify that the expansion of internet infrastructure refers to the establishment of the required infrastructure, while the provision of high-speed internet connections serves as added value. Therefore, another important way that ASEAN can help MSMEs with digital transformation is by promoting the widespread adoption of high-speed connectivity. This advancement opens possibilities for introducing services that demand greater immediacy and precision, such as artificial intelligence (AI), augmented

reality (AR), robotics, and cloud services. Consequently, MSMEs can elevate their digital transformation journey from basic digitalisation to a more advanced level.

In Europe, the European Investment Bank (EIB) has played a key role in supporting the development of digital infrastructure. The EIB has invested in many projects to improve digital connectivity and access, including developing fibre-optic networks, mobile broadband infrastructure, and data centres (European Investment Fund, n.d.).

One example of a project supported by the EIB is the Finnish company Cinia's C-Lion1 submarine cable. The cable provides high-speed data connectivity between Finland and Germany and is part of a more extensive network of undersea cables connecting Europe and Asia. The C-Lion1 cable has helped to improve connectivity and reduce latency for businesses in both regions, including MSMEs.

Certain countries in ASEAN have made notable progress in implementing high-speed lines, facilitating improved internet connectivity, and providing digital access. Singapore and Malaysia have invested significantly in high-speed broadband infrastructure, enhancing digital capabilities for businesses and individuals. According to available data, Singapore boasts one of the highest fixed broadband penetration rates in ASEAN (Raj, 2022), while Malaysia has achieved significant coverage with its National Fiberisation and Connectivity Plan (Sidhu, 2020).

Rather than implementing high-speed lines across the entire ASEAN region, a targeted approach could be adopted to maximise the impact on MSMEs. Identifying focus areas within ASEAN where digital transformation could have a significant impact is crucial. For instance, countries like Malaysia have implemented high-speed lines in designated regions or industrial parks to stimulate digitalisation and foster innovation.

Singapore has consistently prioritised digital transformation and could act as a role model for other AMS. Initiatives such as the Smart Nation programme and the nationwide rollout of high-speed fibre networks have propelled the country's digitalisation efforts. The successful adoption of digital technologies in various sectors has contributed to Singapore's position as a global technology hub (Equinix, 2021).

Malaysia has made significant strides in digital transformation through initiatives like the Malaysia Digital programme. Implementing high-speed lines like the National Fiberisation and Connectivity Plan has improved internet connectivity and laid the foundation for enhanced digital services. Notable successes include digitalising government services and the development of smart cities (TM One, 2021).

ASEAN should prioritise knowledge sharing amongst AMS to facilitate digital transformation for MSMEs. Experiences from successful cases, such as Singapore and Malaysia, could serve as valuable references for other AMS. This could be achieved through workshops, seminars, and collaborative platforms that facilitate sharing of best practices, lessons learned, and technical expertise.

To help ASEAN in its efforts to support MSMEs with digitalisation, CJK could play a crucial role in providing high-speed connectivity. According to the Organisation for Economic Co-operation and Development (OECD), Korea and Japan have the highest fibre penetration rates amongst the OECD member countries, at 87% and 84%, respectively (OECD, 2023). The OECD also cites Korea as one of the first countries to roll out the 5G network (OECD, n.d.).

(1) Leveraging internet infrastructure and technology of CJK governments and private sector

ASEAN could leverage CJK's infrastructure and technology expertise to enhance high-speed connectivity. For example, Korea has achieved one of the highest rates of high-speed internet penetration globally. With nearly 100% fibre-optic cable penetration as of 2021, Korea's experience could serve as a valuable reference for ASEAN. AMS could collaborate with Korea to understand its strategies for infrastructure development, including fibre-optic networks and the deployment of 5G technology. By tapping into CJK's expertise and infrastructure, ASEAN could accelerate the provision of high-speed lines to benefit MSMEs.

(2) Learning from successful cases of public–private collaboration

ASEAN could learn from the experience of CJK how governments and private companies can collaborate effectively to lay high-speed lines domestically. Korea, for instance, has seen remarkable progress in developing its high-speed infrastructure due to strong PPPs. ASEAN could study the frameworks, policies, and initiatives for facilitating cooperation between governments and private entities in CJK. This includes understanding the regulatory environment, incentives, and funding mechanisms encouraging private investment in high-speed connectivity. By adopting similar collaboration models, ASEAN could foster an environment conducive to the rapid expansion of high-speed lines to support MSMEs in their digitalisation efforts.

In summary, CJK could support ASEAN's goal of helping MSMEs with digitalisation by providing high-speed connectivity. ASEAN could leverage the infrastructure and technology expertise of the CJK governments and private sector, and learn from successful cases of public–private collaboration in CJK. By leveraging these opportunities, ASEAN could accelerate the expansion of high-speed lines and empower its MSMEs to thrive in the digital economy.

3.2. Digital tool provision from the market

3.2.1. Challenges identified

- Lack of the product and/or solution supplies

The interview research found that one difficulty in digitalising MSMEs is the lack of supply of tools. In particular, the absence of products and solutions with the functionality that MSMEs require hinders the adoption of digital tools by MSMEs. The questionnaire shows

that lacking the required functionality can hinder MSMEs' digitalisation.

The availability of products and solutions in the languages that MSMEs seek is also an important factor in the digitalisation of MSMEs. As the questionnaire shows, the availability of products, solutions, or after-sales service in the local language of each AMS is an important factor in the implementation of MSME digital tools.

- Non-retention of digital devices

According to Google, Temasek, and Bain & Company (2020), Southeast Asia's internet economy is expected to reach $300 billion by 2025, up from $100 billion in 2019. This growth is fuelled by the increasing penetration of digital devices in the region. The report also states that Southeast Asia's internet economy has tripled in response to the COVID-19 pandemic and is on track to grow by another 5.4% annually until 2025. Increased penetration of digital devices, such as smartphones, tablets, and computers, could contribute significantly to MSMEs' digital transformation journey.

The questionnaire revealed that many companies retain digital tools, but efforts to encourage more MSMEs to retain digital tools and bring this number closer to 100% should be actively pursued in ASEAN.

3.2.2. Policy recommendations

To address the lack of product and/or solution supplies, the following policy recommendations could be considered:

(i) Software provision

MSMEs encounter several challenges when embarking on their digital transformation journey. Despite the challenges, digital transformation offers MSMEs several opportunities, including market expansion, enhanced efficiency and productivity, improved customer engagement, and access to data-driven insights.

ASEAN should conduct a comprehensive assessment to identify the most critical basic solution tools that MSMEs require for digital transformation. These tools may include customer relationship management (CRM) software, accounting software, inventory management systems, project management tools, or website builders. By addressing the most pressing needs of MSMEs, ASEAN could facilitate their transition to the digital realm.

ASEAN could also consider establishing partnerships with regional and global private software providers to secure free or discounted software licences for MSMEs. These partnerships could be formed with established software companies and/or start-ups, or through collaboration with relevant industry associations. ASEAN could ensure that MSMEs can access essential software solutions without incurring significant financial burdens by negotiating favourable arrangements.

ASEAN could establish software donation programmes in collaboration with providers and relevant stakeholders to facilitate free software. Such programmes would encourage

companies and organisations to donate software licences or develop tailored solutions for MSMEs.

More than providing free software alone is required for successful digital transformation. ASEAN should also invest in capacity-building programmes to train MSMEs in utilising the software tools provided effectively. This could be achieved through workshops, training sessions, online tutorials, and mentorship programmes. Additionally, establishing support channels such as dedicated helplines or online forums could assist MSMEs during their digital transformation journey.

The EU has made significant efforts to provide access to free or discounted software and digital resources to MSMEs. Like the case observed in this study from the EU, discounted solutions such as CRM and accounting software can be provided to MSMEs through government-led initiatives within public–private collaboration efforts.

In conclusion, by providing free or heavily discounted software solutions, ASEAN could contribute significantly to the digital transformation of MSMEs in the region. Identifying and addressing the much-needed basic solution tools would empower MSMEs with essential digital capabilities, enabling them to streamline operations, improve productivity, and expand their market reach. Through strategic partnerships, software donation programmes, capacity building, and ongoing support, ASEAN could facilitate MSMEs' successful adoption and utilisation of software tools. As the measures to provide such solutions, a website that is publicly open to MSMEs could be considered, but on-site provision of such solutions could be needed as well so that MSMEs without an online presence could access them. As we observed in the EU (i.e. EDIHs), MSMEs could access such support via local hubs.

CJK could help ASEAN with the provision of free software in several ways:

(1) Collaborate with CJK companies on free software offered on government websites

    CJK could collaborate with companies in their respective countries to offer free software solutions (e.g. CRM and accounting software as observed in the EU) via government websites. This could involve partnering with CJK software firms that specialise in developing digital tools for MSMEs. By providing free software via government websites, ASEAN MSMEs could access essential digital tools without additional costs. Collaborative efforts between CJK companies and ASEAN governments could ensure the availability and continuous improvement of such software, catering to the needs of ASEAN MSMEs. Additionally, the interview study found that CJK solution providers face barriers to market entry in ASEAN, such as establishing partnerships and identifying distribution channels. However, overcoming these barriers would facilitate their market presence and contribute to the localisation of services and products offered by CJK companies.

(2) Government promotion of CJK firms' services and establishment of collaboration schemes

CJK governments could promote the services of their software firms in ASEAN and establish collaborations with local firms. This could include marketing campaigns, trade missions, and business matching events to connect CJK software companies with ASEAN MSMEs. ASEAN governments could facilitate partnerships between CJK and local firms by creating platforms for collaboration, providing funding support, and offering incentives to encourage joint business development programmes. Such collaborations could enable CJK firms to gain entry to ASEAN markets and contribute directly to the digitalisation efforts of MSMEs.

