Asia-Pacific
Economic Cooperation

Advancing Free Trade
for Asia-Pacific Prosperity

Regulations, Policies and Initiatives on E-Commerce and Digital Economy for APEC MSMEs' Participation in the Region

APEC Electric Commerce Steering Group

March 2020

APEC Project: ECSG 02 2018

Produced by

Ministry of Industry and Trade

25 Ngo Quyen, Hoan Kiem, Ha Noi, Viet Nam

For

Asia-Pacific Economic Cooperation Secretariat

35 Heng Mui Keng Terrace

Singapore 119616

Tel: (65) 68919 600

Fax: (65) 68919 690

Email: info@apec.org

Website: www.apec.org

APEC#220-CT-01.3

*** The views expressed in this paper are the views of the authors and do not reflect the views and policies of APEC Economies.*

TABLE OF CONTENTS

TABLE OF FIGURES

LIST OF TABLES

LIST OF BOXES

CHAPTER 1: INTRODUCTION

I. Background

Digital technologies are spreading throughout the world at a faster pace than previous waves of technological innovation and are re-shaping business models and sectors. This transformation includes emergence of the digital economy. Defined as “that part of economic output derived solely or primarily from digital technologies with a business model based on digital goods or services”, the digital economy is estimated to make up around 5% of global GDP and 3% of global employment. Indeed, the digital economy has enabled fast revenue growth for many firms; encouraged the shift from tangible flows of physical goods to intangible flows of data and information; enabled firms in developing economies to connect across borders; and has thus facilitated a surge in cross-border data flows

The Asia-Pacific region is host to some of the fastest growing economies in the world with rapid rates of e-commerce expansion and growth in digital trade. There is however within APEC a ‘digital divide’ in the region’s infrastructure landscape, which might cause a ‘new underclass’ of the disconnected. Taking a boarder perspective of digital divide that refers to social and economic stratification due to unequal ability to access, adapt and create knowledge via use of information and communication technologies, without the advantages on infrastructure, human resources, capital investment and an enabling policy environment, the developing economies are at the danger of being left behind if the governments don’t have proper actions to promote growth and innovation. There is a whole set of challenges are “preventing the digital revolution from fulfilling its transformative potential” in developing economies; including the potential outlined for digital economies. These create the backdrop of problems to which policy solutions are required; and they will here be categorized in terms of digital infrastructural challenges, digital ecosystem challenges (human, institutional) and digital economy dis-benefits.

The digital economy is of increasing importance to developing economies. Yet digital economy reality is undershooting its potential in these economies, due to a series of challenges. Digital infrastructure is in part incomplete, costly and poorly-performing. The wider digital ecosystem suffers a shortfall in human capabilities, weak financing, and poor governance. Growth in the digital economy offers opportunities for MSME participation in regional economies, but it is necessary to have insights on the details of the innovative, regulatory, and incentive about e-commerce and trade related digital economy policies of developed economies to get the advantages of the digital revolution.

II. Research Objectives and Research Questions

The research aims to provide information on policies, initiatives and best practices to develop the e-commerce and trade related digital economy: The research draws on wide ranging desk research and interview with experts and policymakers in developed economies to uncover successful policies to assist and encourage MSMEs to participate in the regional market via e-commerce and trade related digital economy.

To meet the above-mentioned objective, there is a set of questions to be address as follows:

1. What is the current status of e-commerce and digital economy development in global and regional scale?

2. Which polices and initiatives that APEC members applied to develop e-commerce and digital economy?

3. What are the outcomes of those polices and initiatives or how the private sector response to those policies and initiatives?

4. What will be the policy implications for the APEC region to fully utilize the benefit of e-commerce and digital economy?

III. Methodology

Fieldwork researches were conducted in two members including Australia and Korea in July 2019. During the fieldwork trips, the expert had several fruitful discussion and in-depth interview with these members' governmental official working in e-commerce and digital economy field. Through the discussions and interviews, the expert collected adequate and efficient information and data concerning 2 members' e-commerce and digital economy development experiences: what is the background of the drafting policies process; which stakeholders involving in the preparation of policies and their role; which implementation plans are applied at the moment and the outcome.

Desk study has also been conducted to collect and systemize available information and data to serve the research design in particular and the research purpose in general. Information collected from various sources such as government, organizations, reference materials available on the internet and in libraries, etc. includes:

1. Previous studies on the development of e-commerce and digital economy

2. Information on current development of e-commerce and digital economy

3. Information on the policies and initiatives that governments applied to develop e-commerce and digital economy

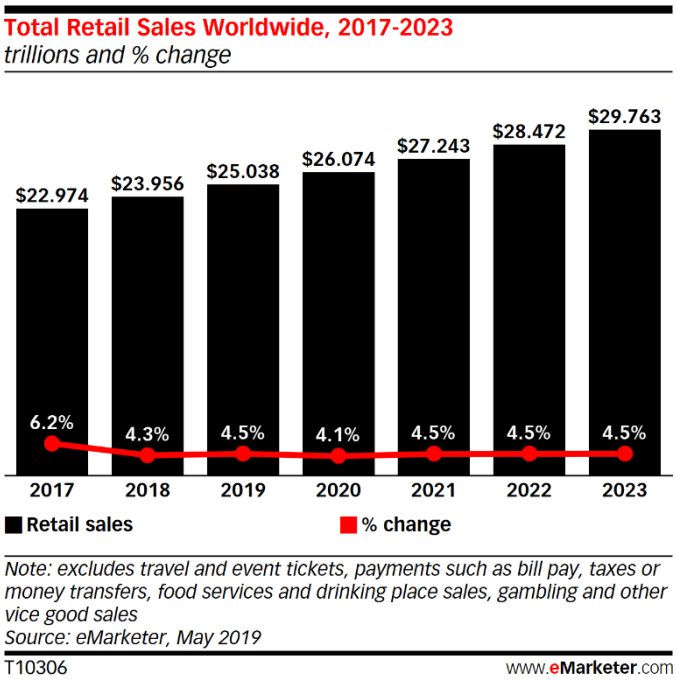
IV. Structure of Research

The report is composed of five chapters. Chapter I describes the background of the research, identifies the research objectives, research questions, and introduces research methodology. Chapter II analyzes the overview of the e-commerce and digital economy over the world with a focus on current trend and development of the subject. Chapter III reviews the policies and initiatives for e-commerce and digital economy in APEC region to provide an overall picture of which potential policies other governments might choose to draw lessons. Chapter IV attempts to provide case studies on stakeholders from the private sector that are active in implementing the domestic strategy of digital transformation. Chapter V wraps up the research report with some policy implications that are applicable for members interested in developing e-commerce and digital economy.

CHAPTER 2: GLOBAL AND REGIONAL DEVELOPMENT OF E-COMMERCE AND DIGITAL ECONOMY

I. Current status of and trends in e-commerce

According to eMarketer, the global retail market will rise by 4.5% to US$25.038 trillion in 2019. At the same time, it represents a marked decline from the previous years, when growth rates of global retail sales range between 5.7% and 7.5% each year[1].

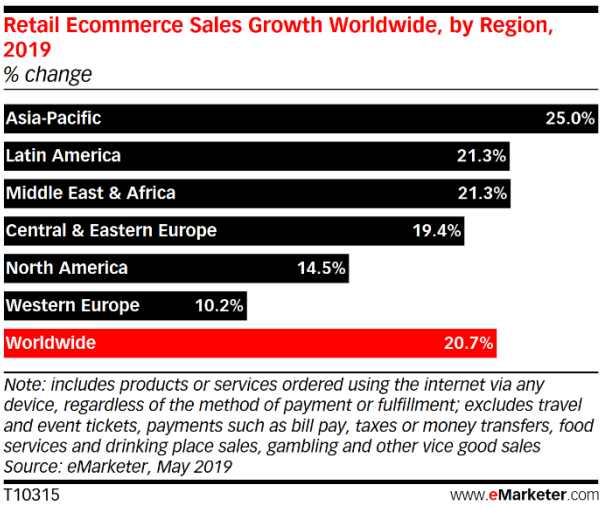


This retail sales slowdown over the past two years reflects growing economic uncertainty and a dampening economic environment across economies.

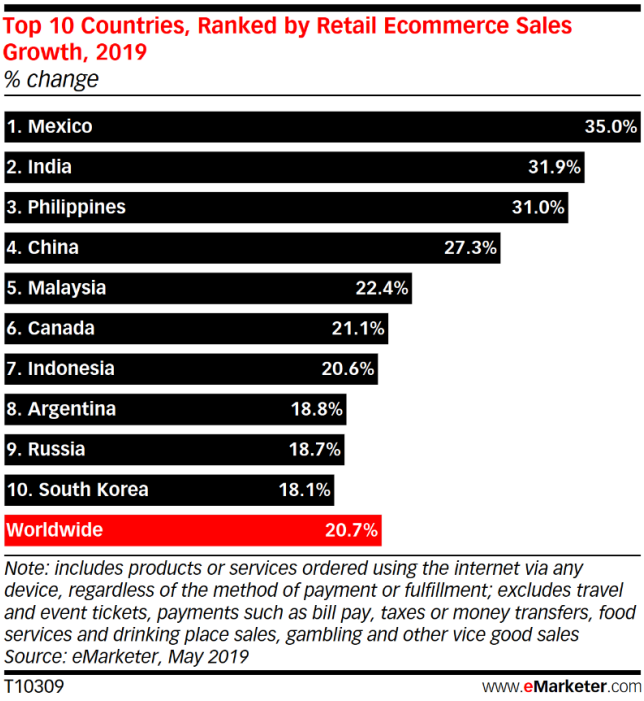
It is estimated that the global retail ecommerce sales will rise 20.7% in 2019 to $3.535 trillion. Despite its strong growth rate, 2019 will witness a decline from two years preceding that, when the industry grew 28.0% and 22.9% in 2017 and 2018, respectively. By 2021, global retail ecommerce revenue will be estimated to stand at $5 trillion, though growth rates will see a decline to the 20% threshold beginning in 2020.

Despite the cooling off of China's previously hot consumer economy, Asia-Pacific will still be the fast growing ecommerce market in 2019. The region is expected to grow 25.0% to $2.271 trillion, making up 64.3% of global ecommerce spending. Latin America and Middle East/Africa will identically experience growth rates of 21.3%, surpassing the global average, while North America and Western Europe grow at slower pace (14.5% and 10.2%, respectively).

[1] https://www.emarketer.com/content/ecommerce-continues-strong-gains-amid-global-economic-uncertainty?ecid=NL1014&fbclid=IwAR2RCsXK235_TB2rosnROKLezjcpO-qX4ZdPVReir7TJXA4C77fiXcM7ogHc



Six of the top 10 fastest-growing ecommerce economies in 2019 come from the Asia-Pacific region, led by India and the Philippines at growth rates of more than 30% growth and followed by China, Malaysia, Indonesia and Republic of Korea. Latin America enters the top 10 with Mexico being the fastest growing economy with a growth rate of 35% and Argentina raking the 8th place with a growth rate of 18.8%. Even more mature regions for ecommerce like North America (Canada, 21.1% growth) and Europe (Russia, 18.7% growth) claimed spots in the top 10.



In 2019, China will be the leader of the global B2C retail ecommerce market, with the revenue of US$1.935 trillion which is more than three times greater than the US at the 2nd place with a revenue of US$586.92 billion. Since 2013 when China surpassed the US in ecommerce sales for the first time, the economy has quickly widened the margin. On its own, China makes up 54.7% of the global ecommerce market, a share nearly twice that of the next five economies combined.

Top 10 Countries, Ranked by Retail Ecommerce Sales, 2018 & 2019

billions and % change

	2018	2019	% change
1. China*	$1,520.10	$1,934.78	27.3%
2. US	$514.84	$586.92	14.0%
3. UK	$127.98	$141.93	10.9%
4. Japan	$110.96	$115.40	4.0%
5. South Korea	$87.60	$103.48	18.1%
6. Germany	$75.93	$81.85	7.8%
7. France	$62.27	$69.43	11.5%
8. Canada	$41.12	$49.80	21.1%
9. India	$34.91	$46.05	31.9%
10. Russia	$22.68	$26.92	18.7%

*Note: includes products or services ordered using the internet via any device, regardless of the method of payment or fulfillment; excludes travel and event tickets, payments such as bill pay, taxes or money transfers, food services and drinking place sales, gambling and other vice good sales; *excludes Hong Kong*

Source: eMarketer, May 2019

T10308 www.eMarketer.com

Three of the top 10 ecommerce markets coming from Western Europe, led by the UK ($141.93 billion), followed by Germany ($81.85 billion) and France ($69.43 billion), but these mature markets are growing at year-over-year rates well below the growth rate of global ecommerce.

Canada's relatively advanced Internet market continues to record a strong growth rate of 21.1% to $49.80 billion in 2019. Despite Canada's overall digital maturity, logistical inefficiencies due to its geographically dispersed population from western to eastern borders making establishment of ecommerce distribution centres and delivery capabilities more cost-prohibitive have traditionally hindered e-commerce. Recent improvements are now helping shift spending online at an accelerated rate.

India is the fastest-growing ecommerce market among the top 10 with a growth rate of 31.9% to $46.05 billion in sales this year. Despite being the largest economies in the world, India's ecommerce market is relatively nascent largely resulting from a lower-income population and still-emerging infrastructure to support payment and delivery.

Cross-border e-commerce

Cross-border e-commerce is also increasing in popularity with both retailers and consumers. According to a survey by Payvision and Juniper Research in August 2017, over 80% of retail professionals worldwide said that cross-border ecommerce has been profitable, while 31% strongly agreed with the statement.[2]

A report by Zion Market Research reveals that the global cross-border B2C e-commerce revenue stood at US$ 562.1 billion in 2018 and is expected to amount USD 4,856.1 billion by 2027, growing at a CAGR of 27.4% between 2019 and 2027.[3]

According to International Post Corporation, 38% of the parcels bought cross-border in 2018 were purchased from China. Marketplaces are the most popular for cross-border purchases. Digital retailers from which cross-border digital buyers worldwide made their most recent cross-border digital purchase are Amazon (23%), Alibaba (16%), eBay (14%) and Wish (10%).

II. Current status of and trends in digital economy

Digital markets have a crucial role to play in the world economy but vast differences exist in the maturity and digital services availability in each region and even more each economy.

The European and North American economies are often highly mature in digital economy, but many of the Asian economies are currently making progresses and catching up. The fast adoption of digital

[2] https://www.emarketer.com/content/for-many-retailers-cross-border-ecommerce-is-profitable
[3] https://www.zionmarketresearch.com/report/cross-border-b2c-e-commerce-market

media and digital payments in these economies leads to a different usage behavior, as interacting online and being online gains an unprecedented “normality”. This in turn leads to different market structures, which have large impacts on the size and development of the digital markets.

But the preconditions required for successful digitalization of markets vary between economies. While European and North American economies have very high Internet penetration rates of up to 94%, Asia and Africa are far behind. In addition, the availability and price of Internet influences the degree of digitalization. While the broadband subscriptions per capita and the average connection speed are on a constant rise, a lot of people still do not have access to Internet or web-enabled devices.

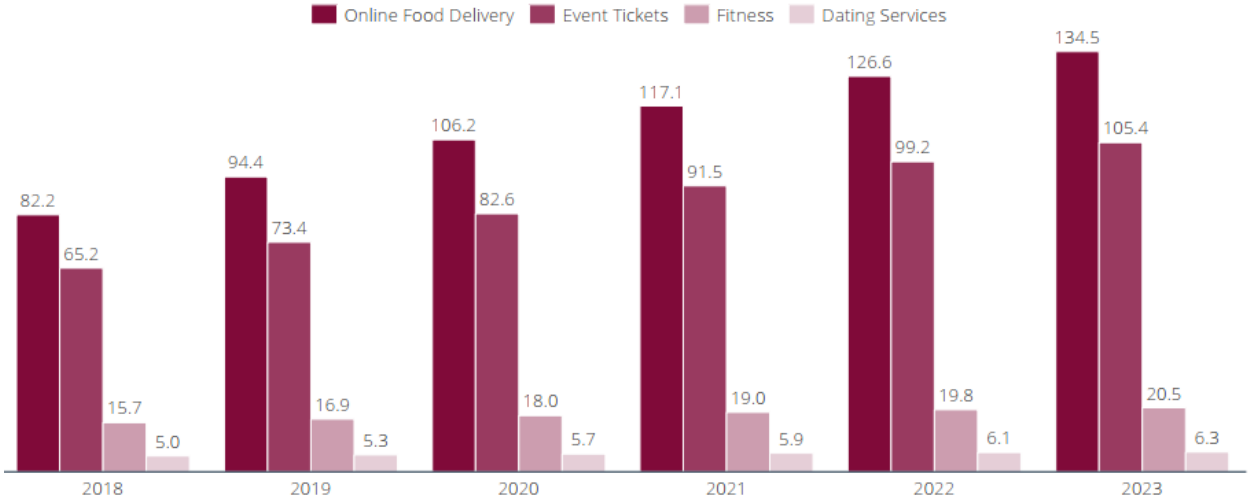
1. Digital markets

This part presents an overview over a variety of digital markets, including market revenue sizes, user developments and current trends.

1.1. E-services

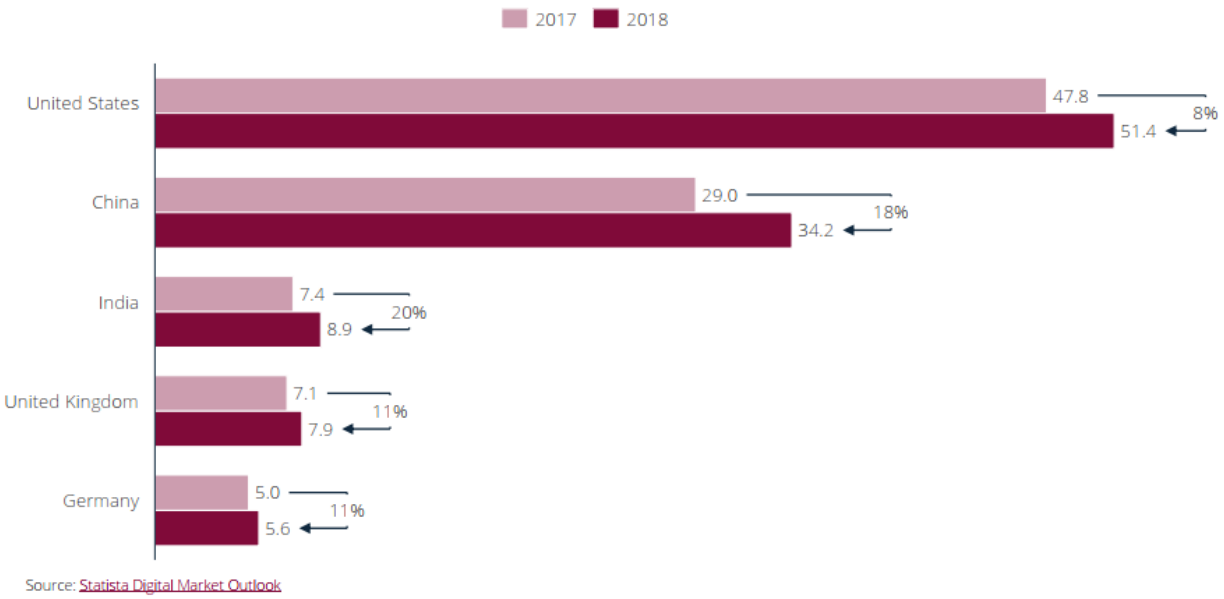
Recent years have witnessed an explosion of e-service business thanks to the ubiquitous use of the Internet and mobile phones. The e-Services market includes four segments: Online Food Delivery, Event Tickets, Fitness, and Dating Services (Figure 1). The global e-Services revenue stood at US$ 168 billion in 2018 with Online Food Delivery accounting for the largest share, followed by Event Tickets. Fitness and Dating Services recorded smaller revenue compared to Online Food Delivery and Event Tickets. The same trend is seen in the years to come.

Figure 1: Global e-Services revenue forecast, billion US$



In terms of geography, 5 economies leading the e-services market include the US, China, India, United Kingdom and Germany (Figure 2). The US and China remained occupy first two place during 2017 – 2018 period, far ahead of 3 remaining economies in the top 5. The e-Services market grew in these top 5 economies by more than 8% during the same period with India leading with a growth rate of 20%.

Figure 2: Top 5 e-Services markets by market revenue, billion US$

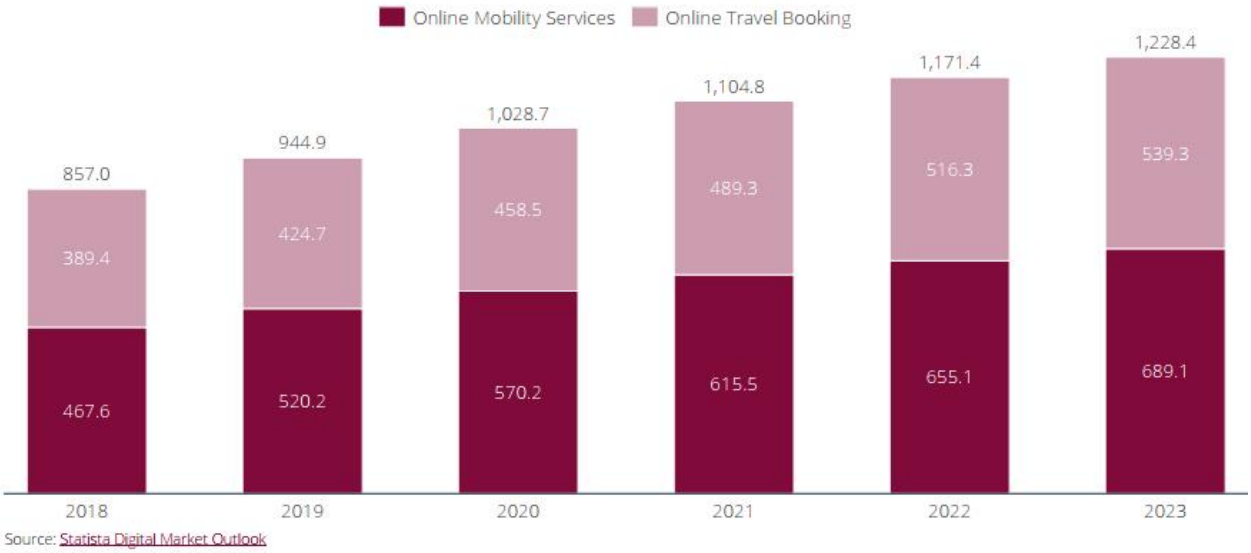


Source: Statista Digital Market Outlook

1.2. E-travel

The e-travel market is a hot topic when it comes to digitalization and heavily disruptive changes within traditional industries. eTravel services enable customers to choose their travel experience from various deals offered by different providers and provide them with tools to make quick and easy comparison of prices. Revenue in the eTravel market amounts to 944.9 billion US$ in 2019 and forecast to reach 1,228.4 billion US$ by 2023 (Figure 3). The eTravel market is composed of two segments: Online Mobility Services and Online Travel Booking with Online Mobility Services being the largest segment which has a market volume of US$ 520.2 billion in 2019.

