Asia-Pacific
Economic Cooperation

Guidebook on SME Embracing Digital Transformation

APEC Small and Medium Enterprises Working Group
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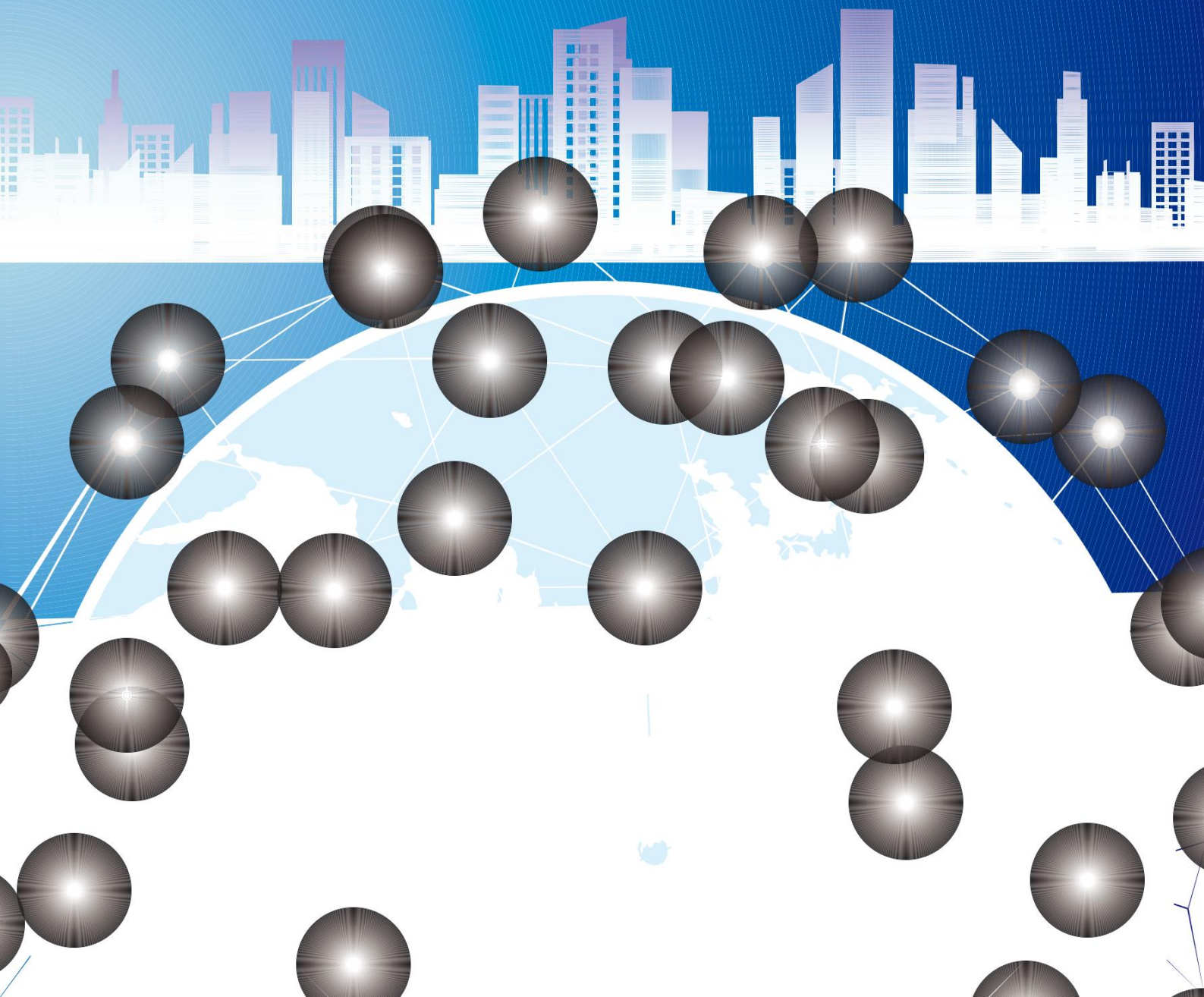

FOREWORD

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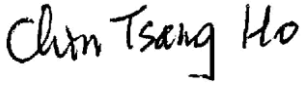
Digital transformation is well recognized as a key element for future developments of small and medium enterprises to date. Referring to this trend, Chinese Taipei has proposed and implemented the 4-year Online-to-Offline (O2O) Initiatives with support of the APEC Small and Medium Enterprises Working Group (SMEWG) from 2016 to 2019.

For the last four years, Chinese Taipei has held 27 events which attracted over 30,000 attendees as platforms for SMEs to interact, exchange ideas and share information with stakeholders in relation to digital transformation. Moreover, to strengthen efforts made for capacity building, Chinese Taipei has released several publications to foster knowledge accumulation and dissemination, including the "APEC Guidebook on SME Digital Resilience", "Probing Digital SME Entrepreneurship for Future Growth
— Best O2O Practices in the Asia Pacific", and "Feature Story: APEC SMEs Adopting Digital Transformation and O2O Application".

As 2019 is to be the concluding year for the aforementioned APEC O2O initiatives, the release of the "APEC Guidebook on SME Embracing Digital Transformation", which covers issues related to strategies for enterprise digitalization, digital experiences of customers, and digital business models, is expected not only to provide the latest developments of the digital economy, but also to offer in-depth analysis on key factors of the SMEs digital transformation through public-private collaboration.

We are convinced that this guidebook will be a valuable reference during SME' s digital transformation. We also would like to express our gratitude to the APEC SMEWG for their firm friendship and support over years. Chinese Taipei is committed to contributing to the field of digital transformation and business innovation in cooperation with the working group and APEC member economies to pave the way towards inclusive and sustainable growth in the APEC region.

Yours sincerely,



Dr. Chin-Tsang Ho
Director General
Small and Medium Enterprise Administration
Ministry of Economic Affairs

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DIGITAL ECONOMY AND O2O TRENDS

The emergence of the digital economy, based on the information and communication technology (ICT) that evolves with each passing day, is changing the structure and outlook of the global economy at a fast pace. Despite varying paces of digital transformation among economies, it is beyond doubt that the global economy, under the waves of digitalization, will face rapid and drastic changes.

The World Economic Forum predicts that by 2022, 60% of the global GDP will come from the digital economy, an indicator of the tremendous impact the digital economy will have on the future of the global economy. However, half of the global population is not involved in the development of the digital economy. G20' s Global Infrastructure Hub also estimates that by 2040, funding gap for information and communication technology infrastructure will approach 1 trillion US dollars. Therefore, there is still much room for growth and progress in the digital economy.

Digital economy' s evolution is closely tied to the development of many cutting-edge technologies, including the block chain, Internet of Things (IoT), 5G, cloud computing, automation & robots, AI, data science and 3D printing. These technologies are driving the digital economy and the innovative products and services based on these technologies are continuously disrupting existing industrial structures and business models. Therefore, businesses under this mega trend must have sufficient insight and wisdom while reconsidering how to create, allocate and obtain value in this brand new environment. On the other hand, the foundation of the digital economy has shown rapid and tremendous improvement in recent years. For hardware, the IC industry continues to improve its process scaling, which, in addition to continuing the Moore' s Law, also guarantees that the new generation' s ICT hardware can support and even drive the development of digital economy and cutting-edge technologies. Data applications, which are the locomotive for the digital economy, have also shown exponential growth. Statistics by UNCTAD have shown a rapid growth in data flow over the World Wide Web even though the digital economy is still in its early phase. The data flow is expected to reach 150,700 GB per second by 2022, more than triple compared to the

46,600 GB per second in 2017. The massive amount of data continuously produced by the applications of various new IC technologies will fuel the development of the digital economy, which is driven by data analysis.