(3) Accumulation of knowledge through collaboration with the private sector

CJK companies could work closely with ASEAN and local private companies to accumulate knowledge and develop products collaboratively. This could involve engaging in R&D initiatives, innovation programmes, and technology transfer arrangements. By leveraging the expertise and resources of CJK companies, ASEAN could enhance its knowledge base in software development. This collaboration could lead to the creation of tailored software solutions that address the specific challenges and requirements of ASEAN MSMEs, fostering their digital transformation.

By collaborating with CJK companies on software provision, promoting CJK firms' services and establishing collaboration schemes, and accumulating knowledge through collaboration with the private sector, ASEAN could effectively support MSMEs with digitalisation. These efforts could provide MSMEs access to essential software tools, promote market entry for CJK firms, and facilitate the development of innovative software solutions for the benefit of ASEAN MSMEs.

To address non-retention of digital devices, the following policy recommendations could be considered:

(j) Proliferation of digital devices

As the questionnaire shows, small and micro companies still need to catch up in the implementation of basic tools such as intra-company management tools (i.e. PCs and smartphones). To address the needs of MSMEs that still need to adopt basic digital devices, it is essential to focus on providing intra-company management tools. These devices serve as crucial tools for efficient operations, communication, and access to digital platforms.

To promote widespread adoption, efforts should be made to distribute devices free of charge, especially in areas where digital devices are not widely utilised. Targeting rural areas and islands, where access and affordability can be significant barriers, is crucial. Cooperation with private companies, foundations, and government agencies will be essential to secure funding and ensure the availability of devices to those who need them most.

ASEAN should explore various avenues of financial support to alleviate the cost burden associated with device adoption. Governments may bear the financial burden through

subsidy programmes, grants, or low-interest loans designed for MSMEs. Such support could encourage wider device adoption and enable MSMEs to allocate resources to other business development initiatives.

Increasing access to basic digital devices should be complemented by efforts to enhance awareness and digital literacy amongst MSMEs. By offering training programmes, workshops, and resources, ASEAN could empower MSMEs to utilise the devices effectively and leverage digital tools for business growth. Integrating awareness initiatives with other digital capacity-building efforts would ensure a holistic approach to supporting MSMEs' digital transformation.

Some notable examples from other regions observed include Smart Africa, which aims to provide 100 million smartphones to African citizens by 2020 (Smart Africa, n.d.), and Digital India, which provides affordable digital devices to citizens, including MSMEs (Digital India, n.d.).

ASEAN has yet to develop an initiative to provide free basic digital devices to MSMEs across AMS. However, initiatives of this nature are primarily led by non-public sector actors such as non-profit organisations, non-governmental organisations, and foundations. Nevertheless, ASEAN could explore collaborating with the private sector, particularly in rural areas and industries facing significant lags in basic digitalisation efforts.

CJK could play a significant role in assisting ASEAN with increasing the supply of basic digital devices to MSMEs.

(1) Provision of discounts on hardware by CJK companies

CJK companies could offer discounts on digital devices, such as smartphones, tablets, laptops, and other essential equipment, to MSMEs in ASEAN. This could be facilitated through bulk buying agreements with ASEAN governments or authorised entities to acquire devices at reduced prices, where governments provide subsidies or financial incentives to reduce the cost of digital devices. By making these devices more affordable, CJK would encourage the adoption of digital technologies amongst MSMEs in ASEAN.

(2) Incentives for companies to expand awareness and distribution

CJK governments could incentivise local companies to expand awareness and distribution networks for basic digital devices in ASEAN. This could include providing tax benefits, grants, or subsidies to CJK companies that actively promote and distribute digital devices to ASEAN MSMEs. By incentivising CJK companies to prioritise the ASEAN market and engage in awareness campaigns and distribution efforts, the supply of basic digital devices could be increased, making them more accessible to MSMEs.

Overall, CJK could support ASEAN in increasing the supply of basic digital devices

to MSMEs by providing discounts on hardware and offering incentives for companies to expand awareness and distribution. These efforts would enhance access to digital devices for MSMEs, enabling them to embrace digitalisation and thrive in the digital economy.

3.3. Cyberattacks

3.3.1. Challenges identified

- Risk of cyberattacks

As the ASEAN Digital Masterplan 2025 stated, cybersecurity is a critical issue for companies implementing digital tools (ASEAN, 2021). In addition, according to the JETRO Business Outlook and Digital Strategy Towards the 'New Normal', 31% of MSMEs consider cybersecurity and data privacy concerns one of the difficulties of digital tools adoption (JETRO, 2020). From the MSME point of view, there is a concern about digital privacy, and they need more security resources and policies to strengthen cybersecurity.

The questionnaire results show that not many companies in ASEAN have implemented cybersecurity tools, and those with no plans to do so are mainly small and micro companies. In the digitalisation of MSMEs, ASEAN needs to ensure that MSMEs across ASEAN are prepared for cyberattacks associated with the digitalisation of MSMEs. ASEAN could help prepare for cyberattacks associated with digitalising MSMEs across the region.

In advancing ASEAN's digitalisation, some of ASEAN's high-level guidelines clearly state its commitment to cybersecurity and have announced plans to do so (e.g. the ASEAN Cybersecurity Cooperation Strategy, 2021–2025). In line with this, AMS are making similar progress in improving cybersecurity. However, it is worth noting that initiatives targeting cybersecurity improvement are currently only found in the high-level policies of Brunei, Indonesia, and the Lao People's Democratic Republic (Lao PDR). This highlights the need for broader action within the ASEAN region to address cybersecurity concerns.

3.3.2. Policy recommendation

To address the risk of cyberattacks, the following policy recommendation could be considered:

(k) Strengthening cybersecurity for regional MSMEs

While AMS have laws and regulations related to cybersecurity and data protection, ASEAN has yet to develop a unified cybersecurity law to create a more secure and resilient digital ecosystem in the region.

To ensure a comprehensive and robust approach to strengthening cybersecurity, ASEAN could establish a standardised set of rules for AMS to adhere to, reinforcing cybersecurity laws. Additionally, ASEAN could promote sharing best practices amongst AMS to enhance

collective cybersecurity efforts. Furthermore, ASEAN could facilitate collaboration between the public and private sectors to ensure a coordinated and effective response to cybersecurity challenges.

The EU has established several region-wide cybersecurity laws and regulations to protect against cyberthreats and promote cybersecurity resilience in the EU. One of the five objectives that the European Commission outlined as part of the Digital Single Market strategy is to strengthen Europe's response capabilities to cyberattacks by reinforcing the European Union Agency for Cybersecurity (ENISA) and establishing a credible European cyber deterrence strategy, while ensuring a robust criminal response to protect businesses, public institutions, and European citizens. Furthermore, the General Data Protection Regulation, enacted in 2018, regulates the collection, use, and sharing of personal data in the EU. It establishes data protection and security requirements, requires organisations to obtain consent before collecting personal data, and establishes penalties for non-compliance (Google, 2022).

For ASEAN, in addition to national laws and regulations, several measures could be undertaken to influence the enhancement of cybersecurity at the regional level to set minimum requirements for AMS. The steps could include the following, amongst others:

(1) Establishing a legal framework for cybersecurity

ASEAN could consider implementing region-wide regulatory harmonisation for cybersecurity, similar to the EU Directive on the security of network and information systems (NIS2 Directive), to ensure critical infrastructure security.

(2) Promoting cybersecurity best practices

ASEAN could promote the adoption of cybersecurity best practices and guidelines such as those developed by ENISA. ENISA has contributed to developing EU cybersecurity laws and policies, such as the EU Cybersecurity Act and the NIS2 Directive. The agency has also provided support to EU member states in implementing these laws and policies, including by providing training and capacity-building initiatives. ASEAN could provide a similar initiative that includes an information-sharing platform for exchanging knowledge from developed countries to other countries, focusing on elevating MSMEs' awareness of cybersecurity.

(3) Building cybersecurity capacity

ASEAN could invest in building cybersecurity capacity by establishing cybersecurity centres like the EU's European Cybercrime Centre (EC3) and Network and Information Security (NIS) Cooperation Group, and providing training and support to member states. For example, ASEAN could develop cybersecurity curricula for educational institutions and provide scholarships for cybersecurity professionals to increase the pool of skilled cyber experts in the region (Google, 2022).

(4) Sharing threat intelligence

ASEAN could enhance regional mechanisms for sharing threat intelligence amongst AMS, by leveraging ongoing efforts like the proposed ASEAN Regional Computer Emergency Response Team (Singapore Cybersecurity Agency, 2022). This would enable AMS to share information about emerging threats and coordinate responses to cyber incidents. For example, one key initiative is ENISA, which serves as a focal point for cybersecurity in the EU. ENISA facilitates threat intelligence sharing amongst member countries by providing technical expertise, promoting best practices, and coordinating activities.

(5) Engaging with the private sector

ASEAN could engage with the private sector to promote cybersecurity best practices and develop PPPs. This could include working with technology companies to develop cybersecurity solutions and partnering with financial institutions to promote secure online transactions. For example, the EU has engaged with technology companies such as Google to develop cybersecurity solutions (Google, 2022). In addition, Google is looking for opportunities to partner with ENISA and other EU organisations to expand training for small businesses and offer specialised cloud computing and cloud security training to expand access to critical skill sets and improve cyber resilience (Google, 2022).

Strengthening cybersecurity in ASEAN will require a coordinated effort from governments, the private sector, and other stakeholders. By adopting a holistic approach that addresses both technical and non-technical aspects of cybersecurity, ASEAN could better protect against cyberthreats and enhance regional cybersecurity resilience.