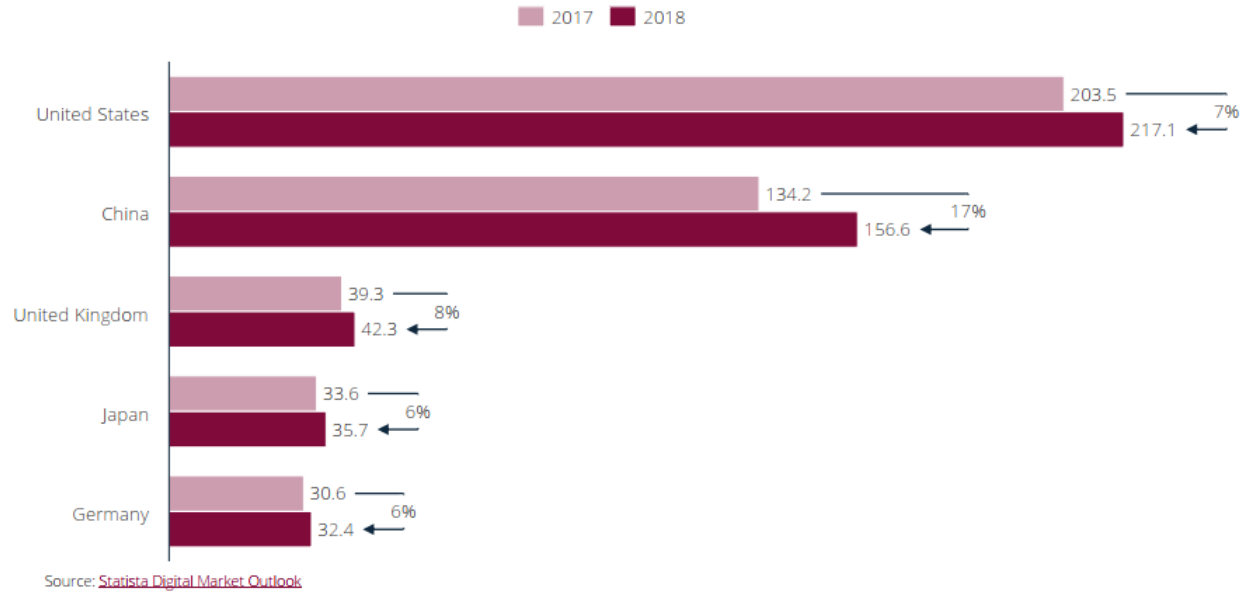
Figure 3: Global eTravel revenue, billion US$



Source: Statista Digital Market Outlook

In terms of geography, 5 economies leading the e-travel market include the US, China, United Kingdom, Japan and Germany (Figure 4). By volume, the US and China are the two largest markets during 2017 – 2018 period. The e-Travel market grew in these top 5 economies by more than 6% during the same period, with China being the fastest growing market with a growth rate of 17%.

Figure 4: Top 5 eTravel markets by market revenue, billion US$

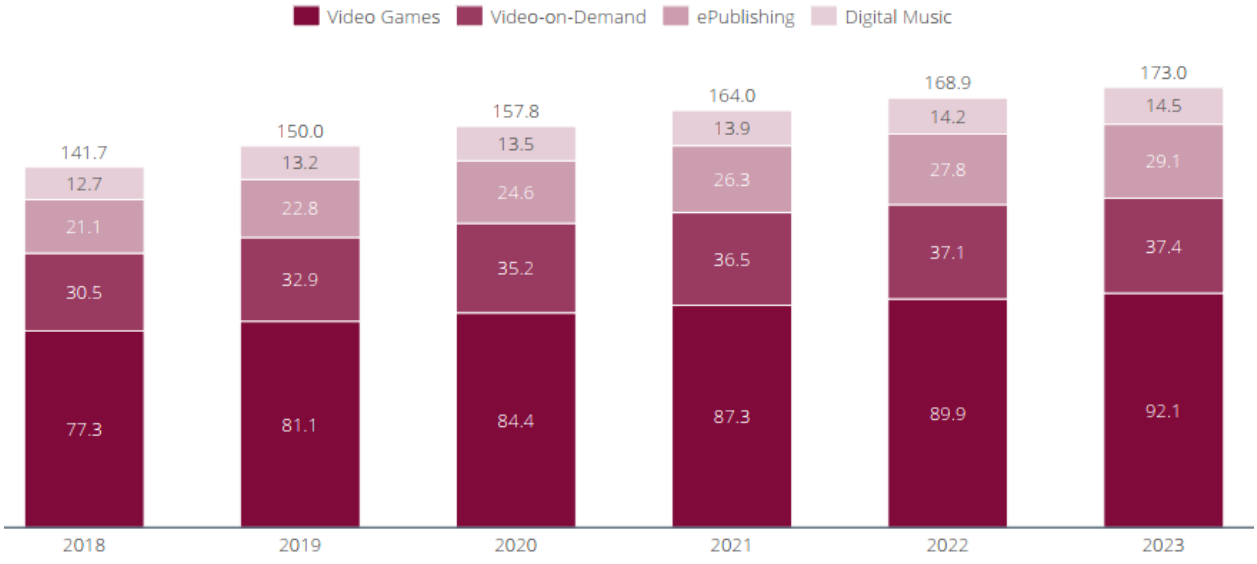


Source: Statista Digital Market Outlook

1.3. Digital Media

The increasing number of mobile and streaming devices together with growing connection speed rates have shifted consumers to digital media. Digital media market is segmented into four areas including Video Games, Video-on-Demand, ePublishing, and Digital Music. The global Digital Media market revenue amounts to US$141.7 billion in 2018 and is expected to reach US$173 billion by 2023 (Figure 5). Video Games are by far the biggest market in 2018 with a global revenue of US$77.3 billion, representing 55% of the whole Digital Media market. Video-on-Demand ranks the second place in digital market with a global revenue of US$30.5 billion in 2018, accounting almost 22% of the market. The next smaller segment is ePublishing, contributing almost 15% of value of the total market. Digital Music is the smallest segment in 2018 with the revenue of US$13 billion, making up 8% of the market.

Figure 5: Global Digital Media revenue forecast, billion US$

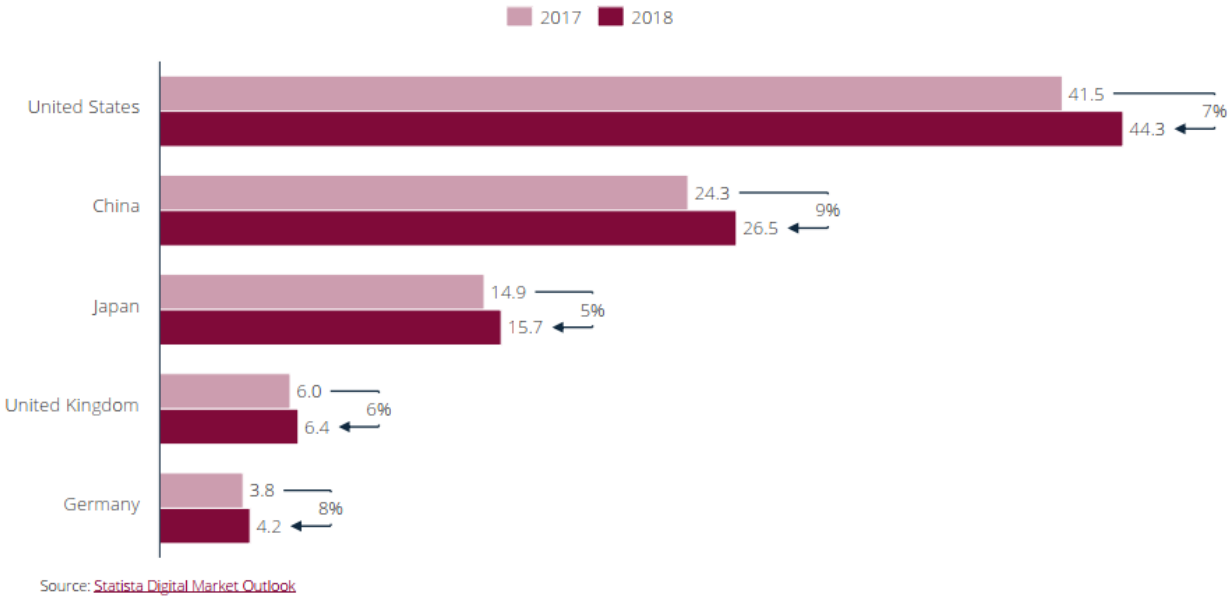


Source: Statista Digital Market Outlook

5 economies leading global media market include the US, China, Japan, United Kingdom and Germany. These top 5 economies generated total value of US$90.5 billion and US$97.1 billion in 2017 and 2018,

respectively. The US and China were the two largest markets during 2017 – 2018, while China and Germany show the highest growth in digital media revenues during the same period.

Figure 6: Top 5 Digital Media markets by market revenue, billion US$

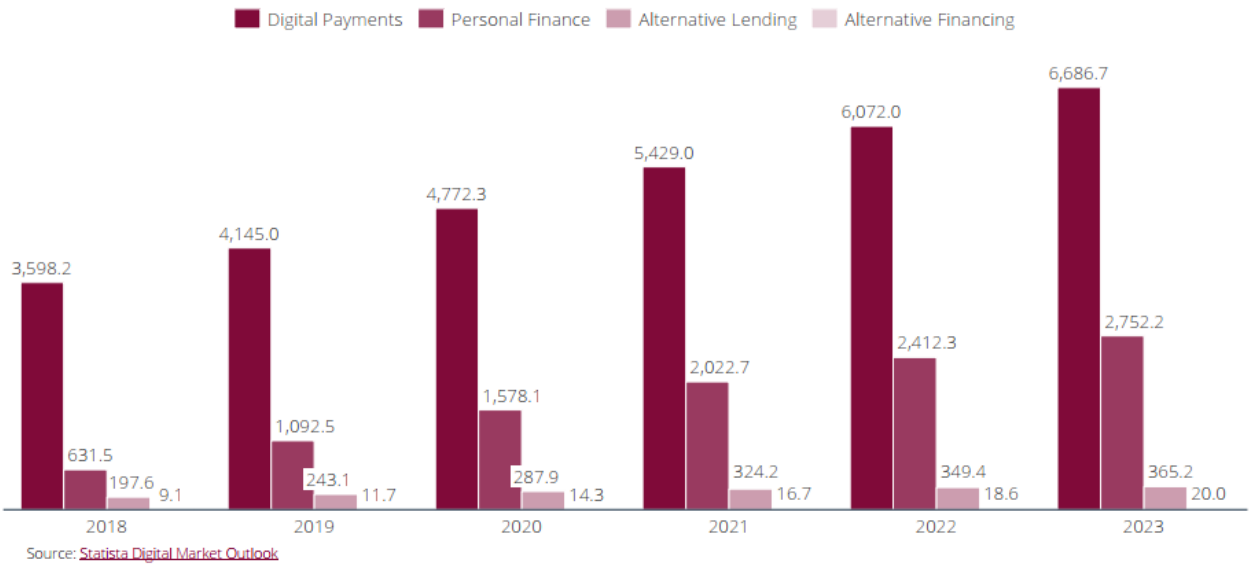


1.4. FinTech

Traditionally, customers go to banks when they need financial services. Now, thanks to the emergence of Internet and advanced technology, FinTech has came and offered quick and convenient targeted services with a range of financial solutions. FinTech, or Financial technology, refers to the integration of technology into delivery of financial services by financial services companies in order to improve activities in the sector. FinTech has been dramatically evolving in the last decade and has already changed the way people spend, invest, and lend money.

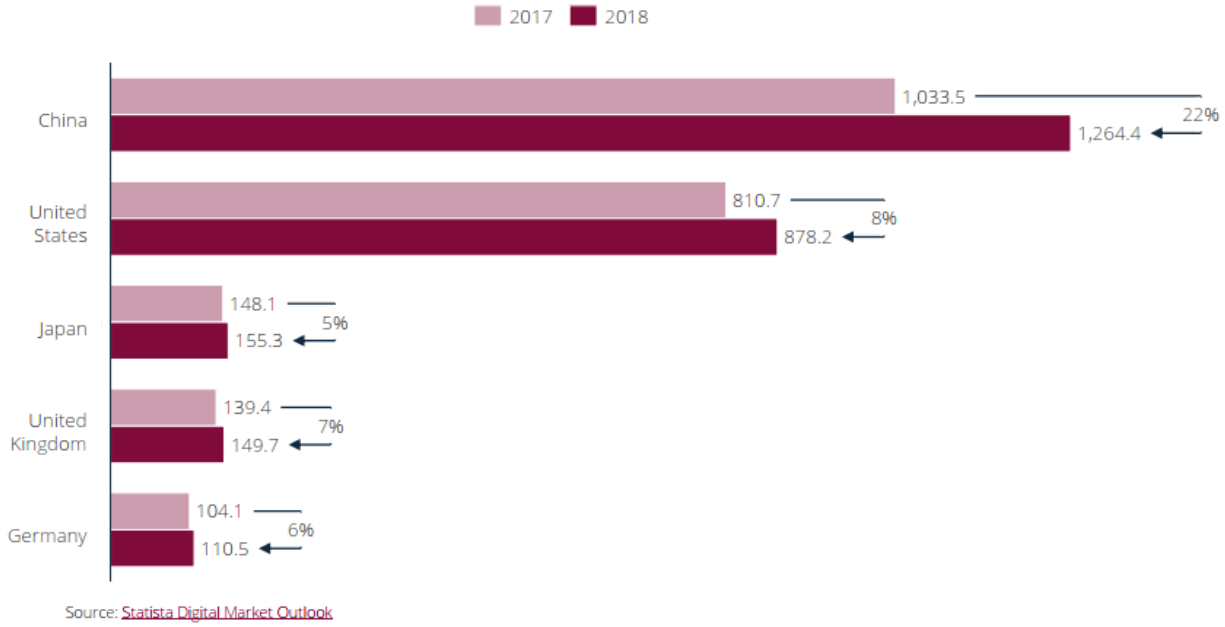
The Fintech Market is composed of 4 segments which are Digital Payments, Personal Finance services, Alternative Financing and Alternative Lending. The FinTech market value stood at US$4,436.4 billion in 2018 and was expected to amount to US$9,824.1 billion by 2023 (Figure 7). Digital Payments are by far the largest segment in the global FinTech market, representing over 80% of the whole market in 2018 and the trend continues for the years to come. The second largest segment in FinTech market is Personal Finance with steady growth during 2018 – 2023 period. Alternative Financing and Alternative Lending are the two smallest segments with transaction values comparatively small.

Figure 7: Global FinTech transaction value, billion US$



In digital Payment segment, China lead the market with transaction values of US$1.033 trillion in 2017 growing by 22% to US$1.264 trillion by 2018 (Figure 8). The US follows China with a transaction value of US$810 billion in 2017 growing by 8% to US$878 billion by 2018. Japan, United Kingdom and Germany are struggling to catch up.

Figure 8: Top 5 FinTech markets by Digital Payments transaction value, billion US$



1.5. Digital Advertising

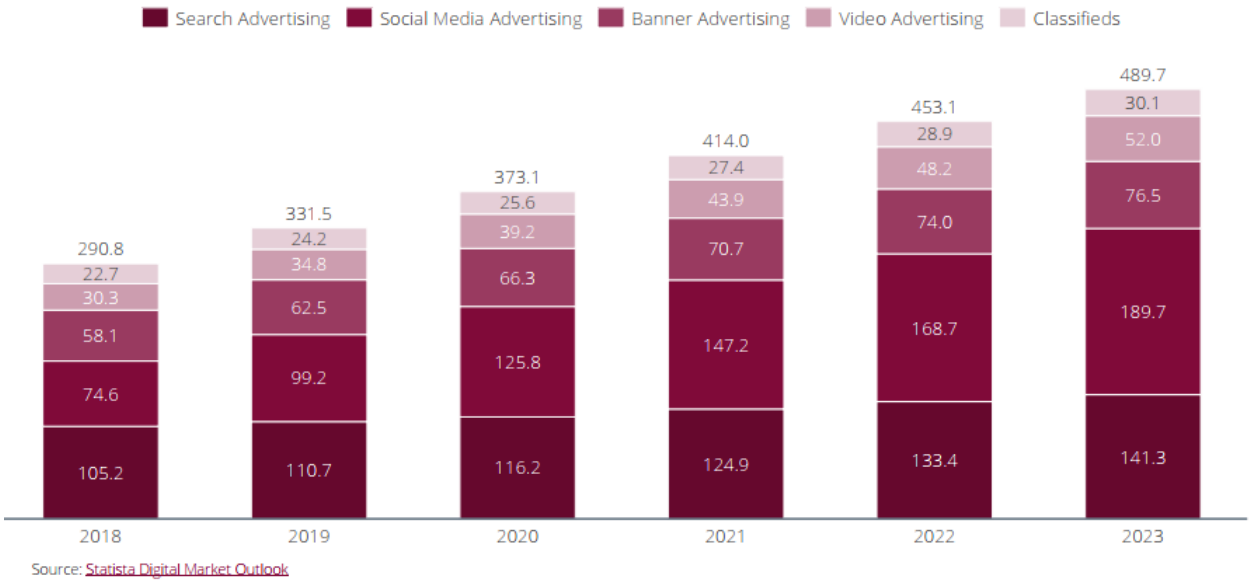
It was reported that worldwide spending on digital advertising surpassed TV ad spending for the first time in 2017, marking a major milestone in the world of advertising and the gap is expected to continue to widen for the years to come.

Digital marketing includes 5 segments: Banner Ads, Video Advertising, Social Media Advertising, Search Advertising and Online Classifieds. Digital ad spending will grow 68% from US$290.8 billion in 2018 to US$489.7 billion by 2023 (Figure 9).

Search Advertising dominates digital advertising with a global market volume of US$105.2 billion in 2018, accounting for 36% of the whole market. Social Media Advertising is expected to exceed Search Advertising to become the leader of the market by 2020 with a global market volume of US$125.8 billion, making up a market share of 37%. Social Media Advertising revenue rises to US$189.7 billion by 2023.

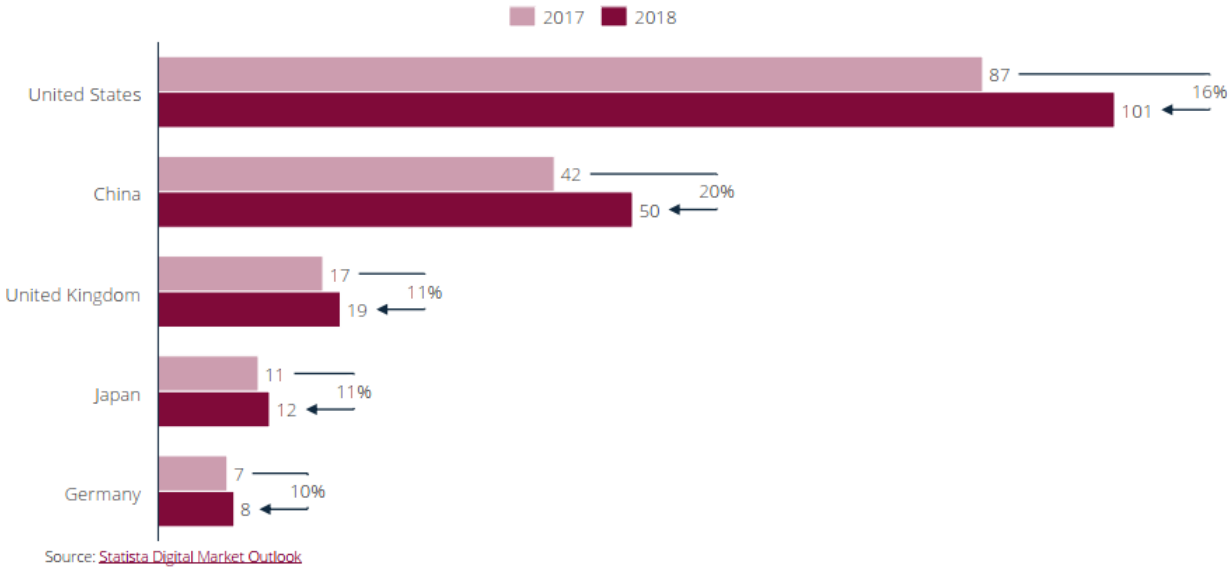
Banner Advertising stood as 3rd largest segment with a volume of US$58.1 billion in 2018, being projected to reach US$76.5 billion by 2023. Banner Ads and Online Classifieds are the two smallest segments in Digital Advertising with revenue of US$30.3 billion and US$22.7 billion in 2018, respectively.

Figure 9: Global Digital Advertising revenue forecast, billion US$



The US is dominant economies in terms of digital advertising revenue with a volume of US$87 billion in 2017, making up 53% of total revenue of top 5 Digital Advertising economies. China ranked the 2nd place in the top 5 and its Digital Advertising revenues increased by almost 20% from 2017 to 2018. United Kingdom, Japan and Germany are struggling to catch up.

Figure 10: Top 5 Digital Advertising markets by market revenue, billion US$



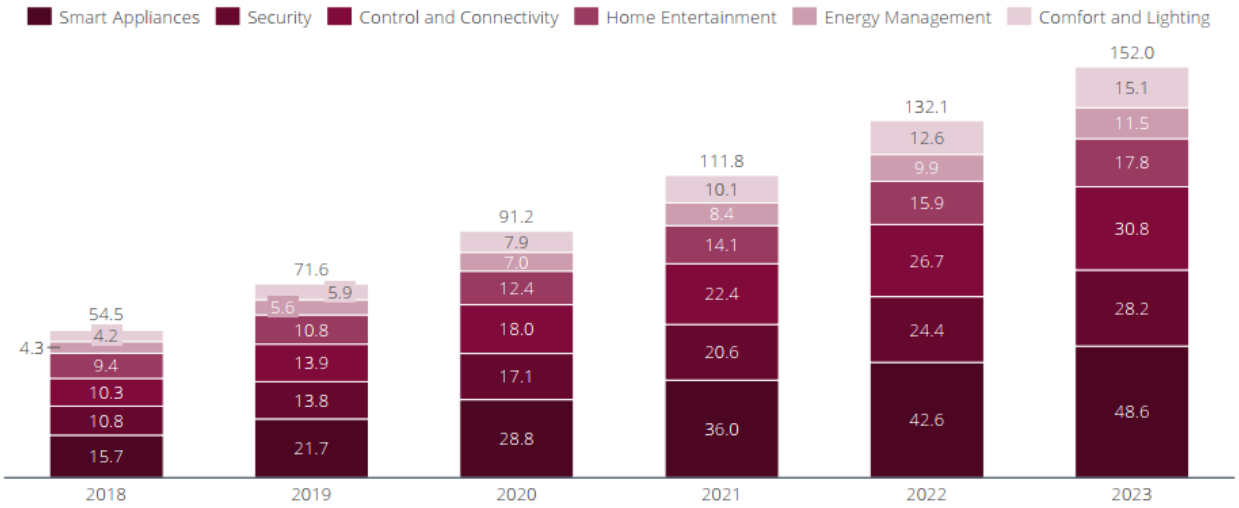
1.6. Smart Home

The Internet of Things (IoT) technology is one of the emerging trends disrupting traditional industries. As one of IoT applications, smart homes make life easier, comfortable and safer by enabling us to control the temperature of our house from anywhere, turn lighting on and off or manage our movie and music collection effortless, manage your life habits by monitoring how often you watch TV, what kind of meals you cook in your oven, the type of foods you keep in your refrigerator, or maximize home security with motion detectors, surveillance cameras, automated door locks, ect. The smart home market amounts to

US$54.5 billion in 2018 and is expected to grow by 22% anually to reach US$152 billion by 2023 (Figure 11).