In this new era of digital economy, smart devices and the Internet have become highly available, blurring the line between the physical world and the online world. Therefore "Online to Offline (O2O)" is the next blue ocean for both physical and online businesses.

Essentially with O2O, online marketing/purchases can boost the business for offline/brick-and-motar stores, mostly in industries that require a physical location to provide services, such as dining, cosmetology, entertainment and performance. By providing product information, discount and online reservation for services, the offline/brick-and-motar store is introduced to consumers online, which will encourage offline purchases. Facing the trend of O2O marketing, physical businesses should utilize the data collection and analysis from O2O to optimize their business models and better meet consumers' needs. For online businesses, they should utilize the O2O' s consumption patterns to accumulate data, create traffic and enhance customer stickiness. For consumers, O2O can effectively provide them with comprehensive product and service information, allowing them to compare the features or prices of similar products to save time while meeting their needs.

In recent years, O2O has become more popular, thanks to the popularity of mobile commerce, sharing economy, IoT and other innovative technologies and business models. Meanwhile, the definition of "Online to Offline" is also gradually changing. Due to changes for the entire e-commerce and consumer behavior, O2O is no longer limited to "Online to Offline" and instead we start seeing "Offline to Online". With "Offline to Online", consumers first experience the products via physical channels or enjoy services and learn about the brand story before making purchases online with their mobile devices or on e-commerce platforms. QR code ads, which have been springing up like mushrooms recently, use physical QR codes to lead consumers to make purchases online. These are both examples of the reversed O2O. In the future, there will be no distinction between regular and reversed O2O. Instead, O2O will focus on the diverse integrations of online and offline businesses, which, combined with interdisciplinary smart marketing (based on new technologies and data analysis), will attract more consumers.

The future development of the digital economy and O2O will have everything to do with the growth of the global economy. It will also bring technology closer to every aspect of human life and create more values while doing so. They will also have significant impact on the world economy' s structure. Individuals and businesses alike have to, facing the changes from digital economy, adjust their paces and strategies to be able to land on their feet and achieve sustainability in the new digital era.

CHAPTER 2.

KEYS IN DIGITAL TRANSFORMATION FOR SMEs

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(1) SME Digital Operation Strategy Analysis

a. Trends in SME Digital Transformation

Recently, the global macro economy has frequently shown unstable fluctuations due to trade protectionism and geopolitical factors, resulting in drastic changes to the industry environment. Under such circumstances and faced with global competition, it is a common trend for SMEs worldwide to implement digital transformation to enhance their strengths and added value. SMEs will work towards becoming high-value businesses by adopting digital technologies and smart manufacturing, making them the cornerstone for economic output and job creation in each economy.

SMEs are the main driver for the economic growth and innovation in APEC economies. The latest statistics from APEC' s SMEWG show that 97% of the businesses in APEC economies are SMEs, with their employees accounting more than half of the total workforce. It is clear that SMEs contribute significantly to the GDP growth in the APEC region. Among APEC economies, SMEs contribute from 20% to 50% of the local GDP and approximately 35% of the total export. Global digital transformation is still in the early stage. For APEC economies, prompting SMEs to implement digital transformation will not only maintain their sustainable development, but also ensure that all APEC economies will have an economy that is inclusive and continues to grow.

Judging from the current trend for SME digital transformation, both the manufacturing and service industries begin their transformation with data collection. The data will be analyzed before businesses adjust their operation strategy and improve their business model accordingly, a common first step for digital transformation.

For the service industry, digital transformation mainly involves the optimization of customer interaction and ad serving based on the analysis of the data collected. The application of AI in this area is adopted widely in the service industry, mainly in industries such as 3C, communication, finance, insurance, tourism and other service-oriented

industries with a mass amount of user data. In addition, retail, dining, education and other industries will gradually adopt AI as well. AI is now considered a technology that can enhance a business' data analysis and reduce labor costs. It is also very effective at targeting a specific user group and analyzing customer preferences and behavior.

For the manufacturing industry, these companies mainly use digital technologies, such as the interconnectivity of IoT, big data-based prediction, automation and other key technologies, to improve their manufacturing process. Digital transformation can help, from conserving manpower, raw material and energy during the manufacturing process to improving quality, production monitoring, improving yield, predicting customer needs for distribution channel inventory and marketing adjustment, customer service and feedback for product design and material selections. Therefore, the implementation of digital transformation can not only improve manufacturing efficiency but also helps companies better need their customers' needs, which will lead to better productivity. For example, companies can fetch real time production numbers of the machines via IoT, which, after being analyzed by AI, can be used to optimize machine settings, conduct preventive maintenance to improve productivity and reduce production risks.

In the past, when allocating resources, SMEs would first allocate resources to improve the manufacturing process and boost manufacturing efficiency. But in this new era of digital economy, the globalization of the production chain has led to industrial shifts, making it challenging for SMEs to maintain a profit by the traditional method of cost control. Instead, innovation and research have become the key factors in value creation in the digital economy era. New business models such as m-commerce, sharing economy, Internet of Things, Nextgen innovation were created in response. Therefore, in addition to the quality control for products and at manufacturing facilities, utilizing new technologies to better analyze and understand customers is equally important to businesses. Digital transformation, fueled by the applications of digital technology, can improve both manufacturing and customer analysis, bringing a comprehensive and balanced boost for SMEs. However, SMEs should also realize that the technologies in digital transformation are simply production tools, not the ultimate goals. In the process of digital transformation, companies

should avoid replacing their workforce with technology excessively and instead seek to boost worker productivity.

b. SMEs' Challenges and Strategy for Digital Transformation

Digital transformation plays a vital role for SMEs' future, but these enterprises certainly will face hurdles while implementing digital transformation. Agile size, flexibility and the ability to respond swiftly are SMEs' advantages. In the current era where the industrial environment changes with each passing second, SMEs' future growth and even survival will depend on their understanding of their advantages/disadvantages, the ability to respond quickly to seize the latest trends and opportunities and finding the appropriate strategy for digital transformation despite all the hurdles.

There remain many challenges as SMEs attempt to adopt the new technologies and innovative applications from digital transformation. In terms of resources, the biggest disadvantage facing SMEs is their lack of resources in the competition for digital transformation. Business innovation and digital transformation both require resources and compared to large enterprises, which have more resources to put into digital transformation, SMEs have already fallen behind when it comes to digitalization. In terms of technologies, since digital transformation is still in its early stage, the industry still needs to accumulate more experience with the newly emerging technologies. Therefore, there certainly will be challenges in adopting and adapting to new technologies. In terms of business operation, if a SME is not open to an innovative culture, new business models and a new information system structure, it may be too conservative or hesitant when it comes to investing in information and communication technologies. In addition, SMEs may also face other challenges in digital transformation, including the manpower required for digital transformation, digital innovation in product and service planning and the adaptation to the constantly changing regulations.