CJK could play a significant role in assisting ASEAN's efforts to strengthen cybersecurity. For example, the Korean government is acknowledged for implementing a new cybersecurity strategy within the nation during the pandemic (OECD, n.d.). Similar support for ASEAN could be considered for each item in the following ways:

(1) Establishing a legal framework for cybersecurity

CJK could support ASEAN by sharing its expertise and best practices in developing comprehensive legal frameworks for cybersecurity. This could involve collaborating with AMS to review and refine existing cybersecurity laws, regulations, and policies. CJK could also offer guidance on implementing effective legal measures to address cybercrime and protect critical infrastructure.

(2) Promoting cybersecurity best practices

CJK could contribute to ASEAN's efforts by sharing its knowledge and experience in promoting cybersecurity best practices. This could involve conducting capacity-building programmes, training workshops, and awareness campaigns to educate MSMEs and other stakeholders in ASEAN about the importance of cybersecurity and

providing guidance on adopting best practices to mitigate cyberthreats.

(3) Building cybersecurity capacity

CJK could assist ASEAN in building cybersecurity capacity by collaborating on initiatives such as training programmes, certification schemes, and skill development activities. This could involve sharing resources, expertise, and training materials to enhance the cybersecurity capabilities of AMS. CJK could also support the establishment of cybersecurity centres of excellence and provide technical assistance for developing cybersecurity strategies and policies.

(4) Sharing threat intelligence

CJK could collaborate with ASEAN in sharing threat intelligence to enhance the collective ability to detect, prevent, and respond to cyberthreats. This could involve establishing information-sharing mechanisms, such as secure channels for sharing real-time threat intelligence, vulnerabilities, and incident response practices. CJK could contribute its expertise in threat intelligence analysis and collaborate with individual AMS Computer Emergency Response Teams to strengthen their capabilities.

(5) Engaging with the private sector

CJK could facilitate partnerships and cooperation between ASEAN and the private sector to promote cybersecurity. This could involve engaging technology companies, cybersecurity firms, and industry associations from CJK to collaborate with ASEAN in developing and implementing cybersecurity solutions. CJK could also support PPPs by encouraging information sharing, facilitating technology transfers, and promoting cybersecurity R&D investments.

3.4. e-Government

3.4.1. Challenges identified

- e-government as a potential investment area

The interview survey suggested that promoting e-government could improve MSMEs' awareness of digitalisation and promote their digitalisation. The questionnaire results revealed that about 30% of respondents would prefer increased government digitalisation. While this number is not the top priority of MSMEs in terms of improved public sector governance, more digitalised governance is one of the needs of MSMEs in their digitalisation.

As the ASEAN Digital Masterplan 2025 stated, AMS governments have an essential role to play in making digital services accessible to all citizens, removing one of the main barriers to digital inclusion (ASEAN, 2021). Aligning with the ASEAN Digital Masterplan 2025, Singapore's Digital Government Blueprint plays a vital role in transforming its public services through digitalisation. The project team observed that some other AMS also encourage national e-government efforts (e.g. Brunei and the Lao PDR). Considering

the importance of e-government in the digitalisation of MSMEs, both ASEAN and AMS need to promote e-government and take the lead in e-government at the national level.

3.4.2. Policy recommendation

To promote e-government efforts in ASEAN, the following policy recommendation could be considered:Improve e-government amongst AMS

As e-government initiatives are being implemented in AMS, they have the potential to simplify administrative procedures by digitalising them, reducing complexity within the nation and ASEAN. In addition, ASEAN could establish policy frameworks highlighting the importance of e-government services and set common goals for AMS. Like the EU's Digital Single Market strategy, ASEAN could provide guidelines and standards to ensure interoperability, cross-border services, and seamless integration of digital technologies. The EU's Digital Economy and Society Index and eGovernment Benchmark could serve as reference models for ASEAN to develop its own benchmarking mechanisms to assess the progress of AMS in improving e-government services. The Digital Economy and Society Index and eGovernment Benchmark assess various indicators, such as the online availability of public services, user-centricity, and mobile accessibility (European Commission, 2023). These rankings create a competitive environment and encourage member countries to improve their e-government services (European Commission, 2022).

In addition, ASEAN could promote knowledge sharing and exchange of best practices amongst AMS, inspired by EU initiatives. Platforms such as the European eGovernment Awards and the European Commission's eGovernment Action Plan facilitate the dissemination of successful e-government practices. ASEAN could create similar platforms to encourage AMS to share their experiences, success stories, and lessons learned in implementing effective e-government services that benefit MSMEs. In return, AMS could learn from each other's experiences and replicate successful practices, thereby motivating continuous improvement.

ASEAN could also encourage AMS to allocate financial resources and provide incentives to support the continuous improvement of e-government services. Like EU funding programmes such as Horizon 2020 and the European structural and investment funds, ASEAN could establish funding mechanisms to promote innovation and enhance e-government capabilities.

AMS should also adopt a user-centric approach in designing e-government services, considering the specific needs and challenges that MSMEs face. The EU's emphasis on simplifying administrative procedures, as demonstrated through the single digital gateway, could inspire ASEAN to streamline processes, reduce complexity, and make e-government services more user-friendly and accessible for MSMEs.

ASEAN could also collaborate with international partners, including the EU, to leverage their expertise and experience in improving e-government services. The EU has a wealth

of knowledge and successful practices to share with AMS. Establishing partnerships, joint research projects, and exchange programmes could facilitate the transfer of knowledge, promote innovation, and accelerate the development of effective e-government services tailored to the needs of MSMEs.

ASEAN actively advocates for a regionally aligned approach, taking inspiration from the EU as a benchmark. Emphasising regional initiatives, ASEAN is committed to advancing its e-government agenda. To bridge the gap in e-government initiatives amongst AMS, ASEAN should encourage developed countries in the region to support their developing counterparts, fostering knowledge sharing and collaboration. Through these efforts, ASEAN could create a supportive ecosystem that empowers MSMEs to thrive in the digital era.

CJK are leaders in e-government services and could play a crucial role in assisting AMS in improving e-government services. For example, the Korean government is recognised as one of the most progressive countries in terms of digitalisation, including digital government (OECD, 2019). The Korean government has established an official e-government website (Government 24) under the Korea e-government master plan 2020 (Korean Ministry of the Interior and Safety, n.d.). By leveraging this experience, CJK could support ASEAN as follows:

(1) Knowledge sharing and best practices

CJK could share their experience, success stories, and best practices in developing and implementing e-government services. This knowledge transfer could help AMS understand CJK's strategies, challenges, and solutions, enabling them to make informed decisions and avoid potential pitfalls.

(2) Public–private partnerships

CJK could encourage their private sector companies, especially those specialising in e-government solutions, to collaborate with AMS. PPPs could facilitate knowledge transfer, technology adoption, and investment in e-government projects. CJK could also support the establishment of regional platforms that bring together government agencies, industry experts, and private enterprises to exchange ideas and foster collaboration.

(3) Policy and regulatory framework

CJK could guide policy and regulatory frameworks for e-government services. They could share their experience in formulating laws, regulations, and standards governing data protection, privacy, interoperability, and digital accessibility. AMS could adapt and customise these policies to suit their specific contexts, benefiting from the insights of CJK's experiences.

By leveraging the expertise and experiences of CJK, AMS could accelerate their progress in improving e-government services. Collaboration between these regions could lead to

the exchange of knowledge, technology, and resources, ultimately enhancing the overall effectiveness and efficiency of government services in ASEAN.

3.5. Microenvironment (i.e. market environment)

3.5.1. Challenges identified

- Regional online economy as a potential investment area

For ASEAN, the COVID-19 pandemic has propelled the e-commerce market into a new phase. From 2016 to 2021, the total value of e-commerce sales grew fivefold, or 40% annually, and e-commerce's share of all retail sales surged to 20% from 5% (McKinsey & Company, 2022). According to Google, Temasek, and Bain & Company (2020), the e-commerce market in Southeast Asia was valued at $62 billion in 2020 and is projected to reach $172 billion by 2025, representing a compound annual growth rate of 29%.

MSMEs account for over 97% of all enterprises in Southeast Asia and employ 67% of the working population. Despite the numbers, MSMEs in the region contributed only 40.5% on average to each country's gross domestic product (GDP) and 19.2% of total export value in 2020 (ADB, 2021). The e-commerce market, which has been growing rapidly and is expected to sustain growth in the near future, offers a great business opportunity to support MSMEs' growth in ASEAN. Thus, the entry of MSMEs into the e-commerce market is important for the continued growth of MSMEs in ASEAN.

On the other hand, there is no unified regional digital single market concept to facilitate MSMEs' entry to the digital economy in ASEAN. Using the EU as a reference point, the Digital Single Market, Data Governance Act, and guidelines on information security are well-developed regional initiatives to maximise the growth of the EU's digital economy and enable European MSMEs to enjoy the full benefits of the digital revolution. As barriers to cross-border e-commerce were removed, e-commerce has become a key economic sector in Europe, with about 359 million active customers and $590 billion in revenue in 2022 (ecommerceDB, 2023).

Developing these initiatives in ASEAN will incentivise ASEAN companies to enter the online economy, including adopting MSME digital tools and improving their awareness of the tools. These initiatives allow for market unification and efficiency in ASEAN, in coordination with other initiatives such as the unification of logistics. ASEAN should develop a regional online economy, considering lessons and best practices from the EU, and create an environment that allows MSMEs to enjoy that online economy.

3.5.2. Policy recommendation

To promote the development of a regional online economy, the following policy recommendation could be considered:

(m) Promoting a digital single market in ASEAN

ASEAN could consider introducing a digital single market (DSM) concept to create a seamless and unified digital marketplace across the region as a public initiative and make the digital economy profitable for MSMEs. Unlike in the EU, the rise of the e-commerce market in ASEAN has been driven mostly by the success of the private sector. Hence, ASEAN could consider outlining a clear initiative towards developing a DSM to realise the full potential of cross-border e-commerce in the region.