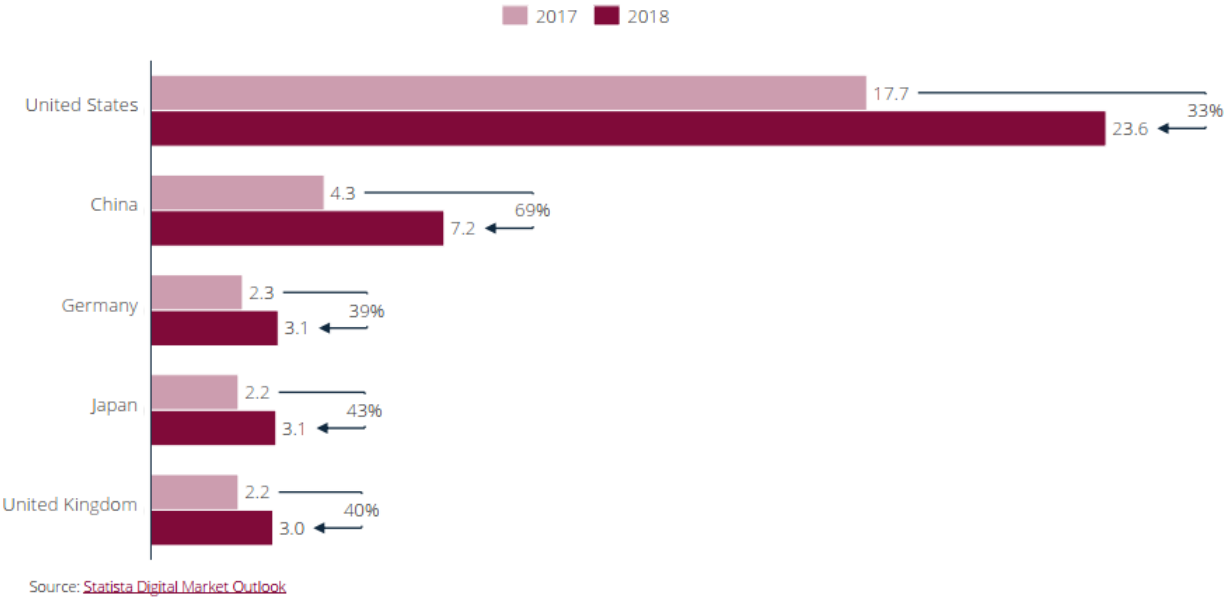
The Smart homes market is divided into 6 segments including Control and Connectivity, Comfort and Lighting, Security, Home Entertainment, Energy Management, and Smart Appliances. Among these 6 market segments, smart appliances are the biggest market with a revenue of US$15.7 billion, making up 29% of total global smart home in 2018 and continue their dominating trend in the years to come (Figure 12).

Figure 11: Global Smart Home revenue forecast, billion US$



Top 5 Smart Home economies include the US, China, Germany, Japan and United Kingdom. The US was the biggest Smart Home market in 2018 with a revenue of US$24 billion, far ahead that of China which is at 2nd place. The Smart Home market is on the rise in all top 5 economies, with China growing at the highest pace during 2017 – 2018 period.

Figure 12: Top 5 Smart Home economies by market revenue, billion US$



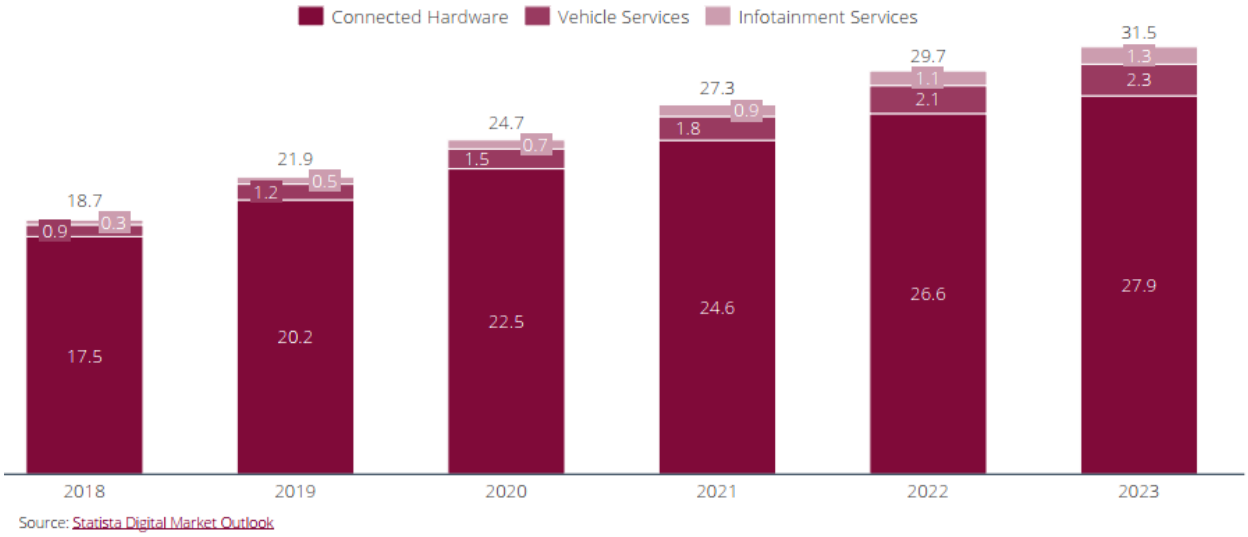
1.7. Connected Car

Another aspect to look into digital economy is Connected Car. Connected Car refers to the car equipped with hard wares that enable internet connect, thus, enables the communication of the vehicle with other connected cars, smartphones, and the environment. In 2018, there were more than 31 million connected

cars newly registered, adding to a total of 119 million vehicles on the roads worldwide. The market generated a revenue of US$18.7 billion in 2018 and continued to rise to US$31.5 billion by 2023.

Connected Car market is segmented into Connected Hardware, Vehicle Services and Infotainment Services with Connected Hardware being the largest segment representing over 88% of the total market. Vehicle Services and Infotainment Services are extremely small segments though their revenues slowly increase during 2018 – 2023 period.

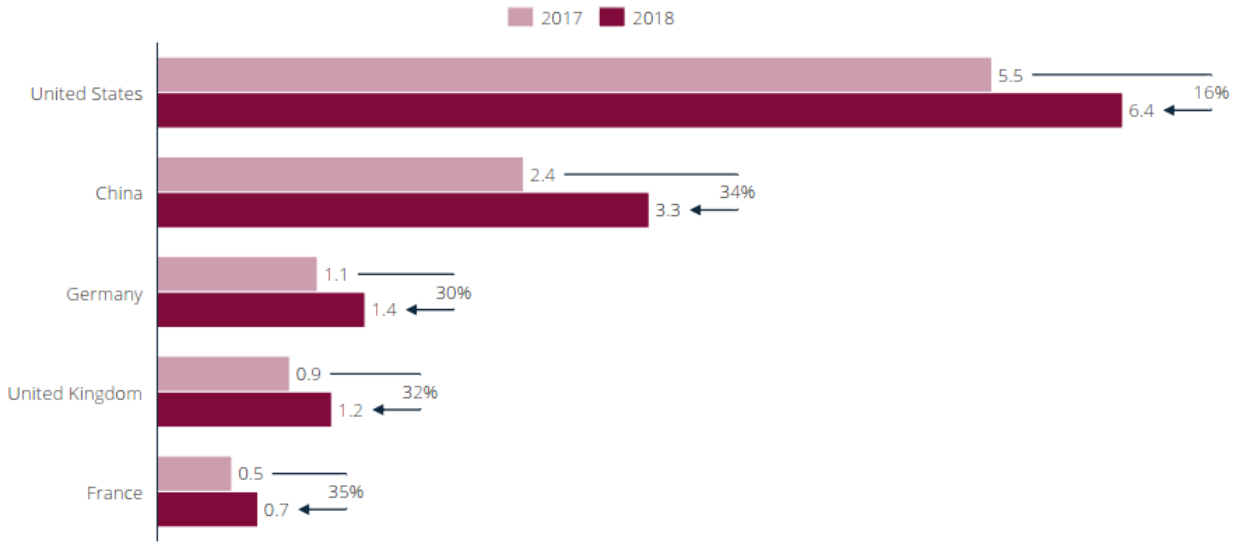
Figure 13: Estimated global Connected Car revenue in billion US$



Source: Statista Digital Market Outlook

The US is dominant in Connected Car market with revenue of US$5.5 billion and US$6.4 billion in 2017 and 2018, respectively. China earned the second place with a revenue of US$2.4 billion in 2017 and rose 34% to US$3.3 billion by 2018. Though size of the markets is relatively small, EU economies show subtential growth during the same period.

Figure 14: Top 5 Connected Car economies by market revenue, billion US$



Source: Statista Digital Market Outlook

2. Trends in digital technologies

The development of new technologies has led to the emergence of new markets and growth of related industries. New technologies – called as disruptive ones that replace established technologies by transforming an existing industry or create a new one - are likely to make changes to the manufacturing and service sectors. Key digital technologies that have been driving forces for digital economy include:

Advanced manufacturing, robotics and factory automation; block chain; Big data analytics; Internet of things (IoT); artificial intelligence (AI).

Being capable of performing a variety of tasks and applications, and being more precise and consistent than human workers, robots can replace human workers in several fields as they are used in industrial manufacturing to the medical field. IoT can facilitate smart manufacturing through improved factory operations. Big data provides firms with optimization measures in production, logistics and interaction with customers. With capability to perform cognitive functions such as perceiving, reasoning, learning, and problem solving, AI solutions are increasingly adopted across industries such as the automotive, healthcare, education, finance, entertainment, and other industries. However, the transformative potential of these technologies can only be fulfilled if and when these elements mature, become better integrated, more interoperable, and broadly used (UNCTAD, 2017). This is unlikely to be a simple, even, or rapid process. Some challenges presented by these technologies such as security or privacy issues could hamper or even derail the development of the digital economy.

In this section, 4 technologies including Advanced manufacturing, robotics and factory automation; Big data analytics; Internet of things (IoT); artificial intelligence (AI) will be discussed in details.

2.1. Advanced manufacturing, robotics and factory automation

Industrial robots have been around for decades, but we have witnessed the evolvement of robots over time. In the past, industrial robots were fixed machine designed for repeating moves to completing a task. Robotics and automation were brought into workplace in order to replace human in dirty, dull, or dangerous jobs; to produce quality improvement by avoiding errors and minimizing variability; and to lower manufacturing cost by replacing workers with increasing minimum wage with cheaper robots (Mc Kinsey, 2017). Today's industrial robots have improved their capabilities. Besides the above-mentioned capabilities of the past, today's most advanced robots have additional capabilities expanding their operation in unstructured environments that we have never seen before.

Today, mobile robots are used for washing windows of skyscrapers. Flying robots are used to inspect powerlines and pipelines, or to collect data for insurance claims. Wheeled robots are deployed to move goods through warehouses. Robots are used combined with advanced analytics by engineers for automation of mining processes. In the healthcare industry, they are helping doctors improve surgical procedures. In the consumer sphere, physical robots are becoming more popular through applications like 3D printing, drones and robotic vacuum cleaners (Accenture, 2018).

Today, we have witnessed the following trends in robot and automation:

- As production of robots has increased, the prices of robot have gone down. It is estimated by Mc Kinsey & Company, over the past 20 years (from 1990 to 2010), the average robot price has gone down by half in real terms, and the price has fallen even further in comparison to labor costs. In order to meet the demand from emerging economies, the production of robots is encouraged to go up and, they are likely to become cheaper and affordable.

- Until recently robotics specialist were rare and expensive. Not many robotics engineers who were equipped with skills necessary for designing, installing, operating, and maintaining robotic production systems were available. Today, people with such skills are available as these subjects are widely taught in schools and colleges around the world, and courses on manufacturing technologies or engineering design for manufacture are provided widely. Testing robotic applications is easier and affordable for companies as software, such as simulation packages and offline programming systems, are available, too.

- Robots are becoming more intelligent. While early robots operated in structured environments, followed the same path and could only handle limited variability and failed at tasks with small changes in the environment, the latest generations of robots can cope with variations in the environment thanks to advances in artificial intelligence (AI) and sensor technologies. Given a desired state of environment as input (e.g., which items to pack into a box for robots deployed for packing boxes, the level of

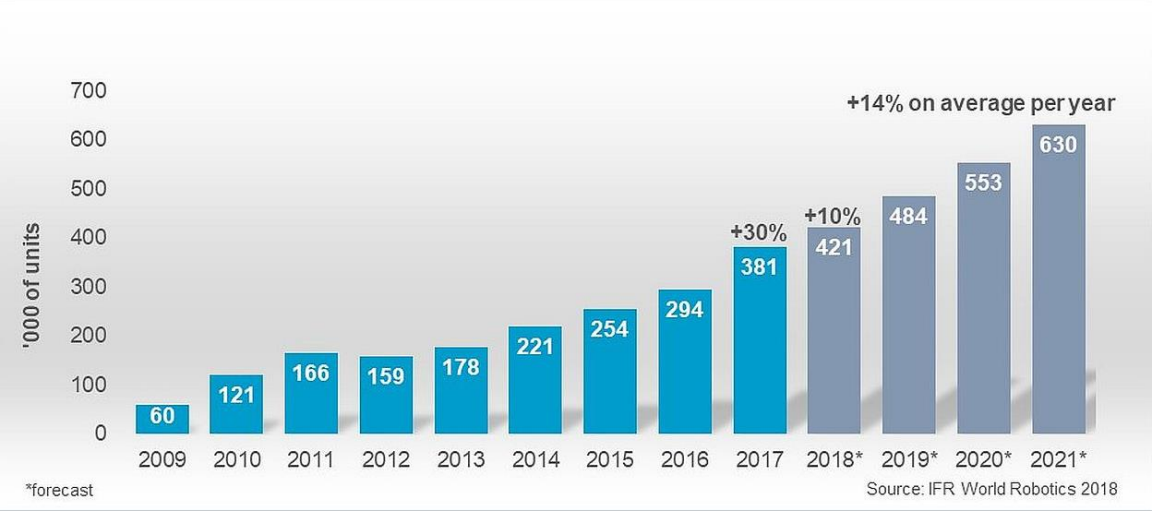
cleanliness desired for a floor for robots deployed for cleaning floors, which pipes to inspect by when for robots deployed for inspecting pipelines), planning algorithms decide to use which of the robot's capabilities and how to use them (Accenture, 2018). Thanks to powerful computer technology and big data–style analysis, they can also, for instance, check the quality of product as it is being made, and therefore help prevent processing errors and significantly reduce the amount of post-manufacture inspection required.

In other cases, advanced sensor technologies and the computer power to analyze the data from those sensors enable robots to oversee complex tasks like cutting gemstones that was previously done by highly skilled craftspeople.

- As robots become more agile and aware of their surroundings, they can work alongside people. Robots can detect human's movements and intelligently adjust their movement to avoid a collision with humans and ensure they can work safely side by side with people to assist them. They are now also reprogrammable to quickly "learn" from human workers how to take on new tasks. When robots and people can work side by side, the ability to reallocate tasks between them helps increase productivity. Working with human colleagues, collaborative robots are contributing to reshape manufacturing processes and workforces.

The adoption of robots has been seen in economies, especially in the developed world. According to International Federation of Robotics, annual sales volume of industrial robots increased by 114% over the period of 2013 - 2017. The sales value rose by 21% from 2016 to US$16.2 billion in 2017.[4]

Figure 15: Global industrial robot sales



According to data from the International Federation of Robotics, average of global robot density in the manufacturing industries increased from 74 installed industrial robots per 10,000 employees in 2016 to 85 in 2017. By region, there are 106 robot units per 10,000 workers in Europe and 91 in the Americas and 75 in Asia. Korea is the world's largest robot adopter, with a density of 710 robots per 10,000 workers, while Singapore ranked second with 658 robots per 10,000 workers, Germany ranked third with 322 robots, Japan ranked fourth with 308, and Sweden ranked fifth with 240. The United States ranked seventh with 200 industrial robots per 10,000 workers. In the United States, the automation pace is slower with a density rate of 200, thus, earning the economy the seventh place.

[4] https://ifr.org/ifr-press-releases/news/global-industrial-robot-sales-doubled-over-the-past-five-years
http://www2.itif.org/2018-industrial-robot-adoption.pdf

Table 1: A selective taxonomy of robotics technology: what they are, what they do, and where they work

Main Categories	Common Tasks	Typical Domain	Established Industry Adopters	New and Future Industry Adopters
Fixed and caged industrial robots Designed to operate within physical barriers (includes Articulated arm, SCARA, Cylindrical and Cartesian)	Assembly Welding Riveting Drilling Fastening Die casting Picking/packaging/sorting Painting/coating	Industrial manufacturing plants and factories	Industrial products manufacturing Retail and consumer Food and beverage Electronics Pharmaceutical	Oil and Gas, pipeline distribution Construction All industries adopting robotic additive (3D printing) manufacturing
Collaborative robots Designed to operate safely around or with humans		Industrial manufacturing plants/factories Warehouses Distribution centers Pipe networks Drilling operations Construction sites	Industrial products manufacturing Retail (warehouses) Medicine (assisted surgery) Semi-conductor Electronics Oil and gas industry Healthcare Law enforcement Agriculture Online retailers Retail and consumer	Industrial products manufacturing Retail (warehouses) Medicine (assisted surgery) Semi-conductor Electronics Oil and gas industry Healthcare Law enforcement Agriculture Online retailers Retail and consumer
Collaborative stationary robots Quickly programmable to augment/supplant manual tasks with humans at a stationary site	Collaborative stationary robots Quickly programmable to augment/supplant manual tasks with humans at a stationary site			
Collaborative Autonomous Mobile Robots (AMRs) (designed to work closely with	Materials handling In-plant transportation Automated palletizing Product/shelf scanning (in warehouse and retail			

Main Categories	Common Tasks	Typical Domain	Established Industry Adopters	New and Future Industry Adopters
humans) and automated guided vehicles (AGVs)	environments) Brick-laying			
Unmanned Aerial Vehicles (UAVs) for surveillance Low payload industrial aerial drones (under 15lb)	Unmanned Aerial Vehicles (UAVs) for surveillance Low payload industrial aerial drones (under 15lb)	Locales of large-area environmental surveillance (mines, forests, oil rigs, pipe-lines, construction sites, farms, etc.) Warehouse/fulfillment centers Airports Energy assets (oil rigs, wind turbines, power plants)	Aerospace Construction (illustration of sites) Real estate Oil &Gas	Agriculture (e.g., crops surveillance) Power utilities (plant, transmission/ distribution network inspection) Mining Industrial products manufacturing
Unmanned Aerial Vehicles for transport High payload capacity 15lb+ (Note: 55 lb-payload is highest permitted by FAA, as or August 2016, for commercial delivery	Retrieval and delivery of parts/packages	Private plants and premises All other airspace permitting UAV use	Private plants and premises All other airspace permitting UAV use	All industries requiring delivery of low pay-load items Last-mile delivery of parts or end-user product In-plant/warehouse inventory management and materials handling Low payload tasks now carried out by airplanes/helicopters (e.g., spraying crops)

Main Categories	Common Tasks	Typical Domain	Established Industry Adopters	New and Future Industry Adopters
applications)				
Robotic Exoskeletons Wearable robotics systems designed to augment human physical performance	Assists manual human labor (e.g., lifting, gripping, carrying)	Assists manual human labor (e.g., lifting, gripping, carrying)	Industrial manufacturing (especially auto sector) Retail & Consumer (in warehousing operations)	Industrial manufacturing (especially auto sector) Retail & Consumer (in warehousing operations)

Source: Robot-ready: Adopting a new generation of industrial robots, PWC, 2018; Accenture,

2.2. Internet of Things

There is “no single, universal definition” of the IoT (Internet Society). From the perspective of technical standardization, the IoT can be defined as a “global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies”[5]. According to the Internet Society, the IoT generally refers to “scenarios where network connectivity and computing capability extends to objects, sensors and everyday items not normally considered computers, allowing these devices to generate, exchange and consume data with minimal human intervention.” Another definition simply puts that the IoT is “that everyday objects can be equipped with identifying, sensing, networking and processing capabilities that will allow them to communicate with one another and with other devices and services over the internet to achieve some useful objective” (Whitmore et al., 2015).

The potential for IoT is enormoUS International Data Corporation (IDC) forecasts there will be 25 billion connected devices in the market by 2025 and IoT global market revenue will reach approximately $1.1 trillion in 2025. Similarly, according to Gartner, there will be 20.8 billion connected devices to be installed and the economic value of IoT will gain $3 trillion during the same timeframe[6]. In its study, HP estimates machine-to-machine connections will gain a compound annual growth rate of 18%, reaching 27 billion by 2024.[7]

[5] (International Telecommunications Union (ITU, 2018b) - International Telecommunications Union (ITU) (2018b), *Overview of the Internet of things*, Geneva: ITU.
[6] EY - Internet of Things Human-machine interactions that unlock possibilities
[7] Realizing the Internet of Things: A Framework for Collective Action (WEF)

By region, IDC Worldwide Semiannual Internet of Things Spending Guide reveals that the Asia/Pacific region will be the global leader for Internet of Things (IoT) Spending in 2019 with around 35.7% of the worldwide spend, followed by the United States and Western Europe with 27.3% and 21.2% of the WW IoT Spend in 2019 respectively. China is the top spender in the region with $168.6 Billion accounted for the year 2019 followed by Republic of Korea and India with a spending of $26.2 Billion and $20.6 Billion in 2019 respectively.

According to IDC, in Asia/Pacific, there is considerable support and mandates from governments, such as China, Republic of Korea, Chinese Taipei, Hong Kong, China and Singapore, to promote the development of IoT across all major industries, particularly energy and resources, transportation, manufacturing, agriculture, government, healthcare, and retail. In China, individual municipalities have embarked on Smart City zones oftentimes in cooperation with local universities and businesses. Willingness towards the implementation of 5G infrastructure will help to accelerate IoT growth of applications that will benefit from low-latency and more bandwidth such as video-centric applications.