There are two types of barriers facing SMEs when it comes to digital transformation: service and technology. Regarding service, in addition to the aforementioned understanding of customers and improving customer stickiness by accurately accessing customers' needs with data collection and analysis, increasing investment to information and communication technologies is also a key to success in the

era of digital economy. In this global market, uninterrupted service and communication play such a crucial role in entering the global market. Therefore, the current generation of SMEs needs to operate 24/7, 7 days a week and digital transformation can help them achieve that. Mindset-wise, in addition to enhancing employees' training in digitalization, SMEs should adopt a more flexible business model, such as adopting "Offline to Online" (the opposite of the conventional "Online to Offline" model). Technology-wise, SMEs need to understand how ICT can enhance their competitive advantages and view technology as a decisive factor when it comes to gaining an edge over your competition instead of seeing it as an inevitable cost or even risk. SMEs need to have a vision for technology and keep a close eye on new technologies' potential impact on the industry. They need to be prepared for new technologies, take advantage of the development of digital economy and enter the supply chain for cutting-edge technologies. The last thing they want to do is limiting ICT in the area of information security.

Data is the most important fuel for digital transformation. If a SME can consistently obtain its operation data and make digital transformation decisions accordingly, it is well on its way for successful digital transformation. Since the investment in staff, skills, infrastructure and technologies requires a certain level of funding, most large corporations are already one step ahead in the development of big data and digital technologies. But the cost for cloud computing and other web-based technologies has been on a decline in recent years, making it a feasible route for SMEs to implement digital transformation. For example, e-commerce has proved to be an effective gateway for SMEs to enter the global value chain. It has increased their communications with their overseas clients, enabling them to promote their products and services more efficiently and handle their payment and customer service. E-commerce has expanded SMEs' influence in the global market. Cross-border e-commerce is expected to continue to grow and play an important role in the era of digital economy.

In a rapidly digitalized world, digital transformation will change each element in an industrial chain, for both large corporations and SMEs. SMEs will continue to evolve and adapt to maintain and even improve their competitive edge. With a lack of knowledge and experience, SMEs with a conservative business culture or limited resources may not

be able to utilize new technologies to implement digital transformation effectively. If this imbalance continues, the gap in productivity for businesses and even industries will only widen and the big ones will only get bigger. Not only will this prevent a balanced development of the industrial structure, it will not contribute to a fair competitive environment or the continuous and inclusive growth of an economy.

(2) Digital Business Models and Customer Experience

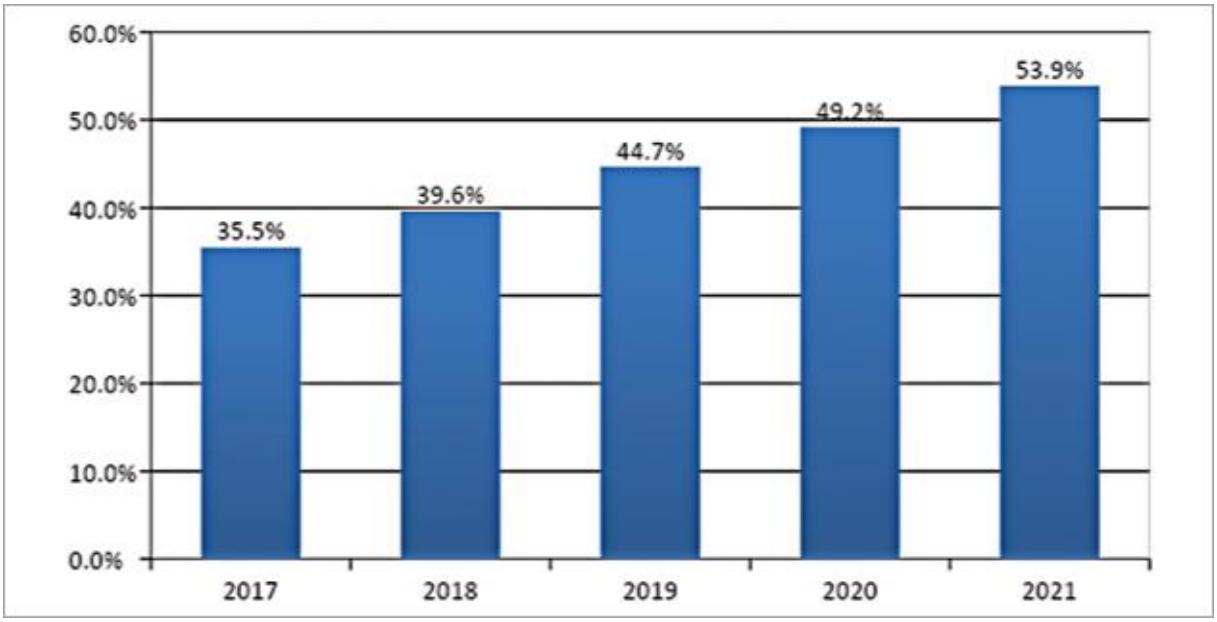
This section features m-commerce, sharing economy, IoT and NextGen innovation and details their current development and future prospect. Some outstanding start-ups in the APEC region are listed as examples.

a. M-Commerce

In the last ten years, smart phones have become more popular than ever. On top of it, the rapid development of social media has made smart phones part of consumers' lives. As people become highly dependent on their smart phones, they have more time to browse the Internet on their devices. This convenience of smart phones drastically changed consumer behavior.

The millennial generation, who has been exposed to mobile devices since birth, has become the largest group of consumers in recent years. Before heading to a physical store, they like to look up the products, user reviews and the stores and even compare prices on their phones first. Fewer and fewer people will chat with store staff for information. To the stores, the information online is influencing consumers' purchasing decisions when they walk into the store more and more. Therefore, no brand can afford to neglect an m-commerce strategy. Their first priority, when developing their m-commerce, is to stand out among a massive amount of information, attract a large number of consumers with mobile devices and get them to choose their brands/products within the short and fragmented time they have during the day.

Judging from the statistics, business opportunities from m-commerce are also on a rapid climb. Take the world' s largest consumer market, USA, for example, m-commerce is estimated to account for 44.7% of e-commerce in 2019, higher than the 39.6% in 2018. This number is expected to exceed 50% in 2021. These clearly show that m-commerce will still have strong growth momentum in the next few years and will play an even bigger role in e-commerce.



Source: Statist
Figure 1. M-commerce to e-commerce ratio (USA)

The rise of m-commerce has also resulted in the growth and popularity of mobile payment. A report by Allied Market Research shows that by 2023, the global mobile payment market will reach $4.57 trillion with a CAGR of 33%. Benefiting from a massive growth in the number of young people, Asia-Pacific region is projected to have the highest growth rate in mobile payment.

The estimated strong growth of m-commerce can no longer be neglected. Brands and retailers alike need to optimize their websites/ online stores for smart phones' operating systems and even design mobile versions to ensure that smart phone users can have better experience accessing product information and making purchases online. Currently many start-ups are providing their services and helping companies establish their m-commerce platforms, helping SMEs conserve budget as them venture into this field. Take StreetBy, a Filipino start-up, for example. StreetBy uses AI to formulate digital transformation strategies for SMEs and plan m-commerce platforms that they can afford. They also design a one-stop shopping service to connect SMEs with their consumers. Currently most of StreetBy' s clients are from the food, logistics and tourism industries, with the commission from the m-commerce platforms as the main revenue source. The company plans to expand its service to the global market.

M-commerce is not limited to simply business matching. With mobile

devices providing related services, m-commerce can also create business value as it provides services to lots of users. Take Gogolook from Taipei as example. Their main product is Whoscall, an application that help users identify unknown incoming calls and prevent harassing phone calls. When the company launched the app, smart phones were getting popular rapidly. The app has addressed the issue that has bothered many when using their phones. Its innovative and practical service has attracted a large number of users, which has generated a tremendous amount of business value, making the app a great venue to serve advertisements.