While ASEAN has taken significant steps to promote a deeply integrated and cohesive ASEAN economy through initiatives such as the ASEAN Economic Community Blueprint 2025 and the ASEAN Digital Masterplan 2025, more can still be done to create a DSM.

Although ASEAN has made strides in harmonising regulations and standards for cross-border e-commerce, differences remain in regulations and procedures between AMS that can create trade barriers. MSMEs often operate with limited resources. Therefore, efforts should be made to lower the barriers to entry to the online economy for MSMEs. Further efforts to lower the barriers may include, but are not limited to, the following:

(1) Harmonising customs procedures

ASEAN could work towards harmonising customs procedures and documentation requirements for cross-border trade. This could involve standardising the types of documents required for import and export, as well as developing a standard set of procedures for customs clearance. For instance, in North America, the United States–Mexico–Canada Agreement, which substituted the North America Free Trade Agreement (NAFTA), includes provisions for harmonising customs procedures and documentation requirements. This has helped MSMEs with cross-border trade in the region by reducing the time and costs associated with customs clearance procedures (United States Department of Commerce, n.d.).

(2) Streamlining logistics processes

ASEAN could work towards streamlining logistics processes for cross-border e-commerce by developing common standards for packaging and labelling and promoting electronic documentation and tracking systems. For instance, the European intermodal loading units code is a standard for intermodal transport units, such as containers and swap bodies. The code aims to improve intermodal transport operations' safety, efficiency, and interoperability; and reduce logistics operators' costs and administrative burdens (European Union, n.d.). ASEAN could consider developing similar initiatives for other modes of transportation and logistics to help

MSMEs access accurate information quickly while eliminating redundant data entry.

(3) Facilitating payments

ASEAN could work towards facilitating cross-border payments for e-commerce transactions by promoting digital payment systems and developing common standards for payment processing. For example, Bank Negara Malaysia and Bank Indonesia have announced the commercial launch of the Indonesia–Malaysia cross-border QR code payment linkage. This initiative promotes faster, cheaper, more transparent, and more inclusive cross-border payments, particularly for the benefit of MSMEs (Bank Negara Malaysia, 2023). ASEAN could consider developing similar initiatives at the regional level to promote collaboration and faster adoption in other AMS.

Collaboration between the public and private sectors could play a key role in creating a more inclusive DSM in ASEAN, which could benefit MSMEs by leveraging the strengths and expertise of both sectors to develop policies, infrastructure, and services that support the growth of MSMEs in the digital economy. Like the cases observed in other regions and countries, the EU partnered with the private sector to implement the Digital Single Market strategy.

CJK could play a crucial role in assisting ASEAN's efforts to promote a DSM by contributing to the harmonisation of customs procedures, streamlining logistics processes, and facilitating payments. This collaboration between ASEAN and CJK could be achieved through ongoing bilateral initiatives (e.g. TradeWaltz between ASEAN and Japan).

(1) Harmonising customs procedures

CJK could provide support by sharing their experiences and best practices in customs procedures with ASEAN. They could collaborate with ASEAN to develop common standards and guidelines for customs documentation, clearance processes, and import and export regulations. This collaboration could help streamline and simplify customs procedures across the region.

(2) Streamlining logistics processes

CJK could leverage their logistics and supply chain management expertise to assist ASEAN in streamlining its logistics processes. They could share knowledge on efficient transportation, warehousing, and distribution practices. Additionally, CJK could collaborate with ASEAN in developing digital platforms and technologies that optimise the tracking, tracing, and coordination of goods throughout the supply chain.

(3) Facilitating payments

CJK could support ASEAN in facilitating digital payments within the region. They could share insights on successful payment systems, fintech solutions, and electronic banking infrastructure. CJK could also collaborate with ASEAN to establish

interoperability standards for digital payment platforms, ensuring seamless and secure cross-border transactions.

Promoting a DSM could help ASEAN promote a data governance act by providing a common framework and enabling regional cooperation in data governance. Several insights from the EU's Data Governance Act could be applied to ASEAN:

(1) Harmonising data governance rules

Similar to the EU, ASEAN could develop common standards and principles for data governance across AMS, ensuring consistency and facilitating cross-border data flows.

(2) Facilitating secure data sharing

A DSM encourages the establishment of trusted mechanisms for data sharing. ASEAN could explore concepts such as data intermediaries and sharing service providers to facilitate secure and transparent data exchange.

(3) Building trust and accountability

A DSM promotes trust and accountability in data governance. ASEAN could adopt transparency and accountability measures to enhance trust among stakeholders in the region's data ecosystem.

(4) Encouraging data portability and interoperability

ASEAN could promote data portability and interoperability, allowing seamless movement and utilisation of data across different platforms and services.

CJK could strengthen cooperation with ASEAN through PPPs in all these efforts. They could engage in knowledge exchange, capacity-building programmes, and joint initiatives to foster the development of a DSM in the region.

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Appendix 1

Digital Tool Implementation

1. Descriptions of Weight Back Analysis Utilised in Chapter 4

A global company database, D&B Hoovers, was utilised for industry weights for the analysis provided in Chapter 4. To check for consistency with public statistics, the project team compared the data of D&B Hoovers with national statistics from Indonesia, Malaysia, and Viet Nam to understand the differences. Table A1 reports the results of the comparison.

Table A1. Comparison Between D&B Hoovers Data List and National Statistics Distribution in Indonesia, Malaysia, and Viet Nam

Country		Category	D&B Hoovers	Census Data	Gap
Indonesia	Industry	Agriculture, forestry, fishing	0.7%	-	-
		Manufacturing (heavy mfg.)	7.9%	-	-
		Manufacturing (light mfg. 1 – consumer goods or consumables)	5.5%	-	-
		Manufacturing (light mfg. 2 – others)	6.4%	-	-
		Services	79.5%	-	-
	Company size	Micro	10.3%	99.6%	89.4pp
		Small	35.4%	0.3%	35.1pp
		Medium	41.1%	0.1%	41.1pp
		Large	13.1%	0.0%	13.1pp
Malaysia	Industry	Agriculture, forestry, fishing	2.5%	1.3%	1.2pp
		Manufacturing	9.7%	5.4%	4.3pp
		Services	87.8%	93.3%	5.5pp
	Company size	Manufacturing			
		Micro	1.5%	44.5%	43pp
		Small & medium	95.1%	52.4%	42.7pp

Country		Category	D&B Hoovers	Census Data	Gap
		Large	3.5%	3.1%	0.3pp
		Services and other sectors			
		Micro	2.7%	77.1%	74.4pp
		Small & medium	96.8%	21.5%	75.3pp
		Large	0.5%	1.4%	0.9pp
Viet Nam	Industry	Agriculture, forestry, fishing	1.7%	1.0%	0.7pp
		Manufacturing (heavy mfg.)	3.4%	1.9%	1.5pp
		Manufacturing (light mfg. 1 – consumer goods or consumables)	3.3%	2.1%	1.2pp
		Manufacturing (light mfg. 2 – others)	6.6%	12.2%	5.7pp
		Services	85.1%	82.8%	2.3pp
	Company size	Less than 5	40.3%	60.5%	20.2pp
		5–9	32.5%	18.5%	14pp
		10–49	22.5%	16.1%	6.4pp
		50–199	3.1%	3.5%	0.4pp
		Over 200	1.6%	1.4%	0.2pp

Mfg. = manufacturing, pp = percentage point.

Notes: The percentage of D&B Hoovers is calculated by dividing the number of companies in the corresponding segment by the total number of each country's companies in D&B Hoovers. The percentage of the census data is calculated by dividing the total number of companies in the corresponding segment by the total number of each country's companies provided by national statistics. 'Gap' represents the difference between D&B Hoovers and the census data corresponding segment.

Sources: Authors, based on D&B Hoovers (accessed 19 June 2023); OECD (2022), *Financing SMEs and Entrepreneurs 2022: An OECD Scoreboard*. Paris: Organisation for Economic Co-operation and Development – used for Indonesia; General Statistics Office of Viet Nam (2020), Number of acting enterprises having business outcomes as of 31 December 2020 by the size of employees and by kinds of economic activity and Size of employees. Retrieved from https://www.gso.gov.vn/en/px-web/?pxid=E0503&theme=Enterprise (accessed 19 June 2023); and Government of Malaysia, Department of Statistics (2017), Economic Census 2016 – Profile of Small and Medium Enterprises.

Highlights of the significant differences between D&B Hoovers and the national statistics for the three countries that should be noted to understand the difference in the data are listed below.

- Indonesia

  The gap is large in micro companies (88.4 percentage points) and medium-sized companies (41.1 percentage points). Micro companies are highly dominant, at 98.7%, in the official statistics. D&B Hoovers shows medium-sized companies at 41.1% and small companies at 35.4% as the two largest segments.

- Malaysia

  By industry, data from D&B Hoovers and national statistics show a similar pattern, with the highest gap of 5.5 percentage points in manufacturing. However, the gap between the data sets is significant by company size. In Malaysia, firm size is reported separately for the manufacturing sector and services and other sectors. Amongst these, a significant gap of about 75 percentage points was observed in segments other than large companies in services and other sectors.

- Viet Nam

  By industry, the services sectors are highly represented in both data sets, with a 2.3 percentage point gap. The other sectors are closer in range with each other. The gap was larger by company size, with the largest gap of 20.2 percentage points in the company segment with less than five people, which makes up the highest representation in both data sets.

Overall, in comparing D&B Hoovers data with the national statistics distribution of establishments in each country, the gap between percentage shares by industry, company size, and employee size shows considerable differences. For instance, Indonesia's micro companies have an 88.4 percentage point difference, while Malaysia's micro companies have a 74.4 percentage point difference and its small and medium-sized enterprises have a 75.3 percentage point difference. On the other hand, the gap in industry segmentation was relatively low, at less than 6 percentage points in both Malaysia and Viet Nam.