The IoT increasingly plays an important role, thus, is of increasing interest for both consumers and businesses. For consumers, the IoT can improve life quality by enabling them to monitor physical fitness and health through wearable devices or better manage their homes through smart appliances such as smart refrigerators by providing them with spoilage alerts, visuals of the fridge and plans of their grocery shopping from distance.

Meanwhile, the IoT can help businesses improve their operational efficiency, make factories smarter, safer and more environmentally friendly. IoT connects the factory to several smart manufacturing solutions running around the production, leading to dramatic improvements to production and cost reduction. IoT allows manufacturers to track objects, to figure out consumer usage habits, and to determine what adjustments should be made to help improve adoption and purchasing rates of the products. Or in other words, IoT allow companies to provide customers with better experience and to better experience and better manage their organizations and complex systems (Fleisch, 2010).[8]

There are various applications of IoT in life at different levels, from individuals to society (Table 2).

Table 2: Applications of IoT in life at different levels

Level	**Individual**	**Community**	**Society**
IoT	Smart phones Wearables	Connected Cars Health devices Smart homes	Smart Cities Smart Grids
Examples	GPS, Fitbits Visa PayWave Mastercard Paypass Employee passes	Intelligent Transport Systems Event Data Recorders (EDRs) Blood pressure monitors; remote burglar/heating systems	Smart metering; Smart water meters Traffic monitoring
Data	Mobile money Fitness data, GPS location-based data	Speed, distance, airbag, crash locations/alerts; Heart rate, blood pressure; Diet, remote heating data	Electricity/water consumption & billing; Traffic flow data

[8] World Trade Report – future of the world trade)

Intended Audience	Individual person Immediate friends/ family; banks; employers	Speed, distance, airbag, crash locations/alerts; Heart rate, blood pressure, Diet, remote heating data	Authorities/regulators Utility companies; Other citizens

However, there are still some stiff challenges for wider adoption of the IoT that include security, connectivity, and compatibility and longevity (Banafa, 2017). As security incidents such as the hacking of baby monitors, smart fridges, thermostats, drug infusion pumps, cameras have occurred, the deployment of connected devices in the home or office can introduce dangerous vulnerabilities and may require the application of sufficient technical and perhaps regulatory safeguards. Connecting millions or billions of new devices to the Internet can create serious bottlenecks in telecommunication systems requiring companies and governments to spend on new investments to upgrade these systems. Finally, as so many companies are competing to develop new connected devices for both business and consumer markets, compatibility issues are likely to arise and there will be a need to develop some standards to cope with this (WTO, 2018). [9]

2.3. Big data analytics

Another trend underlying the digital revolution and shaping the digital economy is the ability to collect, store and transfer many forms of information including text, sound, video, image and more into digital information that can be processed by powerful computers and transmitted via fibre optic cables to a global users. Digital information from complex data coming from anywhere and at anytime has opened up a new era – the era of Big data.

Big data is defined by 3 characteristics: volume, velocity and variety. Volume reflects that Big data involves analysing comparatively huge amounts of information. Velocity reflects the high speed of data generation and change. Variety refers to the fact that Big Data can come from many different sources, in various formats and structures.

Big data analytics refers to advanced analytic techniques, considering large and various types of datasets to examine and extract knowledge from big data, constituting a sub-process in gaining insights from big data process. Using advanced technologies, big data analytics includes data management, open-source programming like Hadoop, statistical analysis like sentiment and time-series analysis, visualization tools that help structure and connect data to uncover hidden patterns, undiscovered correlations and other actionable insights.[10] The power to analyse huge amounts of data provides us with an unprecedented ability to make better, more insightful decisions in each of the areas needed for growth.

Big data has been used across industries for business expansion. Amazon has made use of big data in achieving to disrupt the traditional book market and became the leader in digital shopping. Google has harnessed data from engine search to digital marketing in order to provide and personalize search to its users, while Google and Facebook collect data providing opportunities for personalized and customized marketing. Not only used by digital and data-driven enterprises, big data has been utilized by traditional non-technological companies. General Electric, for example, has developed a cloud-based platform for Industrial Internet application called “Predix” which provides engineers with real-time insights to schedule maintenance checks, improves the efficiency of the machine and reduces downtime. Walmart and many other major retailers have also benefited from applying big data analytics in the entire business process, from supply-chain management to marketing. Netflix collects user data such as searches, ratings, re-watched programs, and so on which help it provide its users with personalized

[9] https://www.wto.org/english/res_e/publications_e/world_trade_report18_e.pdf

[10] https://www.researchgate.net/publication/320771893_Big_Data_Analytics_Applications_Prospects_and_Challenges

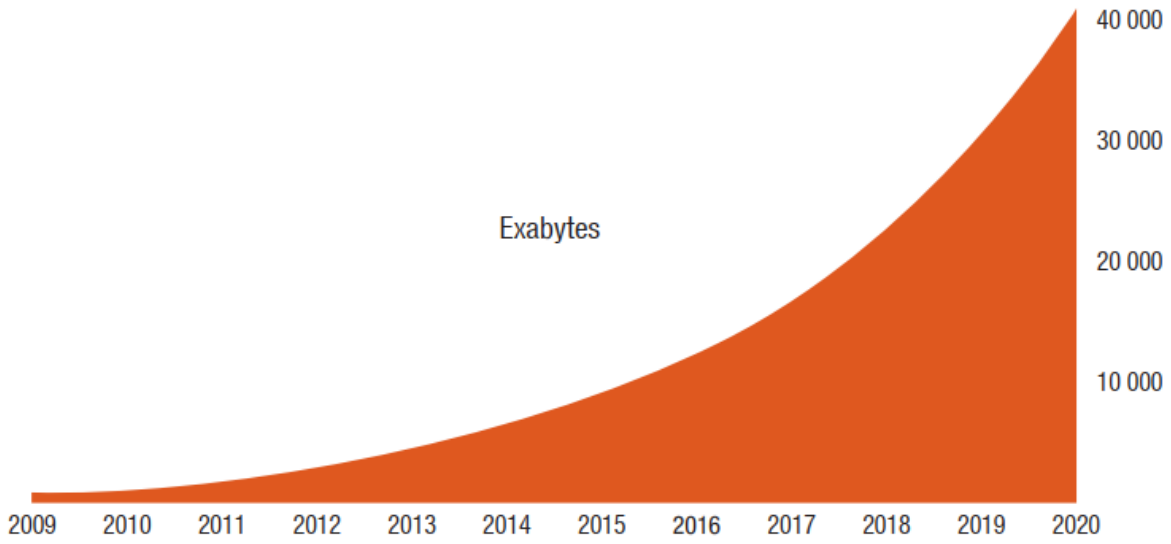
recommendations, suggest videos similar to the ones that has been watched or show various titles from a specific genre. Doing such with big data, Netflix has saved $1 billion per year on customer retention.[11]

Big data exceeds the processing capacity of traditional relational database management systems. As estimated by IDC, data created, replicated and consumed (in a single year) will grow dramatically from around 3 zettabytes in 2013 to approximately 40 zettabytes by 2020[12] (Figure 16).

[11] https://insidebigdata.com/2018/01/20/netflix-uses-big-data-drive-success/

[12]Data included in the estimate include "images and videos on mobile phones uploaded to YouTube, digital movies populating the pixels of our high-definition TVs, banking data swiped in an ATM, security footage at airports and major events such as Olympic Games, subatomic collisions recorded by the Large Hadron Collider at CERN, transponders recording highway tolls, voice calls zipping through digital phone lines, and texting as a widespread means of communications

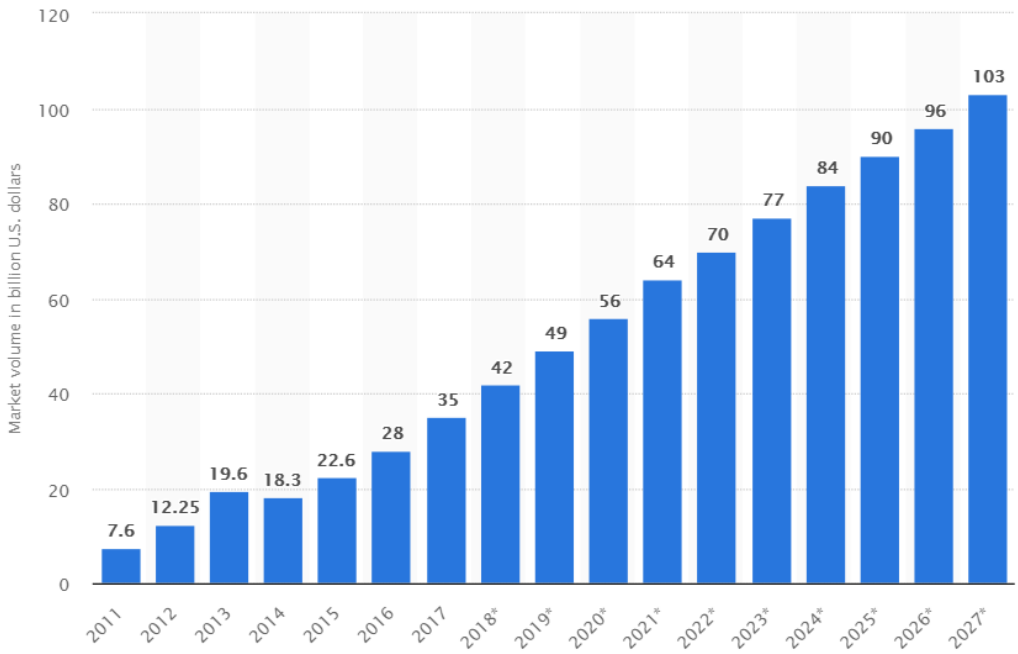
Figure 16: Growth of big data



Source: IDC, 2012

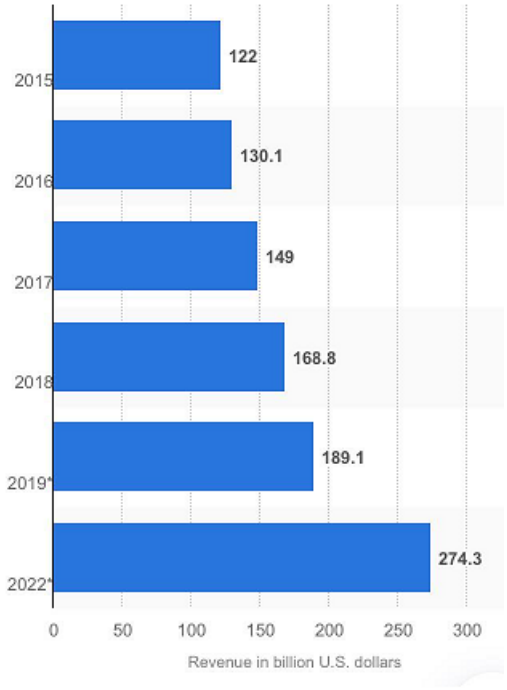
Big data market size grows steadily in terms of revenue. In 2018, annual revenue from the global big data market was estimated to reach 42 billion US dollars, with projection indicating this would further grow in the years to come (Figure 17). According to Statisca, services spending is believed to account for the largest share of big data revenue, which is 40% of the overall market as of 2017. The major providers of big data services include global corporations such as IBM, Splunk, Dell, Oracle, and Accenture.

Figure 17: Forecast of Big Data market size, based on revenue, from 2011 to 2027 (in billion US dollars)



Source: Statista[13]

Figure 18: Big data and business analytics revenue worldwide 2015-2022



Source: Statista

According to Statista, the global big data and business analytics market was valued at 168.8 billion US dollars in 2018 and is forecast to grow to 274.3 billion US dollars by 2022, with a five-year compound annual growth rate (CAGR) of 13.2 percent (Figure 18).

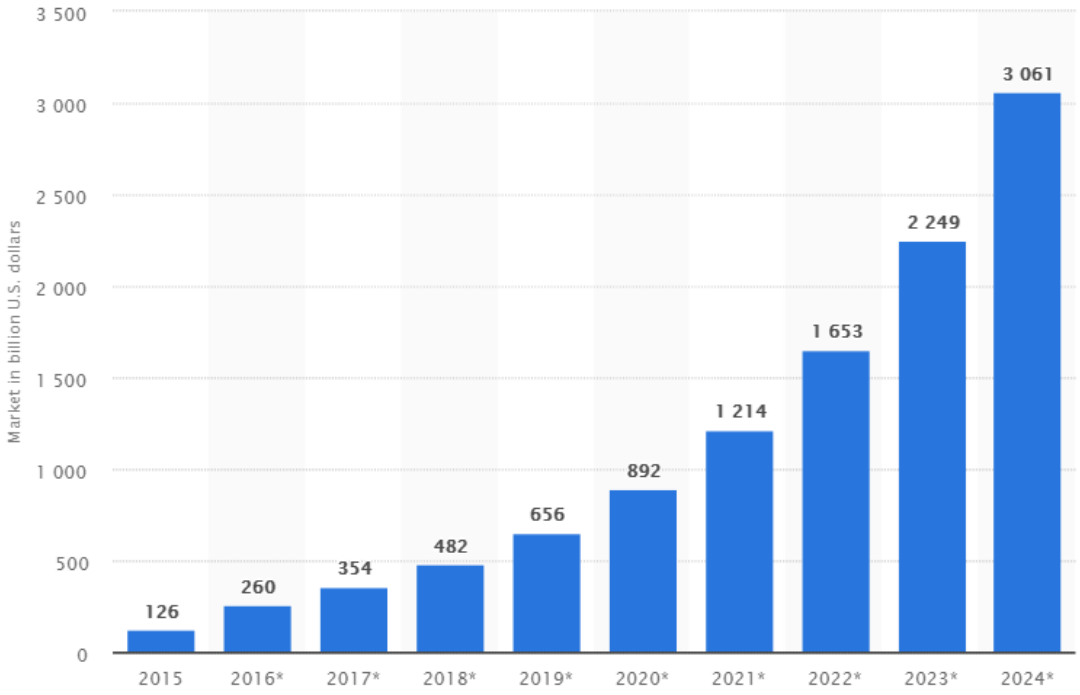
2.4. Artificial intelligence

Artificial intelligence, referring to the ability of a machine to perform cognitive functions associated with human behavior (such as perceiving, reasoning, learning, and problem solving), includes a range of capabilities that enable AI to solve business problems.

The term “Artificial Intelligence” (AI) is not new. It was already established in the 1950s and describes machine intelligence that is able to process, analyze, and react to input and changing situations by itself. While simple robotic process automations only deliver a fixed set of actions, advanced AI is able to learn from humans and past behavior and makes decisions on its own. All AI systems are composed of sensing and processing components, while advanced AI also contains learning components. These components are running in a never-ending cycle, leading to better decisions for the next situation.[14]

[13] statista.com/statistics/254266/global-big-data-market-forecast/
[14] https://www.statista.com/study/52194/digital-economy-compass/

Figure 19: Revenues from the artificial intelligence (AI) market worldwide from 2015 to 2024 (in billion US dollars)



Source: Statista[15]

The statistic shows that the size of the artificial intelligence market worldwide increases dramatically from 2015 to 2024 (Figure 19). In 2015, the global AI market generated revenues of 126 billion US dollars. By 2024, it has the potential to generate over 3 trillion US dollars.

In its study on the impact of AI in 12 developed economies, Accenture revealed that AI could double economic growth rates by 2035. AI will allow people to spend their time efficiently and as the result, it will help increase their productivity by 40%.[16]

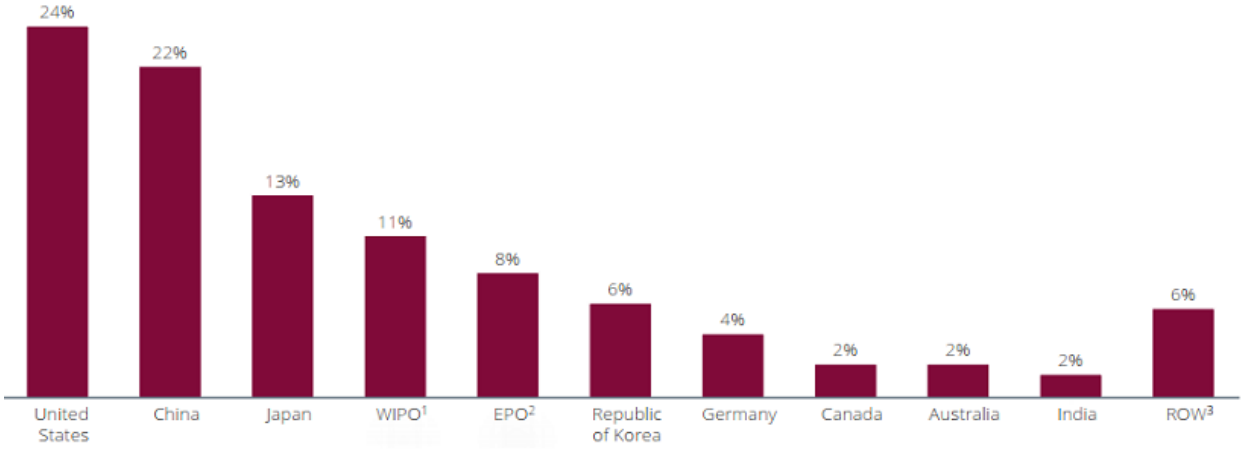
AI solutions are increasingly adopted and customized to meet the demand across industries such as the automotive, healthcare, education, finance, entertainment, and other industries. In the automotive industry, AI is primarily used to power autonomous cars, with these systems expected to become standard in new vehicles in the medium to long term. Even though most automotive manufacturers are developing AI-powered cars, Google and Tesla are currently the frontrunners in the field. Healthcare is another major area of AI disruption, with applications in the fields of diagnostics, drug discovery, personalized treatment plans, and robotic patient care. One of the major breakthroughs brought about by AI is the shift in approach from treating diseases to preventing them.

Competitive landscape Companies from various industries are currently developing AI and related applications. Google, IBM and Microsoft are leading AI innovations in the IT industry, whereas Amazon and eBay are investing in AI to improve their eCommerce platform, and ridesharing company Uber is using AI for autonomous driving, food deliveries, and mapping research. Collaborative development is on the rise, and leading companies such as Amazon, Apple, Facebook, Google/DeepMind, IBM, and Microsoft are currently working in partnership towards developing AI applications. The acquisition of small-scale AI companies in relevant fields by tech giants like Apple, IBM, and Microsoft is decreasing the learning curve. Other leading companies include Baidu, Facebook, and Salesforce.

[15] https://www.statista.com/statistics/621035/worldwide-artificial-intelligence-market-revenue/
[16] https://techjury.net/stats-about/ai/

There is gap in AI adoption among economies. The US is the leading economy in AI patent application with 24% of AI patent filings are made in the US, followed by China (22%) and Japan (13%) (Figure 20). In addition, most of the leading AI companies are also from the US (Figure 21).

Figure 20: the leading economy in AI patent application



1: World Intellectual Property Organization 2: European Patent Office 3: Rest of world
Source: WIPO 2018

Figure 21: Comparison of selected leading AI companies

Company	Headquarter	Revenue in bnUS$[1]	Key AI areas
Amazon	Washington, U.S.	177.9	Text-to-speech, computer vision, deep learning, NLP
Apple	California, U.S.	265.6[2]	Machine learning
Baidu	Beijing, China	13.0	Machine learning, robotics
eBay	California, U.S.	9.6	Predictive analytics, cloud-based AI, big data
Facebook	California, U.S.	40.6	Language technology, machine learning, computer vision
Google	California, U.S.	110.9	Machine learning, deep learning, automotive industry
IBM	New York, U.S.	79.1	Machine learning, cognitive architectures
Microsoft	Washington, U.S.	110.4[3]	Machine vision, machine learning, healthcare
Salesforce	California, U.S.	10.5[4]	Machine learning, analytics
Uber	California, U.S.	7.5	Voice and image recognition, machine learning, automotive industry

1: As of Dec 2017 2: As of Sep 2018 3: As of June 2018 4: As of Jan 2018
Source: Annual reports, corporate news letters

CHAPTER 3: POLICIES AND INITIATIVES FOR E-COMMERCE AND TRADE RELATING DIGITAL ECONOMY

I. Policies and Initiatives for e-Commerce

1. Electronic Transaction and Electronic Signature Legislation

The term Electronic transactions law is often defined as laws that facilitate e-commerce by providing legal certainty for the recognition of electronic communications, electronic records and electronic signatures. The APEC Electronic transactions laws are often influenced by international agreements, for example: the UNCITRAL Model Law on Electronic Commerce (UNCITRAL, 1996), the UNCITRAL MODEL LAW on Electronic Signature (UNICITRAL, 2001), and the United Nations Convention on the Use of Electronic Communications in International Contracts (UN,2005).

While conducting commercial transactions online, including e-payment, enterprises need to obey and follow the legal equivalence between written and electronic form of exchange, and this is also the goal of the e-transaction laws as they create an environment where the electronic forms have the same legal right as the traditional paper-based. There are 20 out of 21 economies (except Papua New Guinea) have adopted laws addressing electronic transactions. The legislation is based on the UNCITRAL 1996 Model Law on Electronic Commerce and 2001 Model Law on Electronic Signatures. However, each economy has their own laws and legislations regulating e-commerce transactions, thus the scope and vision of the legislation may vary in accordance to economies.

However, UNICTRAL 1996 Model Law on Electronic Commerce and 2001 Model Law in Electronic Signatures both have three fundamental principles as follows:

- Non-discrimination among E-transactions, meaning that a communication shall not be denied the validity in term of the electronic form on the sole ground;
- Technology neutrality, allowing electronic communications that have met certain criteria to have the same function and legal right as the traditional paper-based ones;
- Functional equivalence, where equal treatment of different technologies, means (e-mail, Internet, instant messaging, fax, etc.); and if possible, to have detailed provisions on technology requirement in the regulations implementing e-commerce legislation.