The development trend of m-commerce has also made consumers' shopping experience more streamlined and convenient, which means more sales for business owners. A mature ecosystem has therefore been created. Without a doubt, the development and maturing of m-commerce technologies will change e-commerce' s business models fundamentally. For SMEs, this is a trend that cannot be ignored nor business opportunities that they can afford to miss.

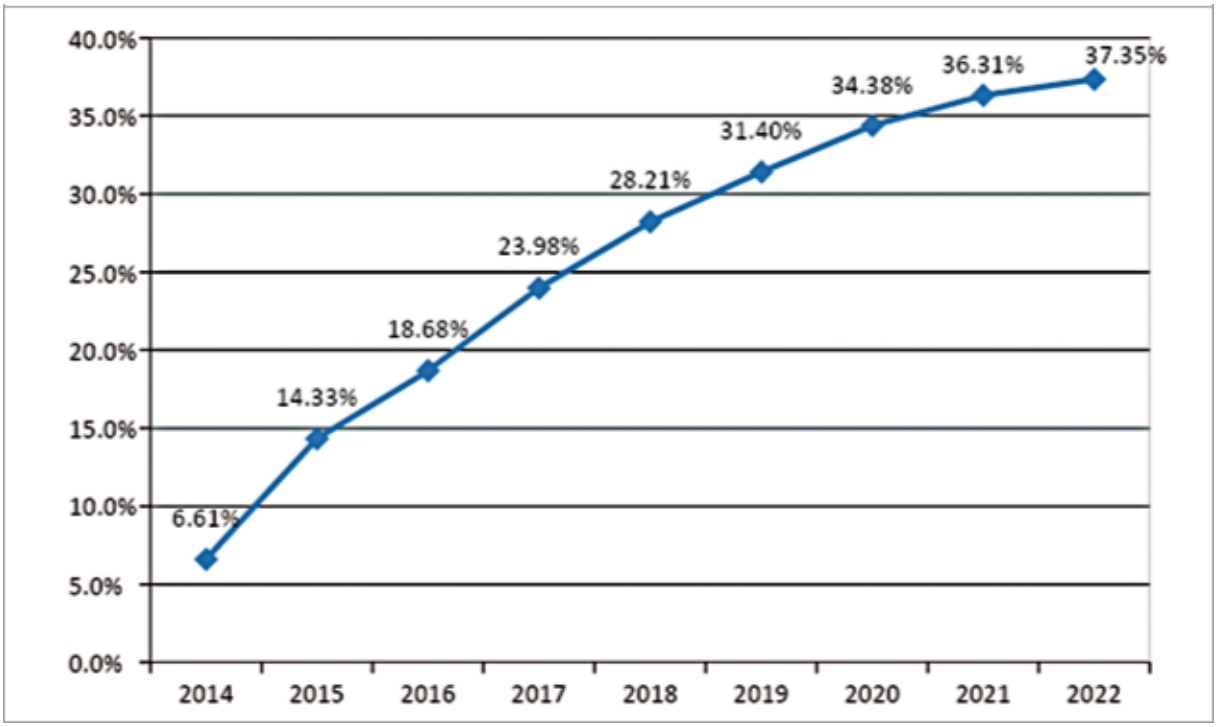
b. Sharing Economy

Sharing economy is the latest hot topic. When sharing economy was first introduced, it was meant to help people take better advantage of idle resources. A sharing platform would match excessive resources to people in need, a business model that would create a win-win for both the sharer and user. With the help of digital technology, individuals can be matched on such a platform, meaning that every person can join a sharing platform to provide and share their idle resources. However, new models have entered sharing economy since. Compared to the original concept of individuals sharing their idle resources, in the new model, businesses purchase hardware or resources and users can pay to use such hardware/resources. Essentially, this turned sharing economy from C2C to B2C (think leasing) and many new models have been created as the result, such as bike sharing and charge sharing. Since sharing economy is no longer just a matching platform, it now prioritizes providing convenience, price and transaction efficiency. It also needs to have better resource matching, funding and better understanding of users' needs.

Judging from the global population ratio that participates in sharing economy, 6.61% of the global population participated in sharing

economy in 2014. This number grew to 28.21% in 2018 and is expected to reach 37.35% by 2022. However, according to the predictions, the growth each year will gradually slow down, reflecting the development bottleneck that sharing economy has been facing in recent years to an extent.

Since it was not long ago that the current business model of sharing economy was introduced, consumers, businesses and regulatory units are still making adjustments. With most transactions on a platform between one individual and another, there are not sufficient regulations in place on regulatory measures, taxation, consumer rights and platform responsibilities. In the future, governments worldwide must formulate clear regulations on the new business models from the sharing economy to, while ensuring consumer safety, provide as much space as possible for business innovation. They also need to stay in communication with the businesses in the sharing economy to feel comfortable with this brand-new business model.



Source: eMarketer
Figure 2. Ratio of global population participating in sharing economy

Even though the sharing economy business model enjoys different levels of development and faces different types of hurdles in different economies, its impact cannot be overlooked. When entering the field of

sharing economy, SMEs and start-ups must actively establish technical thresholds or be the pioneer to establish a new sharing market to have a solid footing in the market. They can also choose, while creating a sharing economy business model, to incorporate the vision of social development or charity, which will further highlight their values. Take WeMo Scooter from Taipei for example. It mainly provides electronic scooter sharing to give people a new transportation mode to choose from. The company has the vision to free up urban space and improve the environment. It also plans to share road data (from vibration sensors installed on the scooters) with the government so that the government can repair roads immediately when needed, which can further improve traffic. This will also prompt the establishment of a smart city and improve a business' contribution to the society and added value.