Looking at the total number of companies in D&B Hoovers and national statistics, Table A2 reports the differences amongst the nations.

Table A2. Comparison of the Number of Companies between D&B Hoovers and National Statistics

Country	D&B Hoovers	National Statistics
Indonesia	145,052 (7.4%)	64,199,606 (96.5%)
Malaysia	686,724 (35.2%)	1,482,579 (2.2%)
Viet Nam	1,116,622 (57.3%)	857,551 (1.3%)
Total	**1,948,398 (100.0%)**	**66,539,736 (100.0%)**

Notes: The percentage of each row is calculated by dividing the total number of companies of the corresponding countries by the total number of companies in the corresponding reports.
Sources: Authors, based on D&B Hoovers (accessed 19 June 2023); OECD (2022), *Financing SMEs and Entrepreneurs 2022: An OECD Scoreboard*. Paris: Organisation for Economic Co-operation and Development – used for Indonesia; General Statistics Office of Viet Nam, Number of acting enterprises as of annual 31st December by kinds of economic activity by economic activity and year. https://www.gso.gov.vn/en/px-web/?pxid=E0503&theme=Enterprise (modified 8 July 2023); and Companies Commission of Malaysia (n.d.), Company and Business Registered Statistics for 2023. https://www.ssm.com.my/Pages/Publication/Statistics/Companies%20and%20Business%20Registered/Companies%20and%20Business%20Registered%20Statistic%20for%202023/Company-and-Business-Registered-Statistic-2023.aspx (accessed 7 December 2023).

In addition to the difference within each proportion of segments in each country, significant discrepancies were observed between D&B Hoovers and government statistics regarding the ratio of the number of companies by country. To address this issue, consideration is given to weighting the analysis based on government statistics. However, looking at the balance of the number of companies based on national statistics, Indonesia has a reported total of about 64 million companies, which accounts for over 90% of the combined total of the three countries. As a result, cross-country analysis may be skewed towards the figures from Indonesia, raising concerns about the diminished significance of cross-country analysis.

Based on the observations, the weight back analysis using D&B Hoovers' data will only be conducted for industry type and location. Therefore, this section consistently segregates and calculates the segments for countries and company sizes.

2. Comparison of Digital Tool Implementation Rates in the Web and Phone Survey Data

To examine the presence of respondent bias in the web survey, a comparison was made of the adoption rate of each tool, focusing on small companies. The phone survey data are weighted back using the method presented in Chapter 4.

Table A3. Digital Tool Adoption Rates in Web and Phone Survey Data

Digital Tool	Indonesia			Malaysia			Viet Nam		
	Web	Phone	Gap	Web	Phone	Gap	Web	Phone	Gap
E-mail and/or chat applications (e.g. digital tools for text message)	88.2%	17.6%	70.6%	98.6%	45.5%	53.2%	87.9%	7.6%	80.3%
Mobile device	96.1%	73.1%	23.0%	85.3%	64.4%	20.9%	95.3%	100.0%	-4.7%
Computer	87.6%	96.1%	-8.6%	100.0%	62.1%	37.9%	95.3%	100.0%	-4.7%
Office suite (e.g. Microsoft Office, Google Workspace, iWork)	85.6%	25.3%	60.3%	98.6%	26.1%	72.5%	86.3%	52.9%	33.5%
Web meeting system	64.1%	0.2%	63.8%	82.0%	0.2%	81.8%	46.1%	0.1%	46.0%
Electronic data interchange – procurement	56.9%	45.0%	11.9%	49.3%	4.4%	45.0%	29.7%	28.0%	1.7%
E-payment – procurement	75.2%	50.9%	24.3%	92.2%	61.6%	30.6%	81.3%	76.2%	5.0%
Document or cargo delivery application	73.9%	36.7%	37.2%	39.2%	47.5%	-8.4%	23.0%	68.9%	-45.9%
Storage or inventory management system	75.8%	42.7%	33.1%	59.9%	17.5%	42.4%	19.5%	9.8%	9.7%
Electronic data interchange – sales & marketing	60.8%	25.1%	35.6%	67.3%	6.9%	60.4%	22.7%	23.3%	-0.6%
Social network service (e.g. Twitter,	84.3%	45.2%	39.1%	99.1%	29.9%	69.2%	85.2%	32.2%	53.0%

Digital Tool	Indonesia			Malaysia			Viet Nam		
	Web	Phone	Gap	Web	Phone	Gap	Web	Phone	Gap
Facebook, Instagram)									
E-commerce	78.4%	39.5%	38.9%	54.8%	1.0%	53.8%	49.6%	33.9%	15.7%
E-payment – sales & marketing	76.5%	36.4%	40.1%	91.2%	25.0%	66.3%	86.7%	32.9%	53.8%
Sales management and automation tool (e.g. Salesforce)	62.1%	26.6%	35.5%	62.7%	0.4%	62.3%	25.0%	2.7%	22.3%
Enterprise resource planning	53.6%	22.7%	30.9%	36.4%	0.2%	36.2%	10.2%	8.5%	1.6%
Cloud storage or centralised server	54.2%	12.7%	41.5%	43.3%	1.4%	41.9%	6.6%	2.9%	3.7%
Cybersecurity or protection software	43.8%	68.5%	-24.7%	52.1%	38.3%	13.7%	6.3%	58.2%	-51.9%
3D printing	37.9%	9.7%	28.2%	47.5%	4.0%	43.5%	2.0%	4.5%	-2.5%
Artificial intelligence	34.6%	1.1%	33.6%	47.5%	0.0%	47.5%	2.0%	0.1%	1.8%
Augmented reality	29.4%	0.0%	29.4%	24.4%	0.0%	24.4%	1.6%	0.1%	1.5%
Drone (e.g. farming management)	20.3%	0.7%	19.5%	35.9%	0.4%	35.5%	9.0%	0.0%	9.0%
Internet of things device	39.9%	5.1%	34.8%	63.6%	33.1%	30.5%	16.0%	2.2%	13.8%

Digital Tool	Indonesia			Malaysia			Viet Nam		
	Web	Phone	Gap	Web	Phone	Gap	Web	Phone	Gap
Radio frequency identification	34.6%	49.0%	-14.3%	43.8%	7.2%	36.5%	2.0%	47.7%	-45.8%
Robotics (e.g. factory robots, farming robots)	22.2%	2.6%	19.6%	9.2%	0.0%	9.2%	9.0%	0.8%	8.2%

Notes: The percentages for the 'web' and 'phone' columns are calculated by dividing the number of respondents of the corresponding segment and selecting the tool for any of the following stages: (i) already implemented (pre-pandemic period (before 2020)), (ii) already implemented (during pandemic restriction period (Jan 2020–Dec 2021)), and (iii) already implemented (post-pandemic restriction period (Jan 2022–now)), by the total number of respondents of the corresponding segment. The percentage for the 'Gap' column is calculated by subtracting the percentage of the 'Phone' column from the percentage of the 'Web' column of the corresponding segment. (Q23. Which stage of consideration is your company in for each of the tools? (1) Already implemented (pre-pandemic period (before 2020)), (2) Already implemented (during pandemic restriction period (Jan 2020–Dec 2021)), (3) Already implemented (post pandemic restriction period (Jan 2022–now)), (4) Plan to implement in the next three years (including pilot implementation), (5) No plan to implement within the next 3 years [MULTIPLE CHOICE: choose all options that apply])
Source: Authors.

Appendix 2

Questionnaire Item

1. Company Overview

Q1-1. Please provide us with your company's name.

Q1-2. Please provide us with your company's website. (if any)

Q2-1. Please provide your company's location. [SINGLE CHOICE: choose one option]

1. Brunei 2. Cambodia 3. Indonesia 4. Lao PDR 5. Malaysia 6. Myanmar 7. Philippines 8. Singapore 9. Thailand 10. Viet Nam

Q2-2. Please select the name of the municipality in which your company is located. [SINGLE CHOICE: choose one option]

Table A1.1. Please select the name of the municipality in which your company is located

Country	Municipality (Answer Option)
1. Brunei Darussalam	1. Bandar Seri Begawan
	2. Others
2. Cambodia	1. Phnom Penh
	2. Siem Reap
	3. Battambang
	4. Poipet
	5. Others
3. Indonesia	1. Ambon
	2. Balikpapan
	3. Bandar Lampung
	4. Bandung
	5. Banjarmasin
	6. Batam
	7. Bekasi
	8. Bengkulu

Country	Municipality (Answer Option)
	9. Bogor
	10. Cirebon
	11. Denpasar
	12. Depok
	13. Jakarta
	14. Jambi
	15. Jayapura
	16. Makassar (Ujung Pandang)
	17. Malang
	18. Manado
	19. Mataram
	20. Medan
	21. Padang
	22. Palembang
	23. Pekalongan
	24. Pekanbaru
	25. Pontianak
	26. Samarinda
	27. Semarang
	28. Sukabumi
	29. Surabaya
	30. Surakarta
	31. Tangerang
	32. Tasikmalaya
	33. Yogyakarta
	34. Others
4. Lao PDR	1. Vientiane
	2. Luang Prabang
	3. Pakse
	4. Thakhek
	5. Kaysone Phomvihane (Savannakhet)
	6. Others
5. Malaysia	1. Alor Setar
	2. Ipoh
	3. Johor Bahru
	4. Kota Bharu
	5. Kota Kinabalu
	6. Kuala Lumpur