Table 3: Electronic Transaction & Electronic Signature Legislation in APEC[17]

Economies	Electronic Transaction& Electronic Signature Legislation
Australia	The Electronic Transactions Act 1999 https://www.legislation.gov.au/Details/C2011C00445 Electronic Transactions Amendment Act 2011 https://www.legislation.gov.au/Details/C2011A00033
Brunei Darussalam	Electronic Transactions Act (revised 2008)
Canada	Personal Information Protection and Electronic Document Act (PIPEDA, 2004)

	Uniform Electronic Commerce Act 1999
Hong Kong, China	Electronic Transactions Ordinance (Cap. 553) https://www.elegislation.gov.hk/hk/cap553
Indonesia	Law of Concerning Electronic Information and Transactions 2008 (amended 2016)
Japan	Act on Specified Commercial Transactions (1976) Law Concerning Electronic Signatures and Certification Services 2000 Payment Service Act (2009)
Republic of Korea	Digital Signature Act No. 5792/1999 Framework Act on Electronic Documents and Transactions Act No. 11461
Malaysia	Electronic Commerce Act 2006 Digital Signature Act 1997
New Zealand	Electronic Transactions Act 2002
The Philippines	Electronic Commerce Act 2000
Singapore	Electronic Transactions Act (Cap. 88) 2010 https://sso.agc.gov.sg/Act/ETA2010
Thailand	Electronic Transactions Act 2001 https://www.bot.or.th/English/PaymentSystems/OversightOfEmoney/RelatedLaw/Documents/et_act_2544_Eng.pdf
United States	State and Federal regulations are applicable
Chinese Taipei	Electronic Signatures Act 2001
People's Republic of China	Electronic Signatures Law 2004
Mexico	Código Civil Federal última reforma 24/12/2013 Código de Comercio última reforma 13/06/2014 Código Fiscal de la Federación última reforma 14/03/2014 Ley de Firma Electrónica Avanzada publicada el 11 de enero de 2012
Papua New Guinea	Not yet

Chile	Ley 19.799 sobre documentos electrónicos, firma electrónica y servicios de certificación de dicha firma Law 20.217
Peru	Law 27269 of 2000 - Law on Digital Signatures and Certification
Russia	Federal Law No. 63-FZ on Electronic Signatures Federal Law No. 149-FZ Information, Information Technologies and Protection of Information
Viet Nam	Electronic Transaction Law 2005

The UNICITRAL Model Law can be seen as a back-bone of several legislations in APEC's economies, playing an important role on giving ideas, directions for the governments in APEC's economies to build their domestic laws. The UNCITRAL Model Laws are reflected in several legislations such as Civil Code, Federal Civil Procedure Code, Commerce Code, the Federal Consumer Protection Law and Advanced Electronic Signature Law.

Worldwide, there are generally three types of electronic signature laws that APEC are currently applying:

(i) "Minimalist "or" permissive" laws: allow for the broad enforceability of e-signature with few legal restrictions. Minimalist or permissive approach have been adopted by Australia, Canada, New Zealand and the United States. With some exception, minimalist or permissive laws give the permit for the use of electronic signature for virtually all uses and are generally technology-neutrality. For example, the Electronic Signatures in Global and National Commerce Act (ESIGN ACT), the United States Electronic Signature Law;

(ii) Prescriptive law: is rarely use among APEC's economies, they require a specific technical method to electronically sign a document, and they also aim to dedicate the types of signature technologies that are suitable and reasonable to use. Moreover, some prescriptive laws act as a restriction to deny the legal rights to an electronic transaction, unless they are secured using approved technology. There are a few economies including the Philippines and Viet Nam that have adopted this approach in their legislation system;

(iii) Two-tier laws: Many APEC member economies have enacted a two-tier approach to legislation governing electronic signatures. This approach is the combination between minimalist and prescriptive laws. Two-tier laws accept all or most of the electronic signatures on technology-neutral basis like minimalist laws, but they also create a class of approved technologies like prescriptive laws. Thus, two-tier laws are the most commonly used systems among APEC member economies. The UNCITRAL Model Law on Electronic Signatures and the new European Union regulation on electronic identification and trust services (eIDAS) that took effect in July 2016 are two-tier laws. In other words, the two-tier approach aims to balance between flexibility and security. In general, this approach grants legal status to all electronic signature methods. However, it also provides a larger legal effect to certain methods, for example: Digital signatures, advanced e-signatures or qualified e-signatures. Several APEC economies have adopted two-tier laws, such as: China, Japan, Korea, Malaysia, Mexico, Singapore Chinese Taipei, and Thailand. Moreover, in Mexico the certification of official documents and those related to tax obligations are required to be signed by the digital signatures. China also requires digital signatures for documents related to personal relationships, termination of public services, etc. (WEF,2017).

Thus, 3 approaches above have summed up how laws and regulations in APEC economies have been adopted in order to deal with electronic and digital signature matters. Depend on the existing laws and legislations as well ICT infrastructures, each APEC member economies will decide which approach will

be applied in within a given category, in order to ensure their cross-border transaction proceeds smoothly and efficiently.

Table 4: Types of e-signatures recognized by law in APEC economies[18]

Economy	Permissive/ minimalist approach	Two-tier approach	Prescriptive approach (only signatures associated with a specific technology, e.g., PKI)
Australia	X		
Brunei Darussalam		X	
Canada	X		
Chile		X	
Hong Kong, China		X	
Indonesia		X	
Japan		X	
Republic of Korea		X	
Malaysia		x	
New Zealand	X		
Peru		X	
The Philippines			X
Singapore		X	
Thailand		X	
United States	X		
Chinese Taipei		X	
People's Republic of China		X	
Mexico		X	
Russia		X	
Viet Nam			X

[18] Source: Compilation from UNCTAD 2013a, Adobe 2017

In order to deal with above issues, relating to the use of digital technologies in cross-border online transactions, UNCITRAL established United Nations Convention on the Use of Electronic Communications in International Contracts (EEC). Thus, this ECC is applied to the use of the electronic communications regarding the formation or performance of a contract between parties in different States. EEC aims to update and complement provisions contained in the UNCITRAL 1996 Model Law on Electronic Commerce and also aim to promote the legal certainty on the use of electronic communication. So far, the Convention has been used both as a treaty and as model law. Currently, there are 5 economies approved and/or ratified ECC including: China, the Philippines, Republic of Korea, Russia and Singapore.

2. Consumer Protection Legislation in E-commerce

Consumer protection plays an important role on maintaining trust, and relationship between businesses and consumers. Consumer protection legislations aim to ensure adequate protection for consumers from misleading, fraudulent and unfair commercial conduct, empowering them with education, and giving them effective dispute resolution measures when disputes arise

Online transactions create a lot of advantages for online sellers, or in other words, online sellers are relatively in advantageous position compared to online buyers. Online sellers are those who directly have access to the products, thus they definitely have better knowledge and information about the goods and services that they are delivering, whereas online buyers are those who have limited access to the products in term of information, quality etc. Matter of trust between online buyers and sellers is a vital factor for the development of e-commerce and relating digital trade. Thus, it is necessary to have the consumer protection legislations in place, as the laws and regulations will help to protect the e-commerce consumer from unfair trade practices by bringing unity among consumers to fight collectively against the business organizations that indulge in unfair trade practices

Government in every economy plays a crucial role on establishing a consumer protections framework that is effective and responsive the online risks, challenges and opportunities that e-commerce opens up to consumers. Moreover, an effective consumer protection legislation could help to promote consumer trust as well as to enhance consumers' capacities to engage more in cross-border e-commerce transactions in safe and informed manner, reaping the opportunities while reducing the risks (OECD, 2018).[19]

APEC member economies have shown a lot of efforts on putting their consumer protection legislations in place. Links and title of legislations relating consumer protections of APEC economies are as follows:

Table 5: **Consumer Protection Legislation in APEC**[20]

Economy	**Title of Legislation/Draft Legislation**	**Links to laws**
Australia	Competition and Consumer Act 2010 (in English)	https://www.legislation.gov.au/Details/C2020C00068
Brunei Darussalam	Consumer Protection (Fair Trading) Order 2011 (in English)	http://faolex.fao.org/docs/pdf/bru113413.pdf
	Sales of Goods Act 1999 (in English)	http://www.agc.gov.bn/AGC%20Images/LOB/PDF/Chp.170.pdf

[19] DIRECTORATE FOR SCIENCE, TECHNOLOGY AND INNOVATION COMMITTEE ON CONSUMER POLICY, 20 Apr 2018http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DSTI/CP(2017)10/FINAL&docLanguage=En

[20] *Source: Compilation from UNCTAD, 2018b*

Economy	Title of Legislation/Draft Legislation	Links to laws
	Unfair Contract Terms Act 1999 (in English)	http://agc.gov.bn/AGC%20Images/LOB/PDF/Chp.171.pdf
Canada	Anti-Spam Law (in English)	http://laws-lois.justice.gc.ca/PDF/E-1.6.pdf
Chile	Law 19.496 (in Spanish)	http://www.wipo.int/edocs/lexdocs/laws/es/cl/cl038es.pdf
China	Consumer Rights and Interests Protection Law of the People's Republic of China (in English, unofficial translation)	http://chinalawtranslate.com/en/consumer-protection-law-including-2013-amendments/
	Consumer Rights and Interests Protection Law of the People's Republic of China (in Chinese)	http://chinalawtranslate.com/consumer-protection-law-including-2013-amendments/
Hong Kong, China	The Consumer Goods Safety Ordinance (Cap. 456)	https://www.elegislation.gov.hk/hk/cap456!en.assist.pdf
	The Trade Descriptions Ordinance (Cap. 362)	https://www.elegislation.gov.hk/hk/cap362!en.assist.pdf
	The Weights and Measures Ordinance (Cap. 68)	https://www.elegislation.gov.hk/hk/cap68!en.assist.pdf
	The Toys and Children's Products Safety Ordinance (Cap. 424)	https://www.elegislation.gov.hk/hk/cap424!en.assist.pdf
Indonesia	Law on Consumers' Protection 1999 (in English)	http://www.bu.edu/bucflp/files/2012/01/Law-No.-8-Concerning-Consumer-Protection.pdf
Republic of Korea	Act on the Consumer Protection in Electronic Commerce Transactions etc. - Act No. 10303 (in English)	http://elaw.klri.re.ROK/eng_mobile/viewer.do?hseq=25650&type=new&key=
Japan	Specific Commercial Transaction Act	
	Electronic Consumers Contract Act	
	Consumers Contract Act	
	Premiums and Misrepresentations Law	

Economy	Title of Legislation/Draft Legislation	Links to laws
	Used Goods Business Act	
Malaysia	Consumer Protection Act 1999, as amended (in English)	http://www.aseanconsumer.org/misc/downloads/misc-msiacpa.pdf
	Akta Perlindungan Pengguna 1999 (in Malay)	https://ttpm.kpdnkk.gov.my/portal/images/ttpm/akta%20perlindungan%20penguna.pdf
Mexico	Ley Federal de Protección al Consumidor, última reforma 13-05-2016 (in Spanish)	http://www.diputados.gob.mx/LeyesBiblio/pdf/113_130516.pdf
New Zealand	Consumer Guarantees Act 1993 Fair Trading Act	http://www.legislation.govt.nz/act/public/1993/0091/latest/DLM311053.html https://www.consumerprotection.govt.nz/general-help/ways-to-buy-and-pay/online-shopping/
Peru	Ley 29571 - Código de Protección y Defensa del Consumidor (in Spanish)	https://www.unifr.ch/ddp1/derechopenal/legislacion/l_20101207_03.pdf
Philippines	Electronic Commerce Act 2000 (in English)	http://www.wipo.int/edocs/lexdocs/laws/en/ph/ph022en.pdf
Singapore	Consumer Protection (Fair Trading) Act 2003 (in English)	http://statutes.agc.gov.sg/aol/search/display/view.w3p;page=0;query=DocId%3A%22403774c5-3764-4c57-bf79-ceb0a3b5ba5d%22%20Status%3Apublished%20Depth%3A0;rec=0
Chinese Taipei	Consumer Protection Act 2015 (in English)	https://law.moj.gov.tw/ENG/LawClass/LawHistory.aspx?pcode=J0170001
Thailand	Consumer Protection Act 1979 (in English)	http://www.wipo.int/edocs/lexdocs/laws/en/th/th026en.pdf
	Civil and Commercial Code (in English)	http://www.samuiforsale.com/law-texts/thailand-civil-code-part-1.html
	the Direct Sales and Direct Marketing Act 2002 (in English)	http://www2.austlii.edu.au/~graham/AsianLII/Thai_Translation/Direct%20Sale%20and%20Direct%20Marketing%20Act.pdf
	Unfair Contract Terms Act 1997 (English, unofficial translation)	https://www.samuiforsale.com/law-texts/unfair-contract-terms-act.html
	Penal Code (in English)	http://www.samuiforsale.com/law-

Economy	Title of Legislation/Draft Legislation	Links to laws
		texts/thailand-penal-code.html
United States	Among other laws and regulations, the Undertaking Spam, Spyware and Fraud Enforcement with Enforcers Beyond Borders Act of 2006 - US Safe Web Act (in English)	https://www.congress.gov/109/plaws/publ455/PLAW-109publ455.pdf
Viet Nam	Law on Protection of Consumer Rights 2010 (in English)	http://www.itpc.gov.vn/investors/how_to_invest/law/Law%20No.59_2010_QH12/mldocument_view/?set_language=en

Consumer protection laws may vary significantly among APEC economies, as each member has different laws and legislations environment. For example, members such as Mexico and Peru rely heavily on general civil law legislation to address e-commerce while Brunei Darussalam, China, Indonesia, Malaysia, Singapore, Thailand and Viet Nam have adopted their consumer protection laws including special provisions to deal with e-commerce, whereas others have issued specific legislation.

Box 1: New Zealand 's Consumer protection in e-commerce

In term of protecting consumers in online trading platforms, there are 2 main acts that assist NZ government, which are the Fair-Trading Act and the Consumer Guarantee Act. Any trade activities made through websites, smart phone, emails, text messaging, social media etc. will be supervised by these two laws. In other words, when customers buy something online, both customers and sellers have entered into a contract electronically and are bound by the same rules and laws as if consumers received a paper contract.

Under the Guarantees Act, when consumers buy goods online from a business based in New Zealand, and they are not happy with a product in term of quality, quantity or service, consumers have the right to ask for the product to be repaired, replaced or for a refund.

The Fair-Trading Act is a statute of New Zealand, it aims to promote the competition among New Zealand businesses and also aim to protect consumers/customers from misleading and deceptive conduct and unfair trade practices. Unfair conduct has been classified in the act as the following:

1) Misleading and deceptive conduct: Generally, in relation to goods, in relation to services and in relation to employment
2) Unsubstantial representation
3) False representations
4) Unfair practices: These include but are not limited to bait advertising, referral selling and trading stamp schemes. Regulation relation to Trading stamp schemes however has been repealed.

Under the Fair-Trading Act, online sellers on site such as Trademe, Facebook must clearly disclose if they are selling in trade. This means their business is selling goods, so the Consumer Guarantees Act applies if consumers buy from them. Moreover, consumers can claim compensation or cancel the purchase under the Fair-Trade Act if any auction website operators or online traders mislead the consumers or make false claims about their products or services.

3. Review of Privacy, Data Protection and Cyber-crime Legislation in APEC

Nowadays, with the rapid development of technology and Internet, E-commerce has brought to us many benefits. However, with the increased number of online consumers around the globe recently, it leads to several issues related to privacy and cybersecurity. Therefore, enhancing the capacity to deal with privacy and cybersecurity related problems is now one of the most important jobs that government around the world as a whole and in APEC economies in particularly need to conduct.

Realizing that, APEC leaders have tried to strengthen APEC activities in the field of upgrading infrastructure protection, including telecomunications. On May 30, 2002, the Telecommunications Ministers of the APEC economies issued the Shanghai Declaration that included a Statement on the Secutiry of Information and Communications Infrastructures and Program of Action (APEC, 2002). The Statement endorsed action by economies to combat misuse of information and instructed the APEC Telecommunications and Information Working Group (TEL) to give special priority to and facilitate APEC work on security. The Program of Action, further expanded the TEL's e-security activities to include facilitating collaboration among relevant expert groups.

APEC also encouraged its members to take into account the Convention on Cybercrime (Council of Europe, 2011) and enact a comprehensive set of laws relating to cybersecurity and cybercrime that are consistent with international legal instruments, including United Nations General Assembly Resolution 55/63 (UN,2001) and the Convention on Cybercrime.

Table 6: Privacy – Cybercrime/Cyber security Laws and relating regulations[21]

Economies	**Cybercrime / Cyber security Laws and Regulations (Computer security, Privacy, Spam and Online Child Safety)**
Australia	Criminal Code Act 1995; Crimes Act 1914; Telecommunications Act 1997; Telecommunications (Interception and Access) Act 1979; Privacy Act 1988 Spam Act 2003
Brunei Darussalam	Computer Misuse Act, Revised in 2007 Computer Misuse order of 2000, Article 3-5, penalizes illegal access, illegal interception, data interference, system interference and misuse of devices
Canada	Personal Information Protection and Electronic Documents Act; The federal government delayed the private right of Action under Canada's anti-spam legislation, which was set to come into effect on 1 July 2017; The federal government also published on 2 September 2017 draft regulations that provide further detail regarding the pending privacy breach notification requirements under the federal Personal Information Protection and Electronic Documents Act

[21] *Source: Compilation from UNCTAD, 2018c; UNCTAD, 2018d*

Hong Kong, China	Crimes Ordinance (Cap.200) Telecommunications Ordinance (Cap.106) Criminal Procedure Ordinance (Cap.221) Personal Data (Privacy) Ordinance (Cap.486) Unsolicited Electronic Messages Ordinance (Cap.593) Prevention of Child Pornography Ordinance (Cap.579)
Indonesia	Law on Cyber security 2017 Criminal Code Telecommunications Law Law No.30 of 2000 regarding Trade Secret Bill on Electronic Information and Transaction (Pending) Child Protection Act Draft Law on the Act Concerning Anti-Pornography and Porno-Action (Pending).
Japan	Act on the Protection of Personal Information amended in 2015 and has been in full force since 30 May 2017. The Act Concerning the Prohibition of Unauthorized (Computer) Access Criminal Code Private Sector regime: Act on the Protection of Personal Information Public sector regime: The Law For the Protection of Personal Information Held by Government Organizations; The Law for the Protection of Personal Information Held by Independent Public Corporations; Law on the Establishment of the Information Disclosure/Personal Information Protection Examination Committee; The Law for the Preparation of Relevant Laws Concerning the Enforcement of the Law for the Protection of Personal Information Held by Government Organizations The Law regarding Specific Commercial Transaction Transactions The Law for Punishing Acts Related to Child Prostitution and Child Pornography, and for Protecting Children Law Restricting Dating Websites.
Republic of Korea	In march 2017, the Enforcement Decree of the Network Act was amended to supplement the March 2016 amendment of the Network Act. Act on Promotion of Information and Telecommunication Network

	Use and Information protection Criminal Code Protection of Communications Secrets Act Act on the Protection of Personal Information Maintained by Public Agencies Juvenile Sex Protection
Malaysia	Law on Cyber security (drafting) Personal Data Protection Act 2013 Computer Crimes Act 1997 Communications and Multimedia Act 1998 Penal Code Child Act 2001 The Credit Reporting Agencies Act 2010
New Zealand	Privacy Bill 2018 Crimes Amended Act 2007 Crimes Act 1961 Privacy Act 1993 Unsolicited Electronic Messages Act 2007 Films, Videos, and Publications Classification Act 1993
The Philippines	Cybercrime Prevention Act of 2012 Electronic Commerce Act Anti-wire Tapping Act Anti-Computer Fraud and Abuses Act of 2007 Implementing rules under the telecommunications Policy Act Revised Penal Code The Special Protection of Children Against Child Abuse, Exploitation and Discrimination Act
Singapore	Cybersecurity Act 2018 Computer Misuse Act (Cap.50A) Spam Control Act Penal Code (Cap.224) Children and Young Persons Act (Cap.38) Women's Charter (Cap. 353)
Thailand	Revisions to Cyber security Bill 2018 Thailand Cybersecurity Act has been approved on 28 Feb 2019

	Computer Crime Act 2007 Penal Code Official Information Act of 1997 Computer Crime Act 2007 Personal Data Protection Act
United States	State and Federal regulations are applicable Some of them are included as: Cybersecurity Legislation 2017 Computer Fraud and Abuse Act of 1986 (CFAA), codified in 18 USC. Sec. 1030, covers nine different offenses whose maximum statutory penalties range from one year to life imprisonment; Wiretap Act, also known as “Title III,” involves the use of wiretaps while investigating crime Network Crime Statutes
Chinese Taipei	Cybersecurity Management Act 2018. Criminal Code Telecommunications Act Communications Protection and Monitoring Act Personal Data Protection Act Commercial Spam Statute 2009 The Law to Suppress Sexual Transactions involving Children and Juveniles
People's Republic of China	Law on Cyber Security 2018 PRC Criminal Code Measires for the Administration of Protecting the Security of International Connections to Computer Information Networks Decision of the Standing Committee of the National People’s Congress on the Protection of Internet Security Internal Email Service Management Regulations 2006 Interim Handling Measures on Spam PRC Penal Regulations Concerning Security Administration Minors Protections Law
Mexico	Criminal Procedural Code (NCPC) 2016 Federal Criminal Code Private Data Protection Law (22/12/2011) National Institute of Transparency, Access to Information and Protection of Personal Data

Papua New Guinea	Cybercrime Code Act 2016
Chile	Law on Cybercrime 1993 Law on Personal Data Protection 1999
Peru	Peruvian Law for the Protection of Private Data Ley Nº 30096 y 30171 - Ley de Delitos Informáticos (in Spanish)
Russia	Federal Law Regarding Personal Data 2006 Criminal Code 1996
Viet Nam	Law on Cybersecurity – 2018 Law on Network Information Security 2015 Law on Information Technology 2006 Decree No 55 on the Management Provision and Use of Internet Services Decree No 142 Specifying Administrative Penalties in the Field of Post, Telecommunication and Radio Frequency Civil Code Penal Code

The number of economies with data protection and privacy legislation have been rapidly grown in recent year in the globe and the Asia – Pacific region is also developing with the same pace. For example, Malaysia is currently drafting its first Law on Cybersecurity, Thailand's Cybersecurity has been approved on Feb 2019, and Viet Nam also published its Law on Cybersecurity on Jan 2019 and for Indonesia, they have issued a new draft personal data protection law in order to strengthen cybersecurity and consumer protection related-issues.

There are some significant gaps and exemptions on data protection laws (UNCTAD,2016). For instance, small businesses are excluded from some data protection laws in some certain circumstances (e.g. Australia and Canada). Other common exemptions apply to: 1) types of data subject (e.g. only to children, or not to employee data); 2) the sensitivity of data (e.g. only to sensitive data like health or financial records); 3) sources of data (e.g. restricted to either online or offline data collection); and/or 4) sectoral data (e.g. exemptions related to the private and public sector, or laws that are restricted to specific sectors like health and credit).

In term of the privacy and data protection, APEC Privacy Framework and Cross-Border Privacy Rules system created two crucial steps that help to facilitate cross-border data flows and also data protection. Regarding to the report of Hogan Lovells (2018), it mentioned a Heat Map on Data Protection Regulation across the region. The map compares various regimes in APEC based on 4 criteria as follows: (i) data management requirements, (ii) data export controls, (iii) direct marketing regulation and (iv) the aggressive of the enforcement environment.

A wide range of positive economic impact stems from the free flow of digital data across borders. UNCTAD has estimated that about 50% of all traded services is enabled by innovation stemming from the technology sector including the facilitation of cross-border data flows. However, the identity thefts, leakage of personal/customers information are also on the rise. Thus, it leads to increasing concerns of government around strengthening privacy, security and as a result some important policies relating to

data protection as well as privacy has been implemented. Hence, restrictions are being imposed by many economies including APEC economies on across border data flows and all-important data and information is being required to be stored within the economy's jurisdiction. These restrictions on the free flow of data across borders is known as Data Localization.