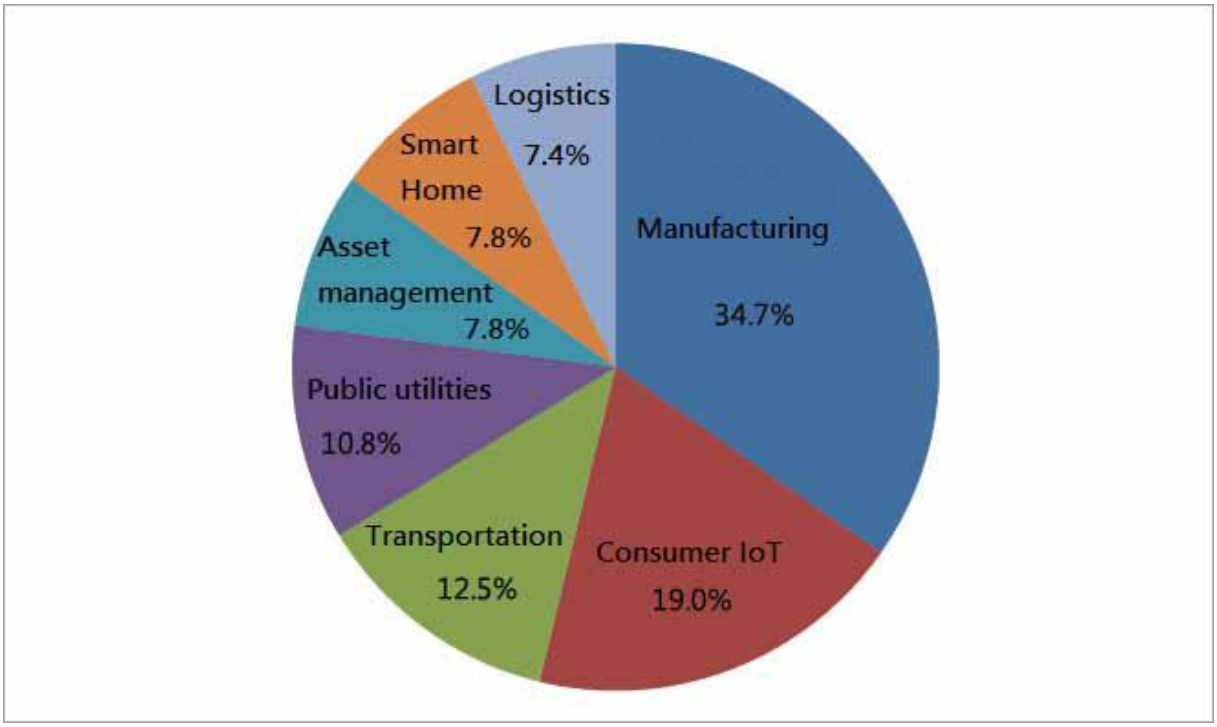
c. Internet of Things

With the development and popularity of the Internet, Internet of Things (IoT) has quietly become part of our lives both at home and in each industry. The fantasy that everything will be connected to the Internet has now become a reality.

According to the statistics from Gartner, an international research and advisory company, there were approximately 7 billion IoT devices in 2017. The number is projected to grow to 14.2 billion by 2019 and 25 billion by 2021, with a projected compound annual growth rate of 17% between 2017 and 2025. With billions of IoT devices and Internet-connected services and systems, the IoT market is expected to enjoy steady growth, especially since IoT devices will only have better cost/ performance ratio, thanks to technological advancements. With such a massive number of IoT devices comes a large amount of data. AI will be widely applied to the data produced by all the IoT, including videos, images, chat, online traffic and all kinds of IoT device data. Since data is getting more complicated as more types of data are being collected, the application of AI in the analysis of such data will be effective.

From the market scale perspective, IDC predicts that by 2025, the global IoT market will reach 1.1 trillion US dollars. By 2025, Asia Pacific will be the region with the largest IoT market while Europe and the Middle East enjoy the fastest growth. The predictions show that in 2019, the industries with the highest IoT expenditure are the manufacturing industry (34.7%), consumer IoT (19.0%), transportation

(12.5%), public utilities (10.8%), with the remaining industries all under 10%. The majority of IoT expenditure for the manufacturing industry, which has the highest IoT expenditure, is on supporting business operation and asset management. For the transportation industry, the majority of the expenditure is spent on monitoring of logistics, followed by transportation tool management. Public utilities spend its IoT expenditure mainly on the smart monitoring and management of electricity, natural gas and tap water. It has been proven that IoT can help businesses reduce expenditure by helping them conversing raw material, energy and manpower. Not only does this give a significant boost to businesses' profit and financial health, it will also shorten the payback period.



Source: EY analysis
Figure 3. 2019 IoT expenditure ratio among global industries

New types of sensors can detect more information, contributing to many applications. As sensors become more affordable, new algorithms can extract even more information from the existing sensors. As the expansion of IoT brings a massive amount of data, the market is starting to recognize the value of data. Many businesses start selling the data produced by their products or services to turn data into cash, making data officially a strategic business asset. Buying and selling of IoT data will also become an important part of IoT. Therefore,

all businesses involved must have a clear understanding of the risks and business opportunities with data brokers.

IoT has also boosted the needs for information security. As IoT devices have become more integral to our lives, information security has become more important as well. Even though IoT can help companies obtain real-time information more efficiently, they also make companies hackers' targets. Even though IoT devices are not designed for this purpose, hackers can hack into them to steal a company' s sensitive documents or even control them remotely to orchestrate large-scale terrorist attacks. When fallen into the wrong hands, these devices can become the best weapon in attacks again information security. Information security on IoT requires many types of defenses. Every member of the IoT ecosystem should take responsibility and protect information security. As a business develops IoT, it will also face a complicated set of issues on information security education.

Even though IoT' s information security issue certainly is worrying, its applications will undeniably become the solutions to the problems people face in their daily lives. Take USPACE Tech for example. The company helps drivers locate parking spots by providing a solution based on 5G and IoT technology. The real-time parking space information, GPS navigation and parking space reservation (with credit card) provided by the company have streamlined a driver' s process of finding a parking space and parking. Its smart locks give parking space owners a chance to generate revenue by renting out their parking spaces, making unused parking spaces available to drivers in need. XinZhao IoT is another start-up that is committed to developing fundraising tools with IoT technology with the goal to create a charity environment with a virtuous cycle. The company' s smart donation boxes equipped with IoT devices can check the donations for counterfeit bills/coins, upload donor information to government system and print out donation receipts. The company streamlines the donation process. More importantly, for the non-profits that receive these donations, they get more than just the donations. They also get the data behind all the donations. These smart donation boxes can keep track of the total amount of donation received, number of donors, foot traffic in different periods of the day, the amount of each donation and a donor' s age, occupation and other information. After a while, the accumulated data can be analyzed

and benefit future fundraising efforts tremendously.

As IoT devices become more popular and more data has been accumulated in various databases, we will continue to see mankind benefiting from the development of IoT and companies becoming more efficient with lower operating cost and higher data utilization. With the implementation of IoT and AI, the human society that could only be imagined in sci-fi movies will soon be a reality. If SMEs can fully utilize the advantages brought by IoT to improve its manufacturing or service efficiency, or even create new business models, they will certainly boost their competitiveness.