Country	Municipality (Answer Option)
	7. Kuala Terengganu
	8. Kuantan
	9. Kuching
	10. Sandakan
	11. Seremban
	12. Others
6. Myanmar	1. Mandalay
	2. Nay Pyi Taw
	3. Yangon
	4. Others
7. Philippines	1. Angeles City
	2. Antipolo
	3. Bacolod
	4. Bacoor
	5. Baguio City
	6. Batangas City
	7. Binan
	8. Butuan
	9. Cabuyao
	10. Cagayan de Oro City
	11. Calamba
	12. Cebu City
	13. Cotabato
	14. Dasmarinas
	15. Davao City
	16. General Santos City
	17. General Trias
	18. Iligan
	19. Iloilo City
	20. Imus
	21. Lamitan
	22. Lapu-Lapu City
	23. Lipa City
	24. Mandaue City
	25. Metro Manila
	26. San Fernando
	27. San Jose del Monte
	28. San Pedro

Country	Municipality (Answer Option)
	29. Santa Rosa
	30. Tarlac
	31. Zamboanga City
	32. Others
8. Singapore	1. Singapore
9. Thailand	1. Buri Ram
	2. Chanthaburi
	3. Chiang Mai
	4. Chiang Rai
	5. Chon Buri
	6. Kalasin
	7. Khon-Kaen
	8. Krung Thep (Bangkok)
	9. Lampang
	10. Lamphun
	11. Lop Buri
	12. Nakhon Pathom
	13. Nakhon Ratchasima
	14. Nonthaburi
	15. Pathum Thani
	16. Phra Nakhon Si Ayutthaya
	17. Phuket
	18. Ratchaburi
	19. Rayong
	20. Roi Et
	21. Sakon Nakhon
	22. Samut Prakan
	23. Samut Sakhon
	24. Songkhla
	25. Suphan Buri
	26. Surat Thani
	27. Ubon Ratchathani
	28. Udon Thani
	29. Others
10. Viet Nam	1. Bien Hoa
	2. Can Tho
	3. Da Nang
	4. Ha Noi

Country	Municipality (Answer Option)
	5. Hai Phong
	6. Hue
	7. Long Xuyen
	8. Nha Trang
	9. Ho Chi Minh City
	10. Thu Dau Mot
	11. Vung Tau
	12. Others

Q2-3-1. If you have selected 'Indonesia' in Q2-1, please let us know about your company identifier. [OPTIONAL QUESTION: please skip this question if you are unsure about yours.]

1. Business Identification Number or Nomor Induk Berusaha 2. Tax Identification Number

Q2-3-2. If you have selected 'Malaysia' in Q2-1, please let us know about your company identifier. [OPTIONAL QUESTION: please skip this question if you are unsure about yours.]

1. Companies Commission of Malaysia Registration Number 2. Company Registration Number

Q2-3-3. If you have selected 'Viet Nam' in Q2-1, please let us know about your company identifier. [OPTIONAL QUESTION: please skip this question if you are unsure about yours.]

1. Enterprise Code Number 2. Tax Identification Number

Q3-1. Besides the country where your company is located, which country does your business operate in? [MULTIPLE CHOICE: choose all options that apply]

1. No overseas operation 2. Japan 3. China 4. Hong Kong 5. Taiwan 6. Republic of Korea 7. Brunei

8. Cambodia 9. Indonesia 10. Lao PDR 11. Malaysia 12. Myanmar 13. Philippines 14. Singapore 15. Thailand

16. Viet Nam 17. India 18. Other Asian countries 19.United States 20. Mexico

21. Europe (member states of the European Union) 22. Middle East

23. Central and South America 24. Others

Q3-2. If you have selected 'Others', please specify. (Please describe in any format.)

2. Digitalisation Status

Q4-1. Which industry is your company's main business? (If multiple options exist, please select the business with the largest percentage of sales.) [SINGLE CHOICE: choose one option]

1. Agriculture, Forestry, Fishing 2. Services
3. Manufacturing (Light Mfg. 1 - Consumer goods or consumables)
4. Manufacturing (Light Mfg. 2 - Others) 5. Manufacturing (Heavy Mfg.)
6. Construction 7. Mining

Q4-2. Please select the detail of your company's main business. [SINGLE CHOICE: choose one option]

Table A2.1. Please select the detail of your company's main business

Industry	Sub-industry (Answer Option)
1. Agriculture, Forestry, Fishing	-
2. Services	1. Transportation & Public Utilities
	2. Wholesale Trade
	3. Retail Trade
	4. Finance, Insurance, Real Estate
	5. Services (hotel, amusement & recreation, automotive repair, health, legal, etc.)
	6. Public Administration
3. Manufacturing (Light Mfg. 1 - Consumer goods or consumables)	1. Food and Kindred Products
	2. Tobacco Products
	3. Textile Mill Products

Industry	Sub-industry (Answer Option)
	4. Apparel and Other Finished Products Made From Fabrics and Similar Material
4. Manufacturing (Light Mfg. 2 - Others)	1. Lumber and Wood Products, Except Furniture
	2. Furniture and Fixtures
	3. Paper and Allied Products
	4. Printing, Publishing, and Allied Industries
	5. Rubber and Miscellaneous Plastics Products
	6. Leather and Leather Products
	7. Fabricated Metal Products, Except Machinery and Transportation Equipment
	8. Miscellaneous Manufacturing Industries (e.g. Jewellery, Silverware, Plated ware, musical instruments, dolls, toys, pens, pencils, etc.)
5. Manufacturing (Heavy Mfg.)	1. Chemicals and Allied Products
	2. Petroleum Refining and Related Industries
	3. Stone, Clay, Glass, and Concrete Products
	4. Primary Metal Industries
	5. Industrial and Commercial Machinery and Computer Equipment
	6. Electronic and Other Electrical Equipment and Components, Except Computer
	7. Transportation Equipment
	8. Measuring, Analyzing and Controlling Instruments; Photographic, Medical and Optical Goods; Watches and Clocks
6. Construction	-
7. Mining	-

Q5. How many regular employees does your company have? [SINGLE CHOICE: choose one option]

Note: 'Regular employees' means paid board members and employees whose period of employment contract exceeds 1 month, whether or not they are permanent full-time, part-time, fixed-term, contract, or other employees. 'Permanent full-time employees' are those categorized as permanent full-time employees among the company's regular employees.

1. 1-4 employees 2. 5-9 employees 3. 10-19 employees 4. 20-49 employees 5. 50-99 employees

6.100-199 employees 7. 200-299 employees 8. 300-399 employees 9. 400-499 employees 10. 500-599 employees

11. 600-699 employees 12. 700-799 employees 13. 800-899 employees 14. 900-999 employees

15. Over 1000 employees

Q6. Of the regular employees you answered in Q5, what percentage are involved in digital-related tasks? (e.g. those in charge of consideration and planning, implementation of digitalisation within the company including in-house engineers) [SINGLE CHOICE: choose one option]

1. None 2. Less than 5% (excluding 'none') 3. 5 - 9% 4. 10 – 19% 5. 20 – 29% 6. 30 – 39% 7. 40 – 49%

8. More than 50%

Q7. What is your company's ownership type? [SINGLE CHOICE: choose one option]

1. Private enterprise (more than half of the shares are held by the private sector)

2. State-owned company (more than half of the shares are held by the public sector)

Q8. Is your company the headquarters? [SINGLE CHOICE: choose one option]

Note: The headquarters is the office that performs the central functions of management, planning, and administration of the company.

1. Yes 2. No (your company is not the headquarter but others (e.g. subsidiary))

Q9. Is your company managed by the owner? [SINGLE CHOICE: choose one option]

Note: 'Owner' means the founder; one of the founders; child, grandchild, or relative of the founder; or a major individual shareholder. An 'owner-managed company' is managed or practically controlled by the owner as the president, chairperson, or adviser.

1. Yes 2. No

Q10-1. Please tell us whether your company is domestic or foreign-affiliated company. [SINGLE CHOICE: choose one option]

Note: A 'foreign-affiliated company' is one where foreign investors hold 10% or more of the company's shares.

1. Domestic company 2. Foreign-affiliated company

Q10-2. If you selected 'Foreign-affiliated company' in Q10-1, please select the country where the company with the largest company's share is located. [SINGLE CHOICE: choose one option]

1. Japan 2. China 3. Hong Kong 4. Taiwan 5. Republic of Korea 6. Brunei 7. Cambodia 8. Indonesia
9. Lao PDR 10. Malaysia 11. Myanmar 12. Philippines 13. Singapore 14. Thailand 15. Viet Nam 16. India
17. Other Asian countries 18. United States 19. Mexico 20. Europe (member states of the European Union)
21. Middle East 22. Central and South America 23. Others

Q11. Does your company have separate base for sales, production, and procurement apart from your company's site? [SINGLE CHOICE: choose one option]

Table A2.2. Does your company have separate base for sales, production, and procurement apart from your company's site?

Category	Answer Option
1. Sales	1. Yes
	2. No
2. Production	1. Yes
	2. No
3. Procurement	1. Yes
	2. No

Q12. Which segment is your customer? [MULTIPLE CHOICE: choose all options that apply]

Note: 'MSMEs' stands for a company with approximately less than 200 employees from your subjective viewpoint. 'Large companies' stands for a company with approximately equal to or more than 200 employees from your subjective viewpoint.

1. Consumer (individual or household consumer)

2. Manufacturing MSMEs (e.g. your company provides parts or components to a small-scale assembly company)

3. Manufacturing large companies (e.g. your company provides parts or components to a large-scale assembly company)

4. Non-manufacturing MSMEs (e.g. your company provides final goods to a small-scale wholesale or retail company)

5. Non-manufacturing large companies (e.g. your company provides final goods to a large-scale wholesale or retail company)

6. Public institutions (including central or local governments)

Q13-1. Does your company have direct customers that include multinational companies, including joint venture companies where at least one owner is a foreign company? [SINGLE CHOICE: choose one option]

1. Yes 2. No

Q13-2. If you selected 'Yes' in Q13-1, please tell us where your direct customers are based. [MULTIPLE CHOICE: choose all options that apply]

1. Domestic 2. Overseas

Q13-3. If you selected 'Overseas' in Q13-2, please specify the countries where your direct customers are based. [MULTIPLE CHOICE: choose all options that apply]

1. Japan 2. China 3. Hong Kong 4. Taiwan 5. Republic of Korea 6. Brunei 7. Cambodia 8. Indonesia

9. Lao PDR 10. Malaysia 11. Myanmar 12. Philippines 13. Singapore 14. Thailand 15. Viet Nam 16. India 17. Other Asian countries 18. United States 19. Mexico 20. Europe (member states of the European Union) 21. Middle East 22. Central and South America 23. Others

Q13-4. If you have selected 'Others', please specify. (Please describe in any format.)