The Internet today with around 3.3 billion-plus users, is as essential to core business function and daily life as electricity. More specifically, the flow of digital information between economies, companies and citizens is playing an important role and it can be seen as critical driver of economic growth and innovation. As the Internet continues to evolve dramatically, however, so do barriers to digital flows. The number of restrictions imposed around the world have increased, with localization mandates topping the list of most frequently identified digital trade barriers. Data localization has caused serious damages to business and also ultimately prevent business innovation. Thus, when economies take actions to limit or to lower the barriers to cross-border data traffic, this will help to boost GDP and business performances. Therefore, minimizing fragmentation by ensuring that any policy actions are the least trade-restrictive to achieve legitimate public policy objectives; and evaluate the full costs of any proposed regulation and reduced innovation in the wider economy do not outweigh the quantifiable benefits, are the most important jobs that governments around the world should put a lot of attentions to.

4. Review of Dispute Resolution in APEC

Dispute resolution is the series of process of resolving dispute between parties. Dispute resolution techniques assist the resolution of antagonisms between parties that can include citizens, corporations, and governments. Dispute resolution is also very much related to the consumer protection discussed in the previous section. Thus, this section will focus on how e-commerce dispute resolution is provided in APEC economies.

When it comes to dispute resolution, there are many options that are available for us to choose. Understandably, disputants are often confused about which process they should use to apply to their situation. According to Fran E.A Sander and Lukasz Rozdeiczer's chapter on the topic in the Handbook of Dispute Resolution (Jossey-Bass, 2005), there three basic types of dispute resolution to consider:

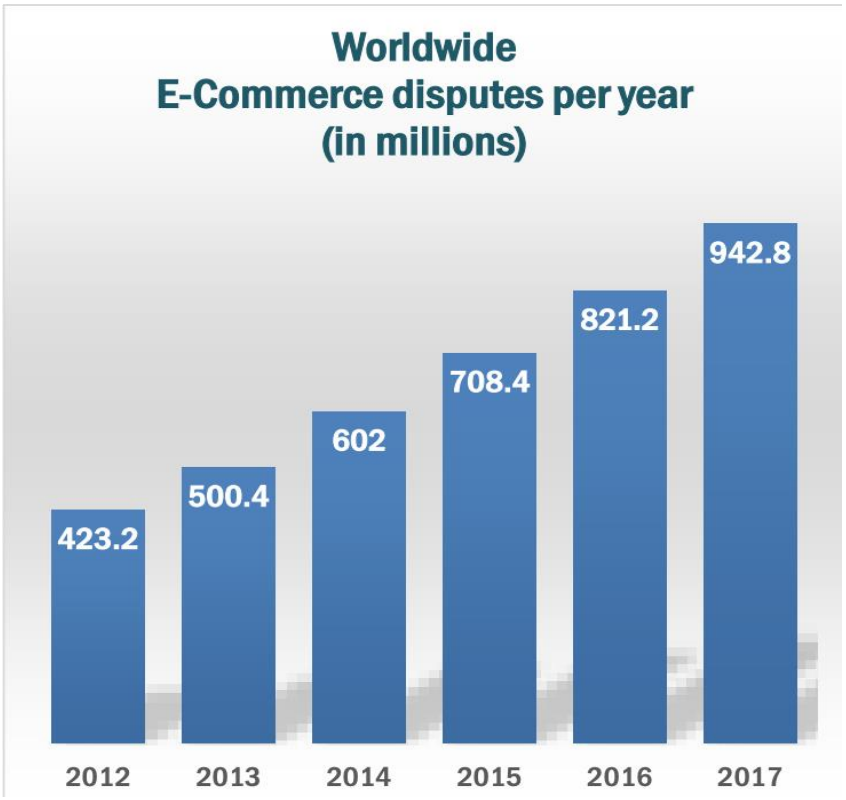
1. Mediation: The goal of mediation is for a neutral third party to help disputants come to a consensus on their own. Mediation can be effective at allowing parties to vent their feelings and fully explore their grievances.
2. Arbitration: In arbitration method, a neutral third party serves as a judge who is responsible for solving the dispute. The disputants can negotiate virtually any aspect of the arbitration process, including whether lawyers will be present at the time and which standards of evidence will be used
3. Litigation: The most familiar method of dispute resolution, civil litigation typically involves a defendant facing off against a plaintiff before either a judge or a judge and jury. Lawyers typically dominate litigation, which often ends in a settlement agreement during the pretrial period of discovery and preparation.

The ICC (International Chamber of Commerce) reported that there were 2,282 were participated in ICC Arbitration cases from 135 economies around the globe in 2018. They also estimated that the total newly registered cases in 2018 represented an aggregate value of US$ 36 billion, in other words, the average amount of money spent in a dispute worth US$ 45 million.[22]

For the current landscape for MSME cross-border dispute resolution in APEC, small businesses engaged in cross-border trade have no effective resolution mechanism. According to Michael J Dennis, a recent APEC study highlighted that leakage of effective ODR resulted to 25-35% of cross-border

[22] https://iccwbo.org/media-wall/news-speeches/icc-arbitration-figures-reveal-new-record-cases-awards-2018/

involving small businesses in the European Union remain unresolved. The average value of disputes was $50.000. Studies also show that vast majority of disputes are about payment. Small businesses are particularly vulnerable to late payment as their cash flow and access to credit lines are more restricted than larger companies.



Source: Collin Rule, What we need to know about Dispute Resolution

APEC MSMEs are in the need of a legal environment that enhance a seamless trade and dispute resolution is an essential part of this. Small businesses in APEC economies account for over 97% of businesses and employ over half of the workforce but represent only 35% of direct exports. APEC MSMEs' expansion into international markets is important for their continued growth as well as for APEC economies' well-being.

Online Dispute Resolution (ODR) is already successful in other context, for instance, eBay processes millions of disputes every year using only automation in 90% cases. The Hong Kong International Arbitration Centre and China International Economic and the Trade Arbitration Commission offer ODR for domain name disputes. In New Zealand, Fairway will launch ODR for commercial building and construction disputes in middle of 2019. APEC courts are also turning to ODR.

Understanding the importance role of Dispute resolution on enhancing economic growth, APEC economies have put a lot of efforts on updating their dispute systems domestically as follows:

Table 7: Online aspects of dispute resolution in APEC economies

	Organization	**Brief Summary**
Japan	Shirogane Cyber Hall	Founded by a group of lawyers in 2001, use emails to provide online consultation services for e-Commerce, libel or defamation at cyber space. Current status: Ceased any activities.

	Organization	Brief Summary
	Dispute Consulting Room for Online Shopping	Started by ECOM. Current status: Ceases operations.
	Dispute Supports	This is a dispute resolution supporting organization accepting online case filing accredited by Ministry of Justice, not an ODR service provider.
	Law Terrace	Belongs to Legal Aid Centre, accepting email application.
	Click Counselor	Provide online consultation to the tenant of real estate.
	EC Network	Private run ADR service provider online.
China	Asian Domain Name Dispute Resolution Center (ADNDRC)	It was approved by the Internet Corporation for the Assigned Names and Numbers (ICANN). A fully web-based online domain name dispute resolution system has been developed, which facilitates the handling of domain name dispute cases.
	Online Dispute Resolution Center	It was set up by China International Economic and Trade Arbitration Commission (CIETAC).
	Guangdong Arbitration Commission	established the China Commercial Arbitration website in 2005, and has since then offered online arbitration services to resolve disputes related to e-commerce
Hong Kong, China	Hong Kong International Arbitration Centre - Asian Domain Name Dispute Resolution Center (Hong Kong, China Office)	Provide domain name dispute resolution services. Pioneered in promoting ODR.
	eBRAM Centre (ebram.org)	It was set up in 2018 to design and develop a platform for online dispute resolution, making use of emerging technologies including blockchain, artificial intelligence, soft robot and cloud, together with cyber security and data privacy protection.

	Organization	Brief Summary
Mexico	Concilianet	An online dispute resolution system run by the Consumer Protection Federal Agency (Profeco), has been established to strengthen the protection and defense of consumers' rights. Concilianet provides consumers who have purchased goods or services, either electronically or by traditional means with a cost-effective way to initiate and resolve complaints or claims against participating suppliers via a virtual Internet platform.
Singapore	DisputeManager.com	Developed by the Singapore Academy of Law and its subsidiary, the Singapore Mediation Centre (SMC), DisputeManager.com offered three main services: e-Settlement (an automated ADR process in which the parties make offers and agree to settle once certain conditions are met), Online Mediation, and Neutral Evaluation. DisputeManager.com also supported the Singapore Domain Name Dispute Resolution Service, a service similar to ADNDRC, but focused only on resolving Singapore (.sg) domain name disputes.
Philippines	Philippine Online Dispute Resolution service	Philippine Online Dispute Resolution service, which was launched by Justice Artemio Panganiban on November 8, 2004
Malaysia	ODRWorld (www.odrworld.com)	Started in 2004 to provide people who have a dispute even for a negligible sum or for non-monetary transactions looking for satisfaction to get what is rightly owed to them.
Republic of Korea	https://www.ecmc.or.kr/	E-commerce dispute resolution committee mediates disputes in e-commerce transactions between consumers & providers.

Source: Compilation from Yun et al. 2013

In 2019, the APEC Economic Committee endorsed the APEC's Collaborative Framework for ODR of Cross-Border B2B Disputes and its Model Procedural Rules[23] (APEC ODR Framework). In return, partners providing ODR (such as regional arbitration and mediation centres) in compliance with the APEC ODR Framework will be listed on the APEC Economic Committee's web page and MSMEs will also be encouraged by participating economies to resolve low-value disputes using the listed ODR providers. Thus, this will be a good news for MSMEs across the APEC region, as most of them are lacking an efficient solution for their disputes at present.

The APEC ODR Framework aims to minimize barriers to entry into international trade, helping to create markets that are safe for businesses to operate. Besides, the APEC ODR Framework will assist to establish trust between business partners as well as to promote a culture of contract-based relationships. It can significantly lower the costs for MSMEs to do business across borders. CBPR System, with requirements for action from businesses, is one of helpful tool to protect consumer protection in the field of privacy and data protection. Overall, ODR is the most fundamental tool for the next global justice system in APEC. As small businesses account for over 97% of the total businesses

[23] http://mddb.apec.org/Documents/2019/EC/EC2/19_ec2_022.pdf

in APEC's economies, as well as they employ the vast majority of workers in the private sector, thus APEC's ODR initiatives will help to enhance the capacity for economic growth in APEC economies.

II. Policies and Initiatives for Digital Economy

In the limit of this Report, experts will focus on economies which have issued domestic policies and initiatives for digital economy.

1. Australia

In December 2018, the Australian Government released its Digital Economy Strategy, *"Australia's Tech Future*".[24] The Strategy sets out a vision to ensure that Australian's enjoy an enhanced quality of life and share in the opportunities of a growing, globally competitive modern economy, enabled by technology.

The strategy details how Australia can maximize the opportunities of technological change by focusing on four key areas: 1) People – developing Australia's digital skills and leaving no one behind; 2) Services – how government can better deliver digital services; 3) Digital assets – building infrastructure and providing secure access to high-quality data; and 4) The enabling environment – maintaining Australia's cyber security and reviewing our regulatory environment.

Under each of these elements, the Strategy sets clear outcomes, identifies opportunities and areas that need further focus, and outlines corresponding Government plans of action. Below is a summary of key Australian Government initiatives already underway across these four areas.

1.1. People

1.1.1 Skills

- To ensure Australians are equipped with the skills required to thrive in an evolving job market, and grow their businesses into the future, the Australian Government is working collaboratively with industry and the education sector to deliver broad reforms to Australia's education and training systems.

- Through the *Quality School Package* the Australian Government is focusing its investment in schools on quality teaching and programs that give students the skills and knowledge they need to live and work in the future[25]. The Government's *Higher Education Reform Package*[26] is also improving the sustainability of the higher education sector, supporting student career aspirations, and ensuring industry has a skilled workforce.

- The Australian Government is also exploring mechanisms to better support life-long learning and help people develop the right skills at the right time in a way that suits them, including exploring ways to overcome perceived barriers restricting people from engaging in further education and improving linkages between vocational education and training, the university sector and industry.

- To encourage small business to embrace digital technology, the Australian Government is building the digital capability of small businesses through the *Small Business Digital Champions initiative,*[27] launched in March 2019. This program assists selected small businesses to transform their operations using hardware, software and digital training.

1.1.2 Inclusion

- The Australian Government's *Universal Service Guarantee* will ensure all Australians have access to voice and broadband services into the future, regardless of their location, and will be complemented by an up-to-date consumer protection framework. The Guarantee is underpinned by the rollout of Australia's *National Broadband Network (NBN)*, which will ensure all premises will have access to fast, affordable broadband by 2020.

[24] https://www.industry.gov.au/data-and-publications/australias-tech-future
[25] https://www.education.gov.au/quality-schools-package
[26] https://docs.education.gov.au/documents/higher-education-reform-package
[27] https://www.employment.gov.au/digital-champions

- The Australian Government's *Women in STEM* package is encouraging more women into STEM education and careers. The 2018-19 Budget provided an additional AUD $4.5 million over four years to progress a *Women in Science Strategy*, a Roadmap for sustained increases in women's STEM participation, a *Women in STEM Ambassador* to promote STEM in schools and the development of a *STEM Choices* resources kit.

- The *Be Connected* program helps older Australians participate in their communities, including in the workforce, by improving their digital confidence, skills and online safety. Through Be Connected online resources, Australians are able to learn the basics of using digital devices and engaging with the internet. Be Connected is not just a website; it is an economy-wide movement working across Australia, within communities, to help people with their digital skills.

1.2. Services

1.2.1 Digital Government

- The Australian Government's *Digital Transformation Strategy* complements *Australia's Tech Future*. It identifies what the Government needs to do to be a world-leading digital government that delivers better services with greater flexibility, more responsive policy and less red tape, all enhanced by digital technology.

- The Australian Government is already making more services available 24/7 online and using feedback to continually improve services. This includes looking at how data already held by government is used to incorporate information for future claims or services, in turn making the process simpler, clearer and faster.

- In 2017, significant improvements were made to the *myGov*[28] *w*ebsite to provide a simple and secure way to access government services online. The Government is now working on a new digital identity solution, *GovPass*,[29] which will make it simple, safe and secure to prove who you are when accessing government services online.

- To ensure taxpayer money is invested wisely to deliver benefits and value to the community, the Australian Government's *Digital Marketplace* [30] is making it easier for businesses – particularly smaller businesses – to provide common ICT services to government. As at February 2020, over $1 billion in contracts had been awarded through the *Digital Marketplace*, with around 69 per cent being awarded to small and medium businesses[31].

- To design, build and deliver great digital services Australia needs the right people with the right skills, the Australian Government's Digital Transformation Agency is working on a three-year *Building Digital Capability program* with a focus on talent attraction and retention strategies and a program to support public service staff to transition into digital careers[32].

- The Government is also exploring opportunities to use technologies such as artificial intelligence and blockchain to enhance government service delivery. Artificial intelligence is currently being used to increase administrative efficiency, improve policy development, deliver new and improved services, and analyse complex datasets. For example, IP Australia is using a virtual assistant, named Alex, to help answer customer's queries, decreasing phone calls by 50 per cent and costs by 66 per cent, while GeoScience Australia is analysing satellite data to detect physical changes in soil and coastal erosion, crop growth and water quality.

1.3. Digital assets

[28] https://my.gov.au/mygov/content/html/about.html
[29] https://www.dta.gov.au/our-projects/digital-identity/join-identity-federation/accreditation-and-onboarding/trusted-digital-identity-framework
[30] https://marketplace.service.gov.au/
[31]
[32] https://www.dta.gov.au/help-and-advice/learning-and-development/start-your-digital-career-government

1.3.1. Digital infrastructure

- Australia's digital infrastructure is rapidly transforming due to one of the largest infrastructure projects ever undertaken in Australia. The NBN[33] is on track for completion by 2020 with improvements being made to the consumer experience for all Australians. By the mid of 2018, over 60 per cent of all Australian premises could access NBN services. In addition, through the *Mobile Black Spot Program*[34] the Government is improving mobile phone coverage and competition in regional and remote areas.

- The Australian Government is also providing $224.9 million to upgrade Australia's world-class navigation and positioning infrastructure to support emerging technologies. This initiatives will provide better GPS for regional Australia with an accuracy of 10cm and build a network of ground stations to provide GPS data with an accuracy of 3-5cm in major population centres.

- Through the Government's *Smart Cities Plan*[35], new technology is revolutionising how cities are planned and function, and how Australia's economy grows. The Plan supports investment in sectors commercializing new innovations to grow Australia's economy and sets out the Government's vision for productive and liveable cities that encourage innovation, support growth and create jobs.

1.3.2. Data

The Australian Government is helping Australians unlock the value of data by improving the way data is shared and released, and by ensuring the regulatory framework does not create unnecessary barriers to data use.

- To build confidence in how government and business use data, the Government is implementing a *Consumer Data Right*[36] to give customers greater control over their data and transaction activities, initially starting with the banking, energy and telecommunications industries. As part of the *Consumer Data Right*, the Government is ensuring all major banks make data available on credit and debit card, deposit and transaction accounts, and on mortgages by February 2020. All other banks will be required to implement these measures within the following 12 months.

- The Australian Government is also developing an ethics framework in partnership with industry and research organizations around the use of data, with a focus on artificial intelligence and machine learning, and delivering legislative reforms to help streamline the sharing and release of public sector data, while protecting Australians' privacy and confidentiality.

- To increase data accessibility: The Government is working with industry to identify valuable public datasets and increasing the number of datasets on data.gov.au; providing open access to spatial data through the *Geocoded National Address File;*[37] establishing a National Data Advisory Council to advise the National Data Commissioner on ethical data use, community expectations, technical best practice, and industry and international development.

- The Government is also building Australia's domestic capability in data analytics through the cutting edge work of Data61. Established in 2016, this leading data innovation group within the Commonwealth Science and Industrial Research Organisation is helping connect and concentrate Australia's data-driven research and technology capability.

1.4. The enabling environment

1.4.1 Cyber Security

- To mitigate cyber security risks and to reduce any risk to Australia's domestic security that result from large scale sophisticated cyber threats: In 2016, the Government released Australia's *Cyber Security Strategy*[38] to secure Australia's prosperity in a connected world. The *Academic Centres of Cyber*

[33] https://www.nbnco.com.au/
[34] https://www.communications.gov.au/what-we-do/phone/mobile-services-and-coverage/mobile-black-spot-program
[35] https://cities.infrastructure.gov.au/smart-cities-plan
[36] https://ministers.pmc.gov.au/taylor/2017/australians-own-their-own-banking-energy-phone-and-internet-data
[37] https://www.data.gov.au/dataset/ds-dga-19432f89-dc3a-4ef3-b943-5326ef1dbecc/details
[38] https://cybersecuritystrategy.homeaffairs.gov.au/

Security Excellence[39] is one initiative under the Cyber Security Strategy that aims to address a shortage of high-skilled cyber security professionals by encouraging more students to undertake studies in cyber security and related courses.

- To raise awareness of cyber security risks and what to do about them, the Australian Government has created the Cyber.gov.au portal. Cyber.gov.au links to simple, easy to understand advice on how individuals and businesses can protect themselves online, and shares up-to-date information on how to respond to the latest online threats.

- To build greater local capacity and make Australia a trusted supplier in the cyber security industry, the Government supported establishment of the Australian Cyber Security Growth Network, or AustCyber. AustCyber is making significant progress in this effort, including releasing its Sector Competitiveness Plan, establishing Cyber Security Innovation Nodes across Australia and working with stakeholders to develop Australia's first domestic skills-based cyber security Certificate and Diploma level qualifications.

1.4.2 Regulation

- To ensure that regulatory frameworks across all areas of the modern economy are fit-for-purpose: The Australian Government is continuously improving the quality of its regulation, including minimizing the regulation on businesses, community organizations and individuals.

- The Government's *Trade Modernization Agenda*[40] is supporting businesses, particularly micro and small businesses, to engage and compete on a global scale by providing businesses with a single window for interactions with government on international trade. The Government also has mature artificial intelligence capabilities to support visa application assessment and is exploring how blockchain distributed ledger technology could be integrated into Australia's trade ecosystem.

- Australia recognizes that good industry standards for blockchain technology are critical to fostering an innovative and competitive environment and establishing market confidence in the technology, and is leading the development of new international standards for blockchain technologies. The Australian Government is also supporting research to better understand the technological and legal risks associated with blockchain.

- To address the challenges the digital economy presents to the tax system, the Australian Government is also consulting broadly and exploring options to move towards a fairer and more sustainable tax system that address the way that digital technology is transforming the economy.

2. Canada

Canada's Digital Charter

In order to strengthen trust between online consumers and online traders, as well as to protect consumers' privacy, government of Canada issued Canada's Digital Charter. The Charter is consisted by 10 different principles, and these principles will assist the federal government's work to help address difficulties and also leverage Canada's unique talents and strengths in order to enhance the power of digital and data transformation. The 10 principles are as follows:[41]

- Universal Access – Creating an environment, where Canadians will have equal opportunity to participate in the digital world;
- Safety and Security – Canada citizen will be able to rely on the integrity, authenticity and security of the services that they use;
- Control and consent – Canadians will have control over the data that they are sharing, who is using their personal data for what purpose, and their privacy will be protected;

[39] https://www.education.gov.au/academic-centres-cyber-security-excellence-accse
[40] https://www.industry.gov.au/data-and-publications/australias-tech-future/regulation/what-is-the-government-doing-in-regulation
[41] https://www.ic.gc.ca/eic/site/062.nsf/eng/h_00108.html

- Transparency, Portability and Interoperability – Canadians will have clear and manageable access to their personal data and should be free to share or transfer it without undue burden;
- Open and Modern Digital Government – Canadians will be able to access modern digital services from the Government of Canada;
- A level playing field – Canada government will ensure fair competition in the online marketplace to facilitate the growth of Canadian businesses and affirm Canada's leadership on digital and data innovation, while protecting Canadian consumers from market abuses;
- Data and Digital for Good – Data will be used ethically in order to create value, the government of Canada also aim to promote openness and improve the lives of people;
- Strong Democracy – The Government of Canada will defend freedom of expression and protect against online threats and disinformation designed to undermine the integrity of elections and democratic institutions;
- Free from Fate and Violent Extremism – Canadians can expect that digital platforms will not foster or disseminate hate, violent extremism or criminal content;
- Strong Enforcement and Real Accountability – There will be penalties for violations of the laws and regulations that support these principles

3. China

In the *"13th Five-Year plan for economic and social development of the people's republic of China (2016 – 2020)",*[42] the Chinese government added the digital innovative industry as an important objective. The plan specifics objective: pursue innovation-driven development, ensure that business start-up and innovation flourish, and see that total factor productivity is markedly improved. Science and technology will become more deeply embedded in the economy, the ingredients needed for innovation will be allocated to greater effect, major breakthroughs will be made in core technologies in key sectors, and China's capacity for innovation will see an all-around improvement. Fulfillment of these goals will help China become a talent-rich economy of innovation.