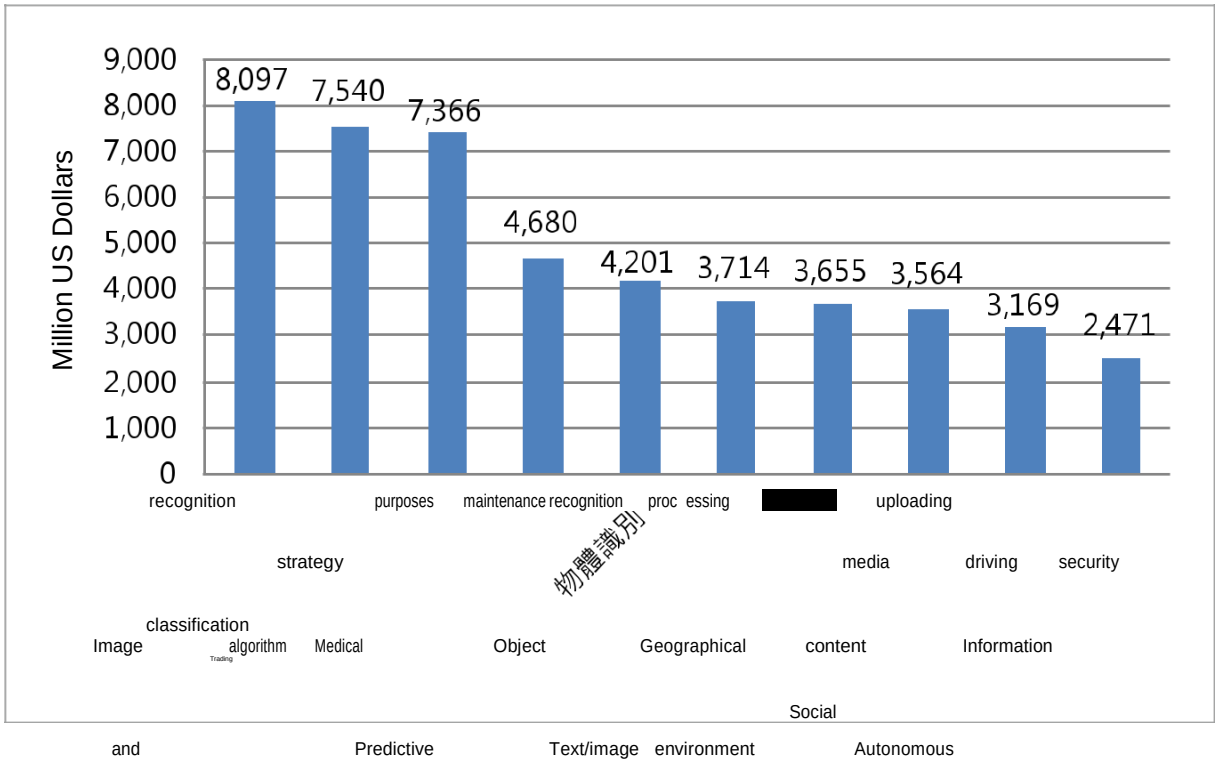
d. NextGen Innovation

In the new era of digital economy, next generation' s innovative applications will certainly surround the development of new types of digital technology. Judging from the current trend, AI applications stand out the most. With 5G and cloud computing, AI has become a well sought-after area for start-ups.

In a broad sense, AI is the technology that mimics a human brain' s way in handling things and even thinking. It aims to mimic human' s intelligence, cognition and behavior with the goal to surpass human' s intelligence. Currently there is a wide array of applications of AI and some of them have already surpassed human capabilities, such as facial recognition, which has a wide variety of practical applications. But most of these applications are based on a subset of AI – machine learning. Machine learning is the scientific study of algorithms a computer system uses to study patterns from a massive amount of data. It is currently the most popular technology of data science. In recent years, "deep learning", a subset of machine learning based on artificial neural networks, has been driving the development of AI while showcasing unlimited potentials. With its powerful feature learning capability, deep learning performs well in areas where machine learning cannot make breakthroughs, such as image recognition. It has made what used to be impossible for computers possible and brought numerous innovative and practical applications. Most of the fundamentals in the neural network theory were proposed more than 10 years ago. However, they were restricted by the limited computing power of the computer systems at that time and the lack of digital data. However, with strong computing power and large

quantity of data, deep learning has quickly been incorporated in our living technologies and become a well sought-after new technology.

Currently there is no AI that can integrate a large number of different functions. In practical application, most AIs have their unique functions and can only be applied to a certain field. Statistics show that the majority of the AI market comprises of image recognition/ classification, trading strategy algorithm and medical purposes. There is a certain level of AI applications in predictive maintenance, object recognition, text/image processing, geographical environment detection, social media content uploading, autonomous driving and information security.



Source: Statista

Figure 4. Predicted accumulated AI market scale in different fields from 2016 to 2025

In the area of autonomous driving, deep learning can train the AI in the on-board computer to respond to various kinds of accidents and unexpected situations. Not only will this improve car safety tremendously, the combination of autonomous driving and car sharing will also effectively reduce traffic and demand for parking spaces, a significant positive externality for the society. In the field of robots, deep learning can improve robots' capabilities, such as handling of items, moving across different terrains and communication

with humans, making robots a bigger helper in our daily lives or manufacturing. In the service industry, AI can replace the majority of customer service staff, with the exception of those on the phone and respond to customers' needs autonomously. In the financial industry, an AI-based data processing/analysis platform, combined with language processing and machine learning, can handle any type of processing/analysis of a large sum of data quickly and respond to investors' complicated financial questions in real time. These AI-based platforms are expected to replace most analysts in the industry now.

For medical research, deep learning can be used to decode the secrets of genes, understand how genetic variation contributes to diseases and expedite the analysis of medical images. Take Wellgen Medical for example. This start-up uses its knowledge to work with the medical system. It uses AI, big data-based image recognition and clinical knowledge on image recognition for various types of diseases. The company has developed autonomous instruments and automatic image recognition system for organisms, which can be used to diagnose tuberculosis, cancers and other diseases. AI's spatial recognition capabilities also can help human life. OSENSE Technology, which was founded in 2017, combines computer vision and AI, allowing AI to recognize and understand space through camera lenses. The AI, when combined with geomagnetic signals, Bluetooth low energy and other signal sources, can transform into a precise navigation system, which can help users navigate in various environments.

In the foreseeable future, AI will drastically change human society and human life to the extent comparable to the invention of electricity and the Internet on human civilization. Currently, it is mostly large corporations that venture into AI applications. But as the costs associated with development tools, platform and computing power gradually decrease, SMEs can also easily and will be more inclined to develop and apply AI in the future. If SMEs can stay ahead of the latest development in different industries and become part of the AI industry chain, they will certainly be able to grasp the business opportunities in the future.

(3) Digitized Social Enterprises

a. Sustainability and Digitization Solution

In 2015, the UN passed its 2030 Sustainable Development Goals

(SDGs), with 17 core objectives for global sustainability. UN hopes that with SDGs, it can lead the governments, businesses and civil groups worldwide and contribute to the sustainability of the human society by effectively narrowing the wealth gap, promoting gender equality and addressing issues such as environmental changes and public health. As the world becomes more digitalized, the global community is all keeping an eye on how to use this trend of digitization to fulfill these sustainable development goals.

To turn the trend of digitization into a strong force behind UN' s SDGs, we must use innovative strategies to turn digital technologies into solutions of social issues so that people can have an equal access to sufficient food, education, energy, healthcare and other resources as well as address environmental and climate change issues. Using smart power grids to conserve energy or promoting sharing of transportation tools to reduce carbon emissions are just two of the many examples.

Take elderly care for example. As the population in many economies becomes aging society, the demand for elderly care and health care has also increased drastically. By establishing social participation channels and building an environment conducive to both physical and mental health, the elderly can enjoy great health as they grow older. Therefore, the issue of senior health care has shifted from disease treatment to preventive care and mental health development. With digital technologies, many solutions have been proposed and implemented in this area. Small solutions such as smart mattresses that can keep track of an elderly getting off bed, laying in bed and their sleep schedule; smart pillboxes that remind a patient to take medication and sort the pills automatically. Larger scale solutions include building a smart care environment with AI and IoT. It will include smart furniture, home video surveillance, indoor positioning system and health examination system. These will greatly conserve manpower in long-term care and improve care quality.

Take Pokemon Go, a mobile game that has taken the world by storm, for example. This mobile game with augmented reality encourages its players to go outdoors and unexpectedly many elderly players start going outdoors and broaden their social circles and build new relationships. This has improved the elderly' s social participation and in turn improved their health. There are rehabilitation centers that, after seeing how Pokemon Go encourages players to go outdoors, lets the

elderly in their center play Pokemon Go to encourage them to get off their beds and go outside. The medical staff will also adjust patients' walking postures and balance as they go outside. The game also helps improve their endurance. These have made Pokemon Go the best example of using a digital technology to address a social issue.