Q14. Does your company have indirect customers that include multinational companies. (e.g. your company is a secondary supplier to multinational companies)? [SINGLE CHOICE: choose one option]

1. Yes 2. No 3. Not sure

Q15-1. Does your company have direct suppliers that include multinational companies, including joint venture companies where at least one owner is a foreign company? [SINGLE CHOICE: choose one option]

1. Yes 2. No

Q15-2. If you selected 'Yes' in Q15-1, please tell us where your direct suppliers are based. [MULTIPLE CHOICE: choose all options that apply]

1. Domestic 2. Overseas

Q15-3. If you selected 'Overseas' in Q15-2, please specify the countries where your direct suppliers are based. [MULTIPLE CHOICE: choose all options that apply]

1. Japan 2. China 3. Hong Kong 4. Taiwan 5. Republic of Korea 6. Brunei 7. Cambodia 8. Indonesia 9. Lao PDR 10. Malaysia 11. Myanmar 12. Philippines 13. Singapore 14. Thailand 15. Viet Nam 16. India 17. Other Asian countries 18. United States 19. Mexico 20. Europe (member states of the European Union)

21. Middle East 22. Central and South America 23. Others

Q15-4. If you have selected 'Others', please specify (please describe in any format).

Q16. Does your company have indirect suppliers that include multinational companies (e.g. your company is a secondary customer to multinational companies)? [SINGLE CHOICE: choose one option]

1. Yes 2. No 3. Not sure

Q17. Which year was your company established? (Please answer your company's information, not the parent company.) [SINGLE CHOICE: choose one option]

1. Before 1900 2. 1900 3. 1901 4. 1902 5. 1903 6. 1904 7. 1905 8. 1906 9. 1907 10. 1908 11. 1909 12. 1910

13. 1911 14. 1912 15. 1913 16. 1914 17. 1915 18. 1916 19. 1917 20. 1918 21. 1919 22. 1920 23. 1921 24. 1922

25. 1923 26. 1924 27. 1925 28. 1926 29. 1927 30. 1928 31. 1929 32. 1930 33. 1931 34. 1932 35. 1933 36. 1934

37. 1935 38. 1936 39. 1937 40. 1938 41. 1939 42. 1940 43. 1941 44. 1942 45. 1943 46. 1944 47. 1945 48. 1946

49. 1947 50. 1948 51. 1949 52. 1950 53. 1951 54. 1952 55. 1953 56. 1954 57. 1955 58. 1956 59. 1957

60. 1958 61. 1959 62. 1960 63. 1961 64. 1962 65. 1963 66. 1964 67. 1965 68. 1966 69. 1967 70. 1968 71. 1969

72. 1970 73. 1971 74. 1972 75. 1973 76. 1974 77. 1975 78. 1976 79. 1977 80. 1978 81. 1979 82. 1980 83. 1981

84. 1982 85. 1983 86. 1984 87. 1985 88. 1986 89. 1987 90. 1988 91. 1989 92. 1990 93. 1991 94. 1992 95. 1993

96. 1994 97. 1995 98. 1996 99. 1997 100. 1998 101. 1999 102. 2000 103. 2001 104. 2002 105. 2003 106. 2004

107. 2005 108. 2006 109. 2007 110. 2008 111. 2009 112. 2010 113. 2011 114. 2012 115. 2013 116. 2014 117. 2015

118. 2016 119. 2017 120. 2018 121. 2019 122. 2020 123. 2021 124. 2022 125. 2023

Q18. What age group does your company's ultimate decision maker belong to? [SINGLE CHOICE: choose one option]

Examples of ultimate decision makers: owner, CEO, founder, etc.

1. Equal to or less than 25 years old 2. 26 - 41 years old 3. 42 - 57 years old 4. 58 -76 years old

5. 77 years old and over

Q19. What is the gender of your company's ultimate decision maker? [SINGLE CHOICE: choose one option]

Answer about the same person as in Q18 examples of ultimate decision makers: owner, CEO, founder, etc.

1. Male 2. Female 3. Rather not specify

Q20. What is the highest level of education of your company's ultimate decision maker? [SINGLE CHOICE: choose one option]

Answer about the same person as in Q18 examples of ultimate decision makers: owner, CEO, founder, etc.

1. Never been educated in an educational institution 2. Elementary school or earlier 3. Middle school

4. High school 5. Vocational school 6. Post-secondary education institution (e.g. university, college)

7. Graduate school or higher (e.g. master, doctoral, post-doctoral)

Q21. What is your company's current sales value (in 2022) compared to the pre-pandemic level (in 2019)? [SINGLE CHOICE: choose one option]

1. More than the pre-pandemic level 2. Almost the same level (approximately in the range from -1% to +1%)

3. Less than the pre-pandemic level 4. Company did not exist before pandemic

Q22. What is your company's profit margin ratio (e.g. operating profit divided by total sales) (in 2022) compared to the pre-pandemic level (in 2019)? [SINGLE CHOICE: choose one option]

1. More than the pre-pandemic level 2. Almost the same level (approximately in the range from -1% to +1%)

3. Less than the pre-pandemic level 4. Company did not exist before pandemic

Q23. Which stage of consideration is your company in for each of the tools? [SINGLE CHOICE: choose one option]

The categories and tools asked in this question are as follows:

1. Intra-company management: E-mail and/or chat applications (i.e. digital tools for text message), Mobile device, Computer, Office suite (e.g. Microsoft Office, Google Workspace, iWork), Web meeting system

2. Procurement: Electronic data interchange (EDI), E-payment

3. Logistics: Document or cargo delivery application, Storage or inventory management system

4. Sales & Marketing: Electronic data interchange (EDI), Social network service (e.g. Twitter, Facebook, Instagram), E-commerce, E-payment, Sales management and automation tool (e.g. salesforce)

5. Overall Company Operation: Enterprise resource planning (ERP), Cloud storage or centralized server, Cybersecurity or protection software

6. Others: 3D printing, Artificial intelligence (AI), Augmented reality (AR), Drone (e.g. farming management), Internet-of-Thing (IoT) device, Radio frequency identification (RFID), Robotics (e.g. factory robots, farming robots)

1. Already implemented (pre-pandemic period (before 2020))
2. Already implemented (during pandemic restriction period (Jan 2020-Dec 2021))
3. Already implemented (post pandemic restriction period (Jan 2022 - now))
4. Plan to implement in the next three years (including pilot implementation)
5. No plan to implement within the next three years

Q24-1. What are the major objectives of digital tools adoption? [MULTIPLE CHOICE: choose all options that apply]

Note: If you have no plan to implement any digital tools within the next three years, please still answer this question based on your assumption.

1. To increase profitability through sales increase 2. To increase profitability through cost reduction
3. To ensure business continuity 4. To address labour shortage
5. To make management decisions in a timely manner based on the data collected
6. To respond to customer requirements (e.g. customer's risk management policy regarding their business partners)
7. To respond to supplier requirements (e.g. supplier's risk management policy regarding their business partners)
8. Others

Q24-2. If you have selected 'Others', please specify. (Please describe in any format.)

Q25. Please answer the following question regarding the tools selected as any of 'already implemented' in Q23*:

* Any answer option of 'already implemented (pre-pandemic period (before 2020))', 'already implemented (during pandemic restriction period (Jan 2020-Dec 2021))', or 'already implemented (post pandemic restriction period (Jan 2022 - now))'.

How successful has the implementation of the corresponding digital tools been in meeting implementation objectives and generating benefits?

If you have experienced multiple cases of implementation, please answer based on your average experience. [SINGLE CHOICE: choose one option]

1. Achieved the objectives of the implementation and produced more benefits than expected
2. Achieved the objectives of the implementation and produced the expected extent of benefits
3. Achieved part of the objectives of the implementation and produced some of the benefits
4. Did not achieve the purpose of implementation and did not produce any benefits at all
5. As the digital tools have recently started operation, it is premature to assess their effectiveness

Q26. Please answer the following question regarding the tools selected as 'without implementation plan within the next three years' in Q23:

Which factor(s) do you consider important when adopting digital tools? [MULTIPLE CHOICE: choose all options that apply]

Table A2.3. Which factor(s) do you consider important when adopting digital tools?

Category	Answer Option
1. Price	1. If digital tools have subscription or reasonable profit-sharing models
	2. If digital tools have price package options that can be customized to meet companies' needs
2. Function or Features	1. If digital tools are available in the local language
	2. If digital tools conform the business practices of the country
3. Service	1. If digital tools have a support program or team to help diagnose the business issues and provide solution recommendation
	2. If digital tools have a support program or team in-country
	3. If digital tools have a support program or team provided in the local language
4. Others	1. Please specify (please describe in any format).

3. Difficulties and Concerns

Q27. Please answer the following questions based on your past implementation or current plans to implement IT tools. If none of these applies to you, please answer the questions assuming you will implement IT tools.

What are the causes of difficulties in information gathering phase? [MULTIPLE CHOICE: choose all options that apply]

Note: Information gathering phase involves identifying company issues and obtain knowledge or information about digital tools.

The categories asked in this question are as follows (same as the categories in Q23):

1. Intra-company management

2. Procurement

3. Logistics

4. Sales & Marketing

5. Overall Company Operation

6. Others

Table A3.1. What are the causes of difficulties in information gathering phase?