Moreover, in this plan, the government implemented the *"Internet Plus" action* plan started in 2015 to promote deeper and more extensive applications of the internet and help transform modes of production and methods of organization, with the aim of bringing about a new pattern of industrial development that is internet-based, intelligent, service-oriented, and coordinated. In the "Internet Plus" action plan, some plan mentions as bellows:

- To promote the development of cloud computing and the Internet of Things;

- To promote innovations in internet-based business models, service models, management models, supply chains, and logistics chains, cultivate the "Internet Plus" ecosystem, and ensure the formation of a new pattern of internet-based collaboration and division of work;

- To make big data a fundamental strategic resource and fully implementation plan for its development, accelerating the opening, sharing, development, and application of data resources so as to help transform and upgrade industries and bring about innovations in social governance;

- To work to see the innovative application of big data in all industries, explore new forms and models of collaborative development between big data industries and traditional industries, and move faster to improve big data industrial chains.

In additions, Government policies have provided a supportive environment for the digital economy in number of ways. Also, the government has adopted light regulation at the early stage of development to allow for innovation. These efforts facilitated the boom of new industries. Relatively limited concerns related to data privacy by the public has also facilitated China's rapid digital development.[43]

[42] http://en.ndrc.gov.cn/newsrelease/201612/P020161207645765233498.pdf
[43] China's Digital Economy: Opportunities and Risks, https://www.imf.org/en/Publications/WP/Issues/2019/01/17/Chinas-Digital-Economy-Opportunities-and-Risks-46459

The China-initiated cooperative plans in digital economy among G20 and Belt and Road economies have been implemented. Fruitful results are seen in information infrastructure construction and sharing, as well as cross economy e-government systems.[44]

4. Hong Kong, China

Innovation and technology

The government of Hong Kong, China has taken innovation and technology (I&T) development further since 2017 and set out in the 2017 Policy Address eight major areas to step up Government's efforts in I&T development.[45] They are: 1) Increasing resources for research and development (R&D) 2) Pooling together technology talent 3) Providing investment funding 4) Providing technological research infrastructure 5) Reviewing legislations and regulations 6) Opening up government data 7) Bettering procurement arrangements 8) Popularizing science education.

To promote scientific and technological collaboration between China and Hong Kong, China, in May 2018, the Ministry of Science and Technology and the Ministry of Finance promulgated provisions on opening up science and technology funding of the Central Government for application by higher education institutions and research institutions in Hong Kong, China. In September 2018, the Arrangement on Enhancing Innovation and Technology Co-operation between the Mainland and Hong Kong (the Arrangement) was signed. The Arrangement serves as an action guide and framework for the two places to take forward the various innovation and technology co-operation initiatives in the coming few years. In April 2019, the Innovation & Technology Commission launched the Mainland-Hong Kong Joint Funding Scheme, inviting proposals for applied research and development projects jointly conducted by both sides under specific themes. This will further enhance research and development collaboration between China and Hong Kong, China. Moreover, the Office of the Government Chief Information Officer established the Smart Government Innovation Lab in the same month to provide a platform for encouraging innovative solutions and product suggestions from the information technology sector, particularly local start-ups and small and medium enterprises, to address public service delivery and operational needs.[46]

In October 2018, the Development Bureau launched the $1 billion Construction Innovation and Technology Fund to encourage wider adoption of innovative construction methods and technology by contractors, subcontractors and consultants with a view to promoting productivity, uplifting build quality, improving site safety and enhancing environmental performance. The Fund also supports manpower development initiatives to build up the capacity of construction practitioners to leverage I&T to drive the transformation and continuous improvement of the industry.

Smart City

The Government published the Smart City Blueprint for Hong Kong, China ("Blueprint")[47] in December 2017 with the vision to embrace I&T to build a world-famed Smart Hong Kong, China characterized by a strong economy and high quality of living. The Blueprint sets out more than 70 initiatives in six major areas, namely "Smart Mobility", "Smart Living", "Smart Environment", "Smart People", "Smart Government" and "Smart Economy", covering digital infrastructure to support online transactions and digital transformation in business. The Government is now preparing for the release of the Smart City Blueprint 2.0 for Hong Kong (Blueprint 2.0) in 2020. Blueprint 2.0 will include updates to existing smart city initiatives as well as new proposals to further smart city development

5. Japan

The Smart Japan ICT Strategy

[44] http://global.chinadaily.com.cn/a/201904/04/WS5ca576a7a3104842260b473d.html
[45] Innovation Hong Kong: https://www.itb.gov.hk/en/publications/InnovationHK.pdf
[46] Half-yearly Economic Report 2019: https://www.hkeconomy.gov.hk/en/situation/index.htm
[47] Smart City Blueprint for Hong Kong: https://www.smartcity.gov.hk/doc/HongKongSmartCityBlueprint(EN).pdf

The Smart Japan ICT Strategy[48] was developed by the Ministry of Internal Affairs and Communication (MIC). The strategy realizes Japan's economic growth and contribution to international society through innovation by ICT. Three main visions are set in the strategy: 1) Building "a knowledge- and information-based nation" by 2020; 2) Utilize ICT to create a total solution for complex social problems faced by Japan other counterparts and the globe 4) Speedy implementation of actions based on global trend.

The Smart Japan ICT Strategy consists of two main parts: the ICT Growth Strategy (the domestic strategy) and the Initiative on Intensification of International Competitiveness and Global Outreach in the Field of ICT (the international strategy).

- The ICT Growth Strategy can be divided into these 9 priority areas:

• Smart Platinum Society – Super- aged society & ICT

• ICT in new business creation / Open Big Data / Education & ICT

• Broadcast content

• Broadcast service sophistication

• Urban development & ICT

• Creation of ICT Innovation

• Geo-space & ICT

• Information Security / Person data

• ICT infrastructure development

- The Initiative on Intensification of International Competitiveness and Global Outreach in the Field of ICT has 4 priorities:

• Improvement of Business Environment

• ICT human resources development and utilization

• Development and strengthening of "technology diplomacy"

• Construction of "Public-Private All Japan system"

New Economic Policy Package

In December 2017, the government launched the New Economic Policy Package, which aims to double labor productivity growth from 0.9% per year to 2.0% by 2020. The Package incorporates fiscal and regulatory measures to boost the labor force and investment to raise productivity, including: 1) a reduction in educational costs borne by families, including free childcare for children age 3-5; 2) financial support for investments in Information and Communication Technologies (ICT) by SMEs, as well as tax measures to facilitate business successions when owners retire; 3) tax incentives for wage and investment increases; 4) further reform in corporate governance; and 5) regulatory reform, including the creation of regulatory sandboxes and development of digital infrastructures for the fourth industrial revolution. In short, the Package should enhance inclusive growth.[49]

Society 5.0

The Science and Technology Basic Plan,[50] based on the Science and Technology Basic Law, aims to comprehensively and systematically advance science and technology policy. The government formulates the basic plan based on anticipating the next decade, putting into effect science and technology policies over a 5-year period. It covers many aspects, including innovation promotion and

[48] https://www.crcom.gov.co/recursos_user/Documentos_CRC_2015/Eventos/10taller/10Hishida.pdf
[49] Japan: Promoting inclusive growth for an ageing society, https://www.oecd.org/about/secretary-general/BPS-Japan-EN-April-2018.pdf
[50] http://www.mext.go.jp/en/policy/science_technology/lawandplan/title01/detail01/1375311.htm

internationalization. A focus point, however, is the development of the society towards a Super Smart Society, *the Society 5.0.*[51]

In the Science and Technology Basic Plan, a super smart society or Society 5.0 is defined as "a society where the various needs of society are finely differentiated and met by providing the necessary products and services in the required amounts to the people who need them when they need them, and in which all the people can receive high-quality services and live a comfortable, vigorous life that makes allowances for their various differences such as age, sex, region, or language."

To realize a super smart society, the Japanese government will promote the creation of a common platform or "super smart society service platform" that allow for coordination and collaboration between multiple ICT or IoT systems and for a wide variety of data (e.g., web data, human activity data, 3D geographical data, transportation data, environmental observation data, production and distribution data of manufacturing and agricultural produce) to be collected, analyzed and applied across all the coordinating systems to produce new value and services.

The Japanese government will further promote the development of technologies for IoT, big data analytics, high-speed processing device, AI (artificial intelligence), networking, edge-computing and cyber security as the "fundamental technologies necessary to build the super smart society service platform", as well as such technologies as those for robotics, sensor and human interface as the "fundamental technologies that are Japan's strengths, which form the core of new value creation."

6. Republic of Korea

Creative economy initiative

In 2013, the government launched the *"creative economy*" initiative,[52] aiming to generate new jobs and markets through creativity and innovation, to strengthen the economy's global leadership in the creative economy, and to promote creativity more generally in Korean society. Naturally, maximizing the potential of Korea's creative economy must involve leveraging its science and technology capacity, capturing the benefits of the digital economy, advancing green innovation, and addressing low productivity in the services sector.

As in 5 June 2013, the government announced Action Plan for the Creative Economy with Six Strategies and 24 Promotional Tasks. Six strategies includes: 1) Creation of the ecosystem in which creativity is rewarded fairly and it is easy to start a new company 2) Strengthen the competitiveness of the venture and small & medium-sized company as a key player 3) Creation of the new growth engine to develop new products and new markets 4) Training of creative global talent 5) Strengthen the Innovation Competitiveness of S&T and ICT as the basis of the creative economy 6) Development of the creative economy culture in which people and government work together.

Three-Year Plan for Economic Innovation

In 2014, the government unveiled the "*Three-Year Plan for Economic Innovation*".[53] The plan suggested three main directions for future economic policies: 1) "economy with sound foundation" through the normalization of abnormality; 2) "dynamic innovative economy" through the creative economy; and 3) "economy in which domestic consumption and export are balanced" through the revitalization of the domestic consumption. The following 11 tasks were suggested for these promotional directions: vitalization of an online creative economic town under a dynamic creative economy category; construction and diffusion of off-line creative economy innovation centers; enhancement of the competitiveness of small and medium-sized businesses; solution of management difficulties for growth of startups into small and medium-sized businesses; diffusion of environment for start-up and re-

[51] Report on The 5th Science and Technology Basic Plan, https://www8.cao.go.jp/cstp/kihonkeikaku/5basicplan_en.pdf
[52] http://roshankhaneh.net/wp-content/uploads/2019/03/2-1041.pdf
[53] http://www.g20.utoronto.ca/2016/2016-growth-korea.pdf

challenging; virtuous cycle of investment fund; expansion of M&A purchase foundation; expansion of M&A incentives; M&A deregulation; and the promotion of convergence based new industry.

In the plan, the Korean government placed special emphasis on the creative economy innovation center—one for each of the 17 local governments through 2015. The creative economy innovation center is an organization that supervises the realization and diffusion of the local creative economy, such as the development of local society, training of talents and businesses, etc., by fostering the center as a core base for the realization of the local creative economy. In particular, the creative economy innovation center applies various support methods and models, such as nurturing a field that the relevant large business has the advantage as a specialized local industry by matching one local government and one large business. In addition, the creative economy innovation center, with an online creative economy town (www.creativekorea.or.kr) completed in September 2013, serves as a core off-line platform for the realization of the creative economy and outcome creation. It allows various economic subjects—individuals or businesses—to collaborate and share ideas online, to support each other on mutual topics of interest (such as technology or commercialization strategies), and to have access to expert mentoring. Additional support, such as an application for intellectual property rights or a prototype for manufacturing expenses, is also provided.

7. New Zealand

The New Zealand Government has four action plans to support a thriving Digital Sector, technology-enabled Digital Businesses, connected and confident Digital New Zealanders and a Digital Government. Below is a summary of main initiatives of the Government.

7.1. A thriving Digital sector

- The Government is supporting NZTech to launch an economy-*wide "Techweek" event.*[54] This event will bring together the technology sector, the wider business community, and New Zealanders from across the economy to promote New Zealand as a high tech economy, bring investors and ICT talent to New Zealand, inspire youth to get into tech, and encourage business uptake of ICT through events in various regions;

- The government also launched *The Investor's Guide to the New Zealand Technology Sector*[55] in 2016. This Guide provides information on the performance of New Zealand's top technology companies and highlights the significant investment opportunities within our growing technology sector.

- The government supported NZTech to form *a New Zealand IoT Alliance.*[56] This Alliance is a collaboration of industry and government working towards accelerating the adoption of IoT technologies for the economic and social benefit of New Zealand.

- The government has produced the *Digital Nation Domain Plan.*[57] It looks at what we should measure, and how. It sets some strategic priorities for data relating to the digital domain and outlines four key areas for action: Digital inclusion; Defining and valuing the digital sector; Digital security; Digital technologies and their impact.

7.2. Technology-enabled Digital Businesses

- The Government is partnering with technology industry associations, regional economic development agencies, and the wider business community to promote the smart use of digital tools in three pilot sectors: arable farming; tourism businesses; traders in the construction sector. The first phase of this pilot program will develop targeted messaging and materials to actively engage arable farmers, tourism businesses, and traders about the specific opportunities digital tools create for their sector. The second phase of the pilot program is to support arable farmers, tourism operators, and traders to assess their

[54] https://techweek.co.nz/whats-on/
[55] https://www.mbie.govt.nz/assets/de3265bf8b/investor-guide-to-the-nz-tech-sector.pdf
[56] https://iotalliance.org.nz
[57] https://www.mbie.govt.nz/business-and-employment/economic-development/digital-economy/digital-economy-work/digital-sector/

current digital maturity and identify specific areas for improvement, including security. The third phase of the pilot program aims to build the confidence and capability of arable farmers, tourism operators, and traders, supporting them to increase their digital maturity, ensure their digital security, and adopt digital tools relevant to their business.

- To promote uptake of digital technologies, the government organized the roadshows called *Taking Care of Business: Government Supporting Your Business* [58] annually (since 2016). Through the roadshows, businesses hear about the Government's vision for small business, learn about the experiences of local business owners get information from government agencies

- The Ultra-Fast Broadband Program, Rural Broadband Initiative and Mobile Black Spot Fund are delivering improved broadband and mobile services to New Zealanders.[59] The Ultra-Fast Broadband (UFB) program is one of the largest and most ambitious infrastructure projects ever undertaken in New Zealand. The Rural Broadband Initiative (RBI) is providing faster internet to hundreds of thousands of rural homes and businesses outside UFB areas. The Mobile Black Spot Fund (MBSF) is providing greater mobile coverage on approximately 1000 kilometers of state highway and in over 100 tourism locations where no coverage currently exists.

- *Connect Smart*[60] is a cyber-security awareness and capability raising campaign which aims to build knowledge and skills across all parts of the economy, from individuals to enterprises. The program includes a website containing targeted advice for individuals and businesses and a range of outreach and other activities to build cyber security capability, including an annual Connect Smart Week.

- The Government is investing $22.2 million from Budget 2016 to set up a new *Computer Emergency Response Team (CERT).*[61] CERT NZ will be responsible for receiving cyber incident reports, tracking cyber security incidents, and providing advice and alerts on how to respond and prevent further incidents.

- The *Cyber Security Strategy 2019*[62] emphasizes that the government needs to work with individuals, businesses, community organizations and the private sector, in order to minimize harm and disruption, and make the most of technological advances.

- To collect Goods and Services Tax (GST) on remote services and intangibles, Government has enacted new rules,[63] including content and software purchased from off-shore websites. The new rules came into effect on the first of October 2016.

7.3. Connected and confident Digital New Zealanders

- The Government launched a pilot to attract more women back into the technology sector.[64] The pilot is likely to be aimed at professional women and may include a mix of skills training and work readiness coaching.

- The Ka Hao: Māori Digital Technology Development Fund[65] is a contestable fund to support initiatives that will create high value jobs and opportunities to advance Māori in digital technologies. In 2014, the Government allocated $30 million over six years to 2021 to support: Māori economic development by encouraging Māori participation in the ICT sector; and access to Māori language and culture through ICT.

- The Government has partnered with NZTech and other supporters to extend the number of participants in Shadow Tech Days.[66] The program, run by NZTech, connects young women who are studying

[58] https://www.business.govt.nz/news/2018-small-business-roadshows/
[59] https://www.mbie.govt.nz/science-and-technology/it-communications-and-broadband/fast-broadband/broadband-and-mobile-programs/#targetText=In%20August%202017%20the%20Government,UFB%20deployment%20by%202%20years.
[60] https://www.connectsmart.govt.nz/about/
[61] https://www.connectsmart.govt.nz/
[62] https://dpmc.govt.nz/publications/new-zealands-cyber-security-strategy-2019
[63] https://taxpolicy.ird.govt.nz/sites/default/files/2015-dd-gst-cross-border.pdf
[64] https://www.digital.govt.nz/news/return-to-it-pilot-encourages-women-into-tech/
[65] https://www.tpk.govt.nz/en/whakamahia/it-and-innovation/ka-hao-maori-digital-technology-development-fund
[66] https://shadowtech.nz/

technology subjects at school with women working in the tech sector, as well as women studying technology at a tertiary level, as mentors.

- To understand the impacts of digital inclusion on the social and economic outcomes of New Zealanders, The Government published research *"Digital New Zealanders: The Pulse of our Nation"*[67] in late 2016 from a consortium engaged in digital inclusion initiatives to better understand the ways in which digital capabilities and digital inclusion affect New Zealanders' social and economic outcomes.

- *Telecommunications (Property Access and Other Matters) Amendment Act 2017 (2017/16)*[68]creates a new consenting process that telecommunications companies must follow when installing networks such as UFB. This Act will make it simpler for those living in apartments or with shared property access to connect to faster broadband at home, by addressing delays such as neighbor disputes and unanswered queries.

7.4. A Digital Government

The Government ICT Strategy and Action Plan to 2017[69] was launched in June 2013 and has since laid the foundation for service and system transformation within Government. In 2016, to ensure that it remained relevant and incorporated emerging technologies and practices, the strategy was revised and now aims to achieve the following outcomes:

• Digital Services – Customers experience seamless, integrated and trusted public services

• Information – Information-driven insights are reshaping services and policies, and adding public and private value

• Technology – Adoption of information and technology innovations is being accelerated and value is being created

• Investment – Investment in innovative digital services is being prioritized and benefits are being realized

• Leadership – Complex problems are being solved and innovative solutions are being adopted.

8. Papua New Guinea

Digital infrastructures

Improving digital infrastructure in particularly is crucial for PNG to meet the goals laid out under the digital roadmap.

Late 2018, the government took a significant step forward in this respect, signing a deal with fellow APEC member Australia for the construction of *an underwater high-speed telecoms cable* between Port Moresby and Australia.[70] Estimated to cost around $100m and be majority funded by the Australian government, construction of the 3000-km cable is expected to be ready for service at the end of 2019. Once complete, the cable will improve capacity and connection speeds for homes and businesses in PNG. Much of the economy's existing international digital backbone is ageing or under-utilized; the two submarine cables currently in place – APNG-2 and PPC-1 – provide approximately 2.5 Gbps of capacity to a population of 7.6m. Demand is expected to grow to just over 450 Gbps by 2040, according to data from Australian think tank the Lowy Institute.

PNG still has some of the highest mobile and broadband internet costs in the region, partly due to the challenges posed by its mountainous terrain and widely dispersed population. To tackle this the government is looking at improving domestic mobile telephone infrastructure and expanding access to

[67] https://www.mbie.govt.nz/search/SearchForm?Search=the+pulse+of+our+nation
[68] https://www.parliament.nz/en/pb/bills-and-laws/bills-proposed-laws/document/00DBHOH_BILL69460_1/telecommunications-property-access-and-other-matters
[69] https://www.digital.govt.nz/digital-government/strategy
[70] https://dfat.gov.au/about-us/publications/Pages/supporting-the-future-digital-economies-of-papua-new-guinea-and-solomon-islands.aspx

3G and 4G services. *The National Information and Communications Technology Authority*[71] is also planning to support the expansion of high-speed broadband to selected communities, according to local media reports.

Digital financial services

Under the Second National Financial Inclusion Strategic Plan (2016-2020),[72] the government aims to reach 2 million more unbanked low-income people in Papua New Guinea, 50% of whom will be women with a wide range of financial services that includes savings, loans, remittance servicers and insurance until 2020. To achieve this goal, digital finance has been prioritized for scaling up financial access and reaching remote parts of the economy. The government continue to actively support innovative use of technology for scaling up financial access and promotion of expansion of digital finance services to reach remote parts of the economy, including 1) Establish holistic and fully enabling long-term regulatory framework; 2) Promote innovative use of identification data for financial inclusion; 3) Increase financial access points in rural areas; 4) Achieve broad interoperability across the payment system; 5) Reduce reliance on cash; 6) Digitize Government payments.

9. Russia

The Digital Economy of Russia[73] program was approved in the summer of 2017, and is designed to last until 2024. This domestic program includes the following six federal projects:

1. Regulation of the Digital Environment

2. Digital Infrastructure

3. Human Resources for Digital Economy

4. Information Security

5. Digital Technologies

6. Digital Government

The implementation of the domestic program involves six areas and that the expenditure on the implementation of the measures planned for all the area of the domestic program through 2024 are expected to total RUB 1.08 trillion. RUB 1.59 billion will go on the implementation "Regulations for the Digital Environment", RUB 413.39 billion will go on the development of "Information Infrastructure", RUB 138.65 billion will go on "Human Reserves for the Digital Economy", RUB 17.99 billion will go on "Information Security", RUB 282.05 billion is to be spent on "Digital Technologies", and another RUB 226.34 billion will be spent on "Digital State Governance".[74]

The list of the main end-to-end digital technologies was provided in the "Digital Economy of Russia" program includes: 1) Big Data; 2) neurotechnologies and artificial intelligence; 3) the systems of the distributed register; 4) quantum technologies; 5) new production technologies; 6) industrial Internet; 7) components of robotics and secsorics; 8) technologies of wireless communication; 9) technologies of the virtual and complemented realities.

Along with this, the development and use of digital technologies in individual industries was included in other domestic projects and departmental programs. Thus, the Ministry of Health of Russian Federation within the framework of the domestic project “Healthcare” will implement the federal project “Digital Healthcare”, the Ministry of Construction of Russian Federation approved the departmental project of digitalization of the municipal economy “Smart City”, the Ministry of Industry

[71] https://www.nicta.gov.pg/

[73] http://ar.gov.ru/ru-RU/typicalPage/typical-page/view/152
[74] http://ac.gov.ru/en/events/018558.html

and Trade of Russian Federation prepared the agency project “Digital Industry”, the Ministry of Energy of Russian Federation is developing an agency Digital Energy project, etc.