Digital technologies can also assist with the care for the disadvantaged. OurCityLove, to provide the elderly, handicapped and disabled with easy access to information on accessible environments and encourage them, their family and caretakers to go outside and be involved, uses IoT, cloud computing, smart Bluetooth, mobile devices and other technologies and establishes smart stations, within its service range, to provide environmental information, smart navigation and multimedia guides. It also provides services such as business information, push ads, marketing/shopping assistance, big data analysis and AI customer service. The company uses technologies to create accessible information services for the disabled and their families, promotes the development of a smart & friendly city and creates a brand-new social participation model for the handicapped.

For the promotion of gender equality, WINcorp from Russia created WomanUP, an online platform for the female entrepreneur community and education resources. The platform provides education to the females that want to start their own business and allow female entrepreneurs to makes exchanges and support one another on the platform. On this platform, female entrepreneurs can obtain knowledge about how to start a business with its online courses in a short period of time before communicating and collaborating with others on the platform.

The digitalization process certainly will bring social changes to an extent, such as the changes to the labor market structure, the pervasive applications of AI and the regulations on newly emerging technologies. In this era of constant change, the human society must be prepared and commit itself to turning all the changes brought by digital technologies into welfare to the entire mankind, making the era of digitization a better future.

b. SME Digitization to Promote Inclusive Growth

Many economies, as they continue to develop, tend to face the

issue of unequal income distribution. A closer look shows that the causes for such issue include the structural issues from a capitalism society, globalized economy, labor' s lack of bargaining power and the constant development of technologies. Therefore, as the global economy and industrial structure continue to change, economies worldwide have realized the potential impact of unequal income distribution on their economic growth and started formulating and implementing policies and measures related to "inclusive growth" to maintain sustainable and steady economic growth.

"Inclusive growth" aims to pursue equal economic opportunities and avoid extreme exploitation. Economic growth coupled with equal opportunity means that all social classes can participate in economic growth and enjoy the result. This contains the idea of improving income distribution and pro-poor distribution of opportunities, helping as many people as possible in an economy to participate and enjoy the results of economic growth.

The development of SMEs is closely associated with the implementation of inclusive growth. At the base layer among all enterprises, not only do SMEs create a large sum of job opportunities, they also have contributed greatly to the growth of the global GDP. They are the backbone for economic growth and the main driver of regional economic growth and innovation. For the global economy, SME development will become the foundation of economic development and a key for the economy to become inclusive and sustainable. The development of SMEs will promote a balanced development between urban and suburban areas, which benefits the development of the economy.

As the world prepares itself for the era of digitalization, if SMEs, while facing global competition, can harness the power of these digital technologies to conduct digital transformation, enhance their capabilities and added value and work towards becoming high value enterprises, they will effectively promote inclusive growth and become a steady source of economic output and job opportunities in APEC economies. To achieve such a goal, government institutions and SMEs must work hand-in-hand. By introducing digital technologies, smart manufacturing and other innovative elements, SMEs will be able to enter the global supply chain. These elements will also help SMEs with capacity building to improve their competitiveness. There should be a

public-private collaboration model between government institutions and SMEs to effectively execute relevant policies.

By supporting SMEs with strong economic potential and utilizing innovative digital models to help SMEs expand to new markets, this will help SMEs, during digital transformation, become a main driver for inclusive growth. SMEs can also bring positive impact for local economy during the process of digital innovation, which can boost local economic development and promote a balanced urban/ suburban development in APEC economies, helping them achieve the goal of sustainable and inclusive economic growth.

(4) Digital Government and Digitalization Policy

a. Digitalization of the Public Sector

Under the trend of digital transformation, economies worldwide are also paying attention to the digitization of their public sectors. As governments continue to deal with various social, economic, political and other issues, they never stop looking for innovative digital solutions and transforming the government in the process. Therefore, the method and type of digitalization for the public sector is constantly evolving. For the policy makers, government officials, researchers and all parties related to a digital government, it is crucial to understand the trend and direction of the public sector' s digitalization since the concept of a digital government will be even more complicated, contextualized and professional, similar to the evolution of cultures and societies. Therefore, the related parties must keep track with the latest trend to have a grasp of the future trend of the public sector' s digital governance.

Tomasz Janowski, UN' s digital government evaluation expert, proposed a four-stage Digital Government Evolution Model comprising Digitization, Transformation, Engagement and Contextualization. Digitalization refers technology in government, such as information flows in a digital format, government websites up and running and digital infrastructure. Transformation refers to an electronic government where the majority of its operations are digitalized and starts adjusting its organization due to digitalization. It also will have more frequent information sharing and collaboration. The transformation stage is in principle internal to government organizations but no transformation of external relationships. Engagement features electronic governance

and transformation of external relationships, including more interaction with the people through digitization technologies and even adopting people' s opinions. The concept of "open government" also appears here. With higher transparency and participation, the government is considered more reliable. Contextualization refers to policy-driven electronic governance. In this stage, different digitization contexts and models will derive from the execution needs of different policies and the current environment. It will also expand to regional governance.

There are many concrete examples of public sector digitalization from many economies. One example is developing inter-agency one-stop integrated service with digitization technologies, which serves as an entry to government services with consistent procedures to improve inter-agency digital service quality. Another example is the optimization of the government' s open data, which, with open collaboration, can incorporate the creativity from the private sector and increase the value of such data. One more example is the inclusion of civil participation into the establishment of an online public policy platform. With the core principles of public-private collaboration and "people first", the utilization of new digitization technologies can promote the transformation of the government' s digital service, which can bring convenience to the people and achieve the goal of transparent governance.

As the public sector digitalization progresses, people' s interaction with the government will change as well. As we face the challenge of the government' s digital transformation, we must look into how we can improve the government' s efficiency with digitalization technologies to provide more high-quality service and implement public administration that is more transparent and open to enhance people' s trust in the government. If the public sector can be fully digitalized and provide digital services that meet people' s needs, it will effectively improve the economy' s digital competitiveness.

b. Government' s Policy and Role in Promoting SMEs' Digitalization

Even though SME' s digitalization can promote an economy' s inclusive growth, the government does not need to lead the market development during SMEs' digitalization. However, it cannot afford to stand on the sideline either, in case the market failure happens, which is quite common when SMEs engage in innovative activities.

The government cannot let the market mechanism decide SMEs' digitalization and must use its power to boost the incentive for SMEs to implement digitalization.

First, compared to large enterprises, SMEs have fewer resources to devote to the implementation of digital technologies. In response, the government can provide policy-exclusive loan so that SMEs can obtain the financial support they need to introduce hardware and software of digital technologies.

Secondly, the government should become the demonstration field for digital transformation. Digital transformation contributes to industrial upgrade and facilitates the government' s communications and services to the private sector and the general public. Its externality also has a positive impact on the development of the industry. If the government can lead by example when it comes to digital transformation, it will benefit SMEs' digitalization tremendously. The government can also start with building the paradigm and establish best practice based on paradigm to promote the strategy and method for transformation across industries.

Third, encourage businesses to develop more digital applications by procuring digitalized products and services. When developing new digitalized products or business models, SMEs, which have fewer resources, will be at a disadvantage since the market has yet to mature and buyers are still speculating. Therefore, if the government can lead by example by procuring such digital products or services, it will help SMEs overcome the early hurdles in digital transformation.