Category	Answer option
1. Internal factors	1. Inability to diagnose the company's issue that may require digital tools
	2. Not knowing where to find the information or whom to consult with
	3. Language barriers to search and understand the available information
	4. Limited IT knowledge due to a lack of internal IT human resources to understand the information
2. External factors	1. Limited information in local language
	2. No supporting organizations nearby
3. Others	1. Please specify (please describe in any format).
4. Not sure because of no experience nor plan to adopt the corresponding digital technologies	

Q28. What are the causes of difficulties in adoption phase? [MULTIPLE CHOICE: choose all options that apply]

Note: Adoption phase involves planning the implementation, including solutions or tools selection, budget allocation, and users training.

The categories asked in this question are as follows (same as the categories in Q23):

1. Intra-company management

2. Procurement

3. Logistics

4. Sales & Marketing

5. Overall Company Operation

6. Others

Table A3.2. What are the causes of difficulties in adoption phase?

Category	Answer Option
1. Internal factors	1. Inability to identify the tools that match with company's issues or needs
	2. Limited financial resources to invest in digital tools
	3. Lack of IT human resources who can plan and implement digital tools
2. External factors	4. Limited or no solution that can meet the business needs
	5. No support from the solution providers available in the country or area
	6. Limited source of fund
3. Others	7. Please specify (please describe in any format).
4. Not sure because of no experience nor plan to adopt the corresponding digital technologies	

Q29. What are the causes of difficulties in post adoption phase? [MULTIPLE CHOICE: choose all options that apply]

Note: Post adoption phase involves deploying and using the tools in actual business operation.

The categories asked in this question are as follows (same as the categories in Q23):

1. Intra-company management

2. Procurement

3. Logistics

4. Sales & Marketing

5. Overall Company Operation

6. Others

Table A3.3. What are the causes of difficulties in post adoption phase?

Category	Answer Option
1. Internal factors	1. Employees are not eager to onboard the adoption as they find digital tools confusing and they increase the work process
	2. Employees' inability to use digital tools due to limited skills
	3. Inability to integrate new digital tools with the ones already implemented
	4. Lack of budget to upgrade digital tools so the solutions are outdated or some features cannot be used
2. External factors	5. No customer support available in the country or area
	6. Internet instability that affects consistent use
3. Others	7. Please specify (please describe in any format).
4. Not sure because of no experience nor plan to adopt the corresponding digital technologies	

4. Needs for Support

Q30. Which support have you ever received in digital tool adoption? [MULTIPLE CHOICE: choose all options that apply]

1. Support from the public sector (government or public institution)
2. Support from the private sector (industry association) (e.g. private manufacturing industry association that manufacturing companies can belong to)
3. Support from the private sector (multinational company)
4. Support from the private sector (local company)
5. Never received support

Q31. If you selected 'support from the public sector (government or public institution)' in Q30, what support have you received? [MULTIPLE CHOICE: choose all options that apply]

Table A4.1. If you selected 'support from the public sector (government or public institution)' in Q30, what support have you received?

Category	Answer Option
1. Knowledge or information provision	1. IT skills seminar or training
	2. Consultation on the suitable solutions
	3. Business matching with solution providers or providing the list of them with companies
	4. Information on the source of funding for digital tool investment
2. Financial support	1. Grant or subsidy for digital tools investment
	2. Low-interest loan
	3. Incentive (e.g. tax reduction for digital tool investment or adoption)
3. Others	1. Please specify (please describe in any format).

Q32. Did the support you received as answered in Q31 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option]

Table A4.2. Did the support you received as answered in Q31 meet your expectations in helping you implement digital tools?

Category		Answer Option
1. Knowledge or information provision	1. IT skills seminar or training	1. Did not meet expectations
		2. Met expectations
		3. Exceeded expectations
	2. Consultation on the suitable solutions	1. Did not meet expectations
		2. Met expectations
		3. Exceeded expectations
	3. Business matching with solution providers or providing the list of them with companies	1. Did not meet expectations
		2. Met expectations
		3. Exceeded expectations
	4. Information on the source of funding for digital tool investment	1. Did not meet expectations
		2. Met expectations

Category		Answer Option
		3. Exceeded expectations
2. Financial support	1. Grant or subsidy for digital tools investment	1. Did not meet expectations
		2. Met expectations
		3. Exceeded expectations
	2. Low-interest loan	1. Did not meet expectations
		2. Met expectations
		3. Exceeded expectations
	3. Incentive (e.g. tax reduction for digital tool investment or adoption)	1. Did not meet expectations
		2. Met expectations
		3. Exceeded expectations
3. Others		1. Did not meet expectations
		2. Met expectations
		3. Exceeded expectations

Q33. Were you able to adopt the tools as a result of the support? [SINGLE CHOICE: choose one option]

1. Yes 2. No

Q34. What do you think are the reasons why you could not proceed to implementation after receiving the support? [MULTIPLE CHOICE: choose all options that apply]

Table A4.3. What do you think are the reasons why you could not proceed to implementation after receiving the support?

Category	Answer Option
1. Factors from your company's side	1. Even with the understanding of the benefit, no internal human resource available to plan the implementation
	2. Inability to get the employees onboard the implementation

Category	Answer Option
	3. Inability to find the solution providers that match the needs
	4. Lack of budget to adopt digital tools
2. Factors from government's side	1. The adoption benefit is unclear
	2. The content of the seminar or training is too difficult to understand
	3. Lack of the solutions proposed by the government that match the company's needs
	4. Slow response from the government agencies when companies have questions or queries
3. Others	1. Please specify (please describe in any format)

Q35. If you selected any of 'support from the private sector' in Q30, what support have you received? [MULTIPLE CHOICE: choose all options that apply]

*Any answer option of 'support from the private sector (industry association)', 'support from the private sector (multinational company)', or 'support from the private sector (local company)'.

Table A4.4. If you selected any of 'support from the private sector' in Q30, what support have you received?

Category	Answer Option
1. Knowledge or information provision	1. IT skills seminar or training
	2. Consultation on the suitable solutions
	3. Business matching with solution providers or providing the list of them with companies
	4. Information on the source of funding for digital tool investment
2. Financial support	1. Grant or subsidy for digital tools investment
	2. Low-interest loan
	3. Discounts or any relevant financial assistance programme for adopting digital tools
3. Others	1 Please specify (please describe in any format).

Q36. Did the support you received as answered in Q35 meet your expectations in helping you implement digital tools? [SINGLE CHOICE: choose one option]

Table A4.5: Did the support you received as answered in Q35 meet your expectations in helping you implement digital tools?

Category		Answer option
1. Knowledge or information provision	1. IT skills seminar or training	1. Did not meet expectations
		2. Met expectations
		3. Exceeded expectations
	2. Consultation on the suitable solutions	1. Did not meet expectations
		2. Met expectations
		3. Exceeded expectations
	3. Business matching with solution providers or providing the list of them with companies	1. Did not meet expectations
		2. Met expectations
		3. Exceeded expectations
	4. Information on the source of funding for digital tool investment	1. Did not meet expectations
		2. Met expectations
		3. Exceeded expectations
2. Financial support	1. Grant or subsidy for digital tools investment	1. Did not meet expectations
		2. Met expectations
		3. Exceeded expectations
	2. Low-interest loan	1. Did not meet expectations
		2. Met expectations
		3. Exceeded expectations
	3. Discounts or any relevant financial assistance programme for adopting digital tools	1. Did not meet expectations
		2. Met expectations
		3. Exceeded expectations
3. Others		1. Did not meet expectations
		2. Met expectations
		3. Exceeded expectations

Q37. Were you able to adopt the tools as a result of the support? [SINGLE CHOICE: choose one option]

1. Yes 2. No

Q38. What do you think are the reasons why you could not proceed to implementation after receiving the support? [MULTIPLE CHOICE: choose all options that apply]

Table A4.6. What do you think are the reasons why you could not proceed to implementation after receiving the support?

Category	Answer Option
1. Factors from your company's side	1. Even with the understanding of the benefit, no internal human resource available to plan the implementation
	2. Inability to get the employees onboard the implementation
	3. Inability to find the solution providers that match the needs
	4. Lack of budget to adopt digital tools
2. Factors from private support providers side (e.g. industry associations or/and other companies, including multinational and domestic companies)	1. The adoption benefit is unclear
	2. The content of the seminar or training is too difficult to understand
	3. Lack of the solutions proposed by the private sector that match the company's needs
	4. Slow response from the support organisations from the private sector when companies have questions or queries (e.g. industry association, multinational company, or local company)
3. Others	1. Please specify (please describe in any format).

Q39. Which issues of ASEAN companies do you think the government should emphasize in order to encourage digital adoption? [MULTIPLE CHOICE: choose all options that apply]

Table A4.7. Which issues of ASEAN companies do you think the government should emphasize in order to encourage digital adoption?

Category	Answer Option
1. Companies' Internal Factors	1. Limited human resources with business knowledge to diagnose and identify company's issue that may be resolved by digital tools
	2. Limited human resources with IT knowledge or skills to plan and implement digital tools
	3. Limited human resources to design the operation flow after digital transformation or to integrate digital tools into current operation
	4. Limited fund to invest in digital tools
	5. Inability to communicate the benefit and get employees onboard
	6. Absence of supporting tools to connect or integrate with digital tools
2. Companies' External Factors	1. Low awareness of adoption benefit due to low usage from customer side
	2. Operational inconvenience caused by unstandardized government e-service
	3. Difficulties in finding suitable solutions due to limited options for localised solutions
	4. Difficulties in finding affordable solutions
	5. Internet connection instability that affects business continuity
	6. Cybersecurity concerns
	7. Support programs from private sector support providers do not match business needs
	8. Lack of opportunities to learn about support programs of private sector support providers
3. Others	1. Please specify (please describe in any format)