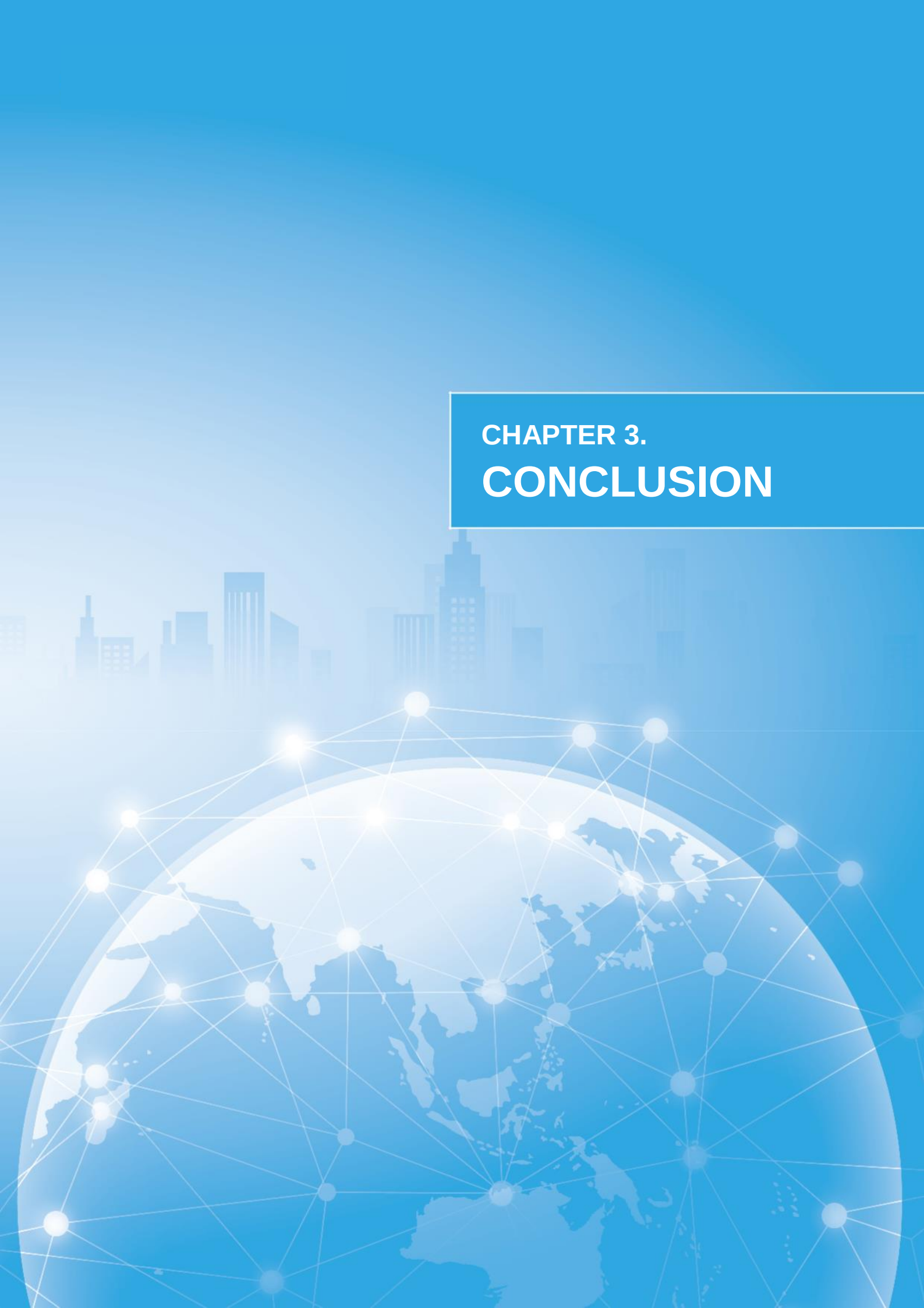
Fourth, build a diverse digital transformation support system. When implementing digital transformation, SMEs require the capabilities from digital technologies as well as talent training and organizational adjustment. In light of this, the government can work with the industry and the academia (including public associations, research institutions and universities) to provide consulting and guidance on digital transformation to SMEs. These organizations and the SMEs can hold seminars regularly to share their digitalization experience.

Fifth, during the process of SMEs' digitalization, the government certainly will need to review and amend related regulations and provide a more flexible environment for innovation to promote digitalization. Not only will this encourage industries to implement

digital transformation, it will also inspire innovation and accelerate the upgrade of the entire industry. In addition, as the protector of the public interest, the government also needs to review the regulations and taxation on the new digitalized business models to ensure fairness and put in place necessary regulatory measures.

Sixth, enhance SMEs' awareness to implement digital transformation. If the government wants to promote SMEs' digitalization, it must help SMEs realize its necessity. Many SMEs lack the awareness of digital transformation and the limited resources have discouraged and restricted their investment in digital transformation. The government can promote the collaboration between SMEs and think tanks to share SMEs' experience in digital transformation, how it benefits them and how they overcome the challenges. This will boost SMEs' digitalization awareness.

If the government wishes to promote SMEs' digitalization and incubate innovation with limited resources, it needs to build the right environment and provide financial as well as technical support to reduce SMEs' digitalization cost. With a environment conducive to digital transformation provided by the government, the success of digitalization for some SMEs will inspire more SMEs to implement digitalization, forming a positive cycle for digitalization.



CHAPTER 3.
CONCLUSION

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With the development of digital economy and the O2O business model, the future of the global economy will have everything to do with digitalization. Cutting-edge technologies such as blockchain, IoT, 5G, cloud computing, autonomous robots, AI, data science and 3D printing, along with the emergence of new digitalized business models, will drastically change human lives as well as the global economic structure.

SMEs are the backbone behind the economic development of the APEC region. When faced with changes brought by the digital economy, SMEs should embrace digital technologies and promote digitalization. They should also learn from the successful companies in m-commerce, sharing economy, IoT, NextGen innovation and other new business models and seek the opportunity to increase their own added value in the wave of digitalization. SMEs should also overcome the lack of resources, lack of experience in the implementation of newly emerging technology and conservative investment in ICT and adapt to the ever-changing regulations, which will allow them to become high-value enterprises and enter the global market.

The digitalization of SMEs will not only give a comprehensive and balanced boost to their competitiveness, it will also benefit the society as a whole. As the main driver of regional economic growth and innovations, SMEs' development also plays a crucial part in shaping an inclusive and sustainable economy while narrowing the urban/suburban development gap and bringing a balanced regional economy. In recent years, digitalization solutions have contributed greatly to the UN' s 2030 sustainable development goals and promoted the balanced development of the human society. These solutions have reduced wealth gap, improved gender equality and responded to climate change, giving people a fair and equal access to the resources necessary to their survival.

As the world continues to go digital, the digitalization trend also has much to do with the development of the government, be it the government' s digitization or the impact of its policies on the digitalization trend. What role government institutions should play in the wave of digitalization is also

a important research topic. Whether or not digitalization will bring a better tomorrow solely depends on the joint effort of everyone involved. SMEs' roles in this also cannot be overlooked.

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Produced by
Small and Medium Enterprise Administration
Ministry of Economic Affairs
Email: thy@moea.gov.tw
Tel: (886) 2 2366 2237 Fax: (886)2 2367 7484

For
Asia-Pacific Economic Cooperation
35 Heng Mui Keng Terrace, Singapore 119616
Tel: (65) 68919 600 Fax: (65) 68919 690
Email: info@apec.org Website: www.apec.org

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