Below are some activities implementing the *The Digital Economy of Russia* program:

9.1. Supported sale of apartments on the Internet

On September 2019 it became known that the government approved the bill allowing to carry out real estate transactions remotely. The initiative assumes that it is optional to buyer and seller of the apartment to meet with each other therefore they can be in the different cities. The parties of the transaction will need to address the notary who will check documents, will explain legal consequences of the transaction and will certify intentions to sell and purchase the real estate only. Further the notary who works with the acquirer of the real estate will send electronic documents for registration of the property right. Confirmation will be ready one working day later. The procedure of preparation for the transaction will remain the same, and the certificate of the agreement will pass online, through the secure channel of communication of notaries which is specially developed for this purpose.[75]

9.2. End-to-end technologies of digital economy

The list of the main end-to-end digital technologies was provided in the *"Digital Economy of Russia"* program in 2017 includes: 1) Big Data; 2) neurotechnologies and artificial intelligence; 3) the systems of the distributed register; 4) quantum technologies; 5) new production technologies; 6) industrial Internet; 7) components of robotics and secsorics; 8) technologies of wireless communication; 9) technologies of the virtual and complemented realities.

In the new domestic program *"Digital Economy of Russia"* approved at the end of 2018, the list of end-to-end technologies is not provided, but within the federal project "Digital Technologies" road maps on artificial intelligence technologies, robotics, Big Data, the systems of the distributed register, quantum technologies, new production technologies, the industrial Internet, wireless communication, the virtual and complemented realities were developed.[76]

10. Singapore

Networked Trade Platform (NTP)[77]

The Inland Revenue Authority of Singapore (IRAS) has published its plan to support E-commerce investments in Singapore. The Networked Trade Platform (NTP) is an advanced trade information management platform to support companies in the trade and logistic industry and also assist adjacent sectors such as trade finance, where importers and exporters would have access to all government-related and commercial trade services. Furthermore, NTP will help businesses boost their productivity by streamlining work processes, reducing inefficiencies of manual trade document exchange, and leveraging data analytics for insights from their trade data, so as to be well-equipped for the digital economy.

Action Community for Entrepreneurship (ACE)[78]

To assist E-commerce SMEs, expand their network and also develop industry-specific skills, the private-led Action Community for Entrepreneurship (ACE) was established in 2014. The ACE will seek to support Singapore SMEs in three main areas as follows:

- An all-in access hub to connect Singapore SMEs with technology, funding and talent providers;
- Provide consultant services, clinic and workshops that offer advices to Singapore SMEs on scaling an internationalization;

[75] http://tadviser.com/index.php/Article:Real_estate_(market_of_Russia)
[76] http://tadviser.com/index.php/Article:End-to-end_technologies_of_digital_economy
[77] https://www.edb.gov.sg/en/news-and-events/insights/innovation/singapore-industry-initiatives-for-e-commerce.html
[78] https://www.guidemesingapore.com/business-guides/industry-guides/ecommerce-industry/singapore-e-commerce-initiatives

- Create an environment, in which promote and facilitate co-innovation between Singapore SMEs and enterprises.

Retail Industry Transformation Map (ITM)[79]

The Retail Industry Transformation Map (ITM) consists of key strategies to support innovation, agility, and technology adoption efforts in Singapore's retail sector. Under the Retail ITM, Singapore's Infocomm Media Development Authority (IMDA) and Enterprise Singapore have planned support initiatives to grow two key areas as follows:

- Omni-channel retail and integrated digital ecosystem participation for physical retailers. For instance, DBS and Singtel jointly launched the 99% SME collaboration project, a business-to-business (B2B) e-commerce platform that gives SME retailers an online presence to sell goods and services, as well as facilitate payment and order fulfilment services;
- Enhancing immersive and personalized customer experiences in physical retail locations, with the aid of suitable technologies (such as sensors, robotics and augmented reality). A pioneer project under this initiative is the Kampung Glam Collaboration, which was signed by IMDA, Enterprise Singapore and the Singapore Malay Chamber of Commerce and Industry (SMCCI).

Digital Economy Framework for Action

On 21 May 2018, the Infocomm Media Development Authority (IMDA) introduced the Digital Economy Framework for Action to build Singapore's competitive edge in the digital era through promoting collaboration and building vibrant ecosystems. The Digital Economy Framework for Action seeks to enable businesses to transform to digital businesses, empower workers with technology, and create connected citizens. It encourages collaboration and partnership to strengthen digital capabilities across Singapore.

The Framework comprises three thrusts:

1. Accelerate Digitalising Industries – to digitalise every industry and every business, raising productivity and efficiencies to grow the economy
2. Compete Integrating Ecosystems – to sharpen Singapore's competitive edge by supporting companies to leverage digital technology
3. Transform Industrialising Digital – to transform the Infocomm Media (ICM) industry to be a key growth driver of Singapore's digital economy

The three strategic priorities can be realised with four key enablers:

a) Manpower Development: continued upskilling and reskilling to train and groom ICM professionals as well as raise the digital literacy of the workforce to take on the challenges of the digital economy
b) Research & Innovation: giving companies the competitive edge to keep abreast of the latest trends in technology through roadmaps which aims to inform and anticipate new developments
c) Physical and Digital Infrastructure: continued investment to boost Singapore's infrastructure and enhance digital connectivity as technology evolves
d) Governance, Policies and Standards: robust data privacy laws, cybersecurity and data protection, as well as continued efforts to calibrate governance of data policy and related activities like Artificial Intelligence (AI)

[79] https://www.guidemesingapore.com/business-guides/industry-guides/ecommerce-industry/singapore-e-commerce-initiatives

SMEs Go Digital

The SMEs Go Digital, an initiative by the Infocomm Media Development Authority, aims to help SMEs use digital technologies and build stronger digital capabilities to seize growth opportunities to the digital economy. Building on the foundation of the Enhanced iSPRINT, SMEs Go Digital has a more structured and inclusive approach towards the adoption of digital technologies by SMEs. This programme includes the Industry Digital Plans for SMEs (IDPs), which the SMEs can refer to for guidance on the use of digital technologies at different stages of their growth. IDPs will be developed for six sectors – food services, logistics, retail, wholesale trade, environmental services and security.

Through the IDPs, SMEs in these six sectors can:

1) Use a digital roadmap to understand the digital readiness of their business and the trainings required to raise their employees' digital skills.
2) Identify pre-approved digital solutions relevant to their business. Examples of solutions include digital ordering and payment, fleet management and supply chain optimization.
3) Reach out to SME Centres for basic advisory services with regard to the digital roadmap or the pre-approved solutions, or be referred to the SME Digital Tech Hub for more specialized advice.
4) Participate in digital sector projects led by their industry leaders to pilot emerging solutions with the potential to scale and uplift whole sectors.
5) Engage pre-approved digital project management services to help implement digital solutions to yield maximum sustainable outcomes through business processes re-engineering and job redesign.

Review of the Electronic Transactions Act (Cap. 88)[80]

IMDA is reviewing the Electronic Transactions Act (ETA) to ensure that it continues to be progressive, facilitate innovation in the Digital Economy, strengthen Singapore's position as a hub for electronic transactions, and support Digital Government efforts. The ETA Review will:

1) Enable more transactions under the ETA, including property transactions, Lasting Powers of Attorney, and negotiable instruments such as bills of lading. The paper also looks at the adoption of the UNCITRAL Model Law on Electronic Transferrable Records ("MLETR") which would facilitate cross-border use of transferrable documents and instruments in electronic form.
2) Offer certainty on the use of technologies such as Distributed Ledger Technology (DLT), Smart Contracts and Biometrics; and
3) Update the Certification Authority (CA) framework to ensure currency with the latest international standards.

IMDA launched the Public Consultation on the Review of the ETA on 27 June 2019 and closed on 27 November 2019 after extensions due to requests from industry players.

11. Chinese Taipei

Fintech sandbox[81]

The experimental mechanism for fintech innovation (fintech sandbox):

- In accordance with the "Financial Technology Development and Innovative Experimentation Act".

- Provides a safe environment for fintech innovators to experiment with innovative products and services.

[80] https://www.imda.gov.sg/ETA-Review-Consult
[81] https://www.fsc.gov.tw/en/home.jsp?id=177&parentpath=0,4,175

- The purpose is to establish a friendly ecosystem and foster fintech development.

ITS Development Plan 2017-2020

Rapid advances in information and communications technology, the popularity of smart mobile devices, and developments in cloud technology have intensified public demands for real-time traffic information updates, internet and mobile applications, and integrated transportation data. To meet these demands for smart transportation and smart living, the government has launched a plan (2017-2020) to develop intelligent transportation systems, which included 6 main programs: Smart Corridor, rural area accessibility, ITS safety, connected vehicles for automated cars and motorbikes, and mobility-as-a-service (MaaS) programs.

Startups Regulatory Adjustment Platform

In response to the development of the digital economy, Chinese Taipei set up the Startups Regulatory Adjustment Platform[82] on October 18, 2017 to help startup operators clarify the applicable regulations for emerging business models. Startup operators can conveniently submit an application online via the aforementioned platform. By facilitating face-to-face communication between the competent authorities concerned and startups, the applicability and restrictions of regulations can be quickly clarified, actively building a business-friendly regulatory environment.

12. United States

National Cyber Strategy 2018

On September 20, 2018, the Government released a new *Cybersecurity Strategy* with several important changes in direction meant to give government agencies and law enforcement partners a greater ability to respond to cybercrime and nation-state attacks.[83]

The new strategy includes four main pillars of priority:

(i). Protect the United States People, the Homeland, and the United States Way of Life by securing federal networks and information, securing critical infrastructure, combating cybercrime and improving incident reporting. This includes giving the Department of Homeland Security more oversight of civilian cybersecurity efforts and combating cybercrime by cooperating with other countries to track down cyber criminals.

(ii). Promote United States Prosperity by fostering a vibrant and resilient digital economy, fostering and protecting U.S. ingenuity and developing a superior U.S. workforce. The administration says it will work with tech companies to promote cybersecurity testing in new products and "improve recruitment and retention of highly qualified cybersecurity professionals."

(iii). Preserve Peace through Strength by enhancing cyber stability through norms of responsible state behavior and attributing and deterring unacceptable behaviors in cyberspace. The strategy says the administration will use "all instruments of national power" to deter cyberattacks and impose "swift and transparent consequences" against malicious actors. It also calls for a "Cyber Deterrence Initiative" made up of foreign allies to support each other's responses to major cyberattacks.

(iv). Advance its Influence by promoting an open, interoperable, reliable and secure Internet and building international cyber capacity by helping equip U.S. allies with cyber capabilities to address "threats that target mutual interests."

Executive Order on Maintaining American Leadership in Artificial Intelligence[84]

[82] https://www.ndc.gov.tw/en/Content_List.aspx?n=0B881158C3EE8B32&upn=A9D72CE9207D963B
[83] https://www.whitehouse.gov/wp-content/uploads/2018/09/National-Cyber-Strategy.pdf
[84] https://www.whitehouse.gov/presidential-actions/executive-order-maintaining-american-leadership-artificial-intelligence/

On February 11, 2019, the government issued an executive order aimed at establishing the United States' place as the global leader in artificial intelligence technology. The executive order outlines five main directives:

(i). Federal investment: Federal agencies should establish AI research and development as an agency priority and develop budgets accordingly. The agencies should also explore opportunities to collaborate with academia and the private sector.

(ii). Federal resources: Agencies should identify ways to enable the greater AI research community to use federal resources in the form of data, models, and computing resources, while preserving security and confidentiality.

(iii). Guidelines for regulation: The Office of Management and Budget and the National Institute of Standards and Technology should establish guidelines and standards to enable the regulation of AI technologies, with the aim of enabling innovation while protecting privacy and national security interests.

(iv). Preparing the workforce: Agencies that provide educational grants and fellowships to students and researchers should consider AI as a priority area, giving preference to American citizens when possible.

(v). Protecting the United States AI: The National Security Advisor should develop an action plan to protect AI technology critical to the United States economic and national security against strategic competitors and adversarial nations.

The American Broadband Initiative[85]

The United States Broadband Initiative (Initiative) is the Administration's signature strategy to stimulate increased private investment in broadband infrastructure and services to fill broadband connectivity gaps in the United States. The Initiative will drive change across Federal Agencies to better leverage public assets and resources through partners to expand domestic's broadband capacity. This mission is built on three core principles: (i) Government processes should be clear, transparent, and responsive to stakeholders; (ii) Federal assets should provide the greatest possible benefit to stakeholders and the public; (iii) The Federal Government should be a good steward of taxpayer funds.

The United States Broadband Initiative includes:

(i). Implements the e-Connectivity "call to action" from the Report to the President of the United States from the Task Force on Agriculture and Rural Prosperity,

(ii). Supports Agency activities to implement the President's broadband-related Executive actions,

(iii). Builds on NTIA's mission as the Agency principally responsible for advising the Administration on telecommunications and information policy,

(iv). Refocuses the work of the Broadband Interagency Working Group (BIWG), and

(v). Establishes a coordination vehicle for the broadband provisions in the Consolidated Budget Act of 2018.

Cybersecurity Framework and Privacy Framework by NIST

To help these organizations manage their cybersecurity risk, the National Institute of Standards and Technology (NIST) convened stakeholders to develop a *Cybersecurity Framework* that addresses threats and supports business.[86] The Framework integrates industry standards and best practices to help organizations manage their cybersecurity risks. It provides a common language that allows staff at

[85] https://broadbandusa.ntia.doc.gov/sites/default/files/resource-files/american_broadband_initiative_milestones_report_1.pdf
[86] https://www.nist.gov/privacy-framework

all levels within an organization—and at all points in a supply chain—to develop a shared understanding of their cybersecurity risks.

The Framework not only helps organizations understand their cybersecurity risks (threats, vulnerabilities and impacts), but how to reduce these risks with customized measures. The Framework also helps them respond to and recover from cybersecurity incidents, prompting them to analyze root causes and consider how they can make improvements. Companies from around the world have embraced the use of the Framework, including JP Morgan Chase, Microsoft, Boeing, Intel, Bank of England, Nippon Telegraph and Telephone Corporation, and the Ontario Energy Board.

Following a transparent, consensus-based process including both private and public stakeholders to produce this voluntary tool, NIST is publishing this *Privacy Framework*: A Tool for Improving Privacy through Enterprise Risk Management (Privacy Framework), to enable better privacy engineering practices that support privacy by design concepts and help organizations protect individuals' privacy.[87] The Privacy Framework can support organizations in:

(i). Building customers' trust by supporting ethical decision-making in product and service design or deployment that optimizes beneficial uses of data while minimizing adverse consequences for individuals' privacy and society as a whole;

(ii). Fulfilling current compliance obligations, as well as future-proofing products and services to meet these obligations in a changing technological and policy environment; and

(iii). Facilitating communication about privacy practices with individuals, business partners, assessors, and regulators.

Enhancing the Resilience of the Internet and Communications Ecosystem Against Botnets and Other Automated, Distributed Threats[88]

Following the opportunities and challenges in working toward dramatically reducing threats from automated, distributed attacks, the Government identified five complementary and mutually supportive goals that, if realized, would dramatically reduce the threat of automated, distributed attacks and improve the resilience and redundancy of the ecosystem. A list of suggested actions for key stakeholders reinforces each goal. The goals are:

(i). Identify a clear pathway toward an adaptable, sustainable, and secure technology marketplace.

(ii). Promote innovation in the infrastructure for dynamic adaptation to evolving threats.

(iii). Promote innovation at the edge of the network to prevent, detect, and mitigate automated, distributed attacks.

(iv). Promote and support coalitions between the security, infrastructure, and operational technology communities domestically and around the world.

(v). Increase awareness and education across the ecosystem

Digital Trade Officers

In order to deal with challenges related to associate with the free flow of goods and services online, the US government has launched a pilot program in March 2016 for Digital Trade Officers[89], in order to

[87] https://www.nist.gov/privacy-framework
[88] https://csrc.nist.gov/CSRC/media/Publications/white-paper/2018/05/30/enhancing-resilience-against-botnets--report-to-the-president/final/documents/eo_13800_botnet_report_-_finalv2.pdf
[89] https://www.export.gov/article?id=Digital-Attach%C3%A9-Program-Information

facilitate US private sector involvement in the global digital economy and to help the US companies to reach markets worldwide. The primary goals of the Digital Trade Officers are to:

- Provide support and assistance to the US businesses for engaging in E-commerce activities;
- Assist the US to successfully navigate digital policy and regulatory issues in foreign markets;
- Expand exports through global E-commerce channels.

The initiative will be supported and led by the Department of Commerce's International Trade Administration (ITA), working with bureaus across the Department, in collaboration with the Department of State and industry stakeholders. The Digital Trade Officers will enhance efforts to advance commercial diplomacy, drive policy advocacy on technology issues, ensure linkages between trade policy and trade promotion efforts, and lastly it provides front-line assistance for the US SMEs to take advantages of the robust E-commerce channel.

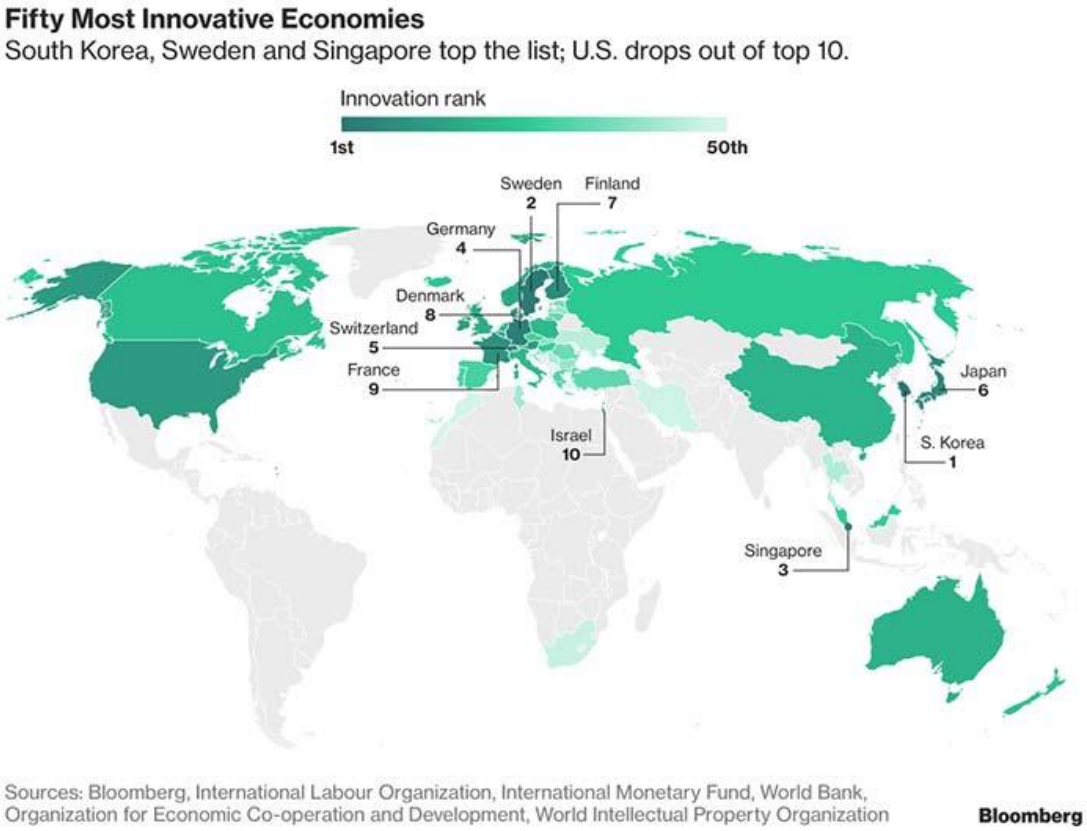
Engaging in WTO's projects related to E-commerce

The US has been actively engaging to many WTO's E-commerce initiatives. For example, on Apr, 2018 the US submitted a paper to the WTO highlighting the provisions to promote digital trade, including free flows of information, fair treatment of digital products, protections of proprietary information, digital security, facilitating internet services, competitive telecom markets, and trade facilitation. In the late in 2018, the US supported the decision made at a high-level Ministerial meeting in Argentina to move forward, and again in Jan 2019, first in a joint statement with the EU and Japan, and subsequently with the group of 76 economies.

CHAPTER 4: BEST PRACTICES AND CASE STUDIES

I. Republic of Korea

The Republic of Korea has a reputation for innovation among the world's most innovative economies according to the 2018 Bloomberg Innovation Index. This APEC member also ranked number one in the world for R&D intensity, as well as value-added manufacturing and patent activity.



The index scores economies using seven equally weighted categories, including: (1) research and development (R&D) spending, (2) manufacturing value-added, (3) productivity, (4) concentration of high-tech public companies, (5) tertiary efficiency, (6) researcher concentration, and (7) patent activity. Each economy was then scored on a 0-100 scale based on seven criteria, those that do not have data in at least 6 criteria were eliminated.

Seoul, capital of ROK ranks 27th out of 45 cities from the report by The Economist Intelligence Unit (EIU) commissioned by Telstra. The report measures executives' confidence in the strength of their local environments to support digital transformation, across categories such as innovation and entrepreneurship, ICT infrastructure, and development of new technologies. Moreover, this city creates the leading way to ROK government and its chaebols (large conglomerated including Samsung, LG, and Hyundai) in supporting the economy's digital transformation.

There are some efforts of government to accelerate the development of digital economy as belows:

1. Focusing on digital skills

While Seoul is a place of most technology companies, executives in the city face challenges recruiting people with the right digital skills. For example, only 36% of Connecting Commerce respondents based in Seoul believe its educational institutions are effective at equipping students with the requirements of digital skills in businesses.

Government is making an optimal effort to improve the digital skills of economy's workforce. A 2016 report by Barclays jointly ranked ROK first the world, in terms of their ability to equip their workers for the digital economy. This report showed ROK's world-leading track record in broadband provision, in addition to the balanced nature and effective implementation of its digital skills policy – in formal education as well as adult training, including those out of work.

2. Enhancing start-up entrepreneurs with enterprise-level chaebol platforms

ROK has put a sharp focus on entrepreneurship and boosting the start-up scene, both within and beyond the chaebol.

The ROK government has invested heavily in R&D, focusing on technology tied to the Fourth Industrial Revolution such as Artificial Intelligence, Augmented Reality, the Internet of Things and Big Data. President Moon Jae-in has committed to spending US$ 3.7 billion on start-up grants and other initiatives over the next three years, while a range of accelerators like Primer, SparkLabs, and KSTARUP have launched. ROK has seen year –on- year growth in the number of start-up investments increased by 49% in 2016.

As money is invested in innovation, more companies are taking advantage of Korea's world class technology and telecom infrastructure. Telecoms chaebol KT, alongside the economy's dominant messaging app Kakao, have created the first new bank in more than 20 years. K-bank, the economy's first web-only bank, has attracted more than half of million ROK users since its launch in April 2017. By creating new start-ups within the umbrella of a larger chaebol platform, KT has been able to promote new innovation and entrepreneurialism. At the Pyeongchang Winter Olympics in February 2018, KT will also bring technology over the world.

3. Establishing an important position in the innovation ecosystem

Telstra's global research into digital transformation has repeatedly underlined the necessity for organisations to work as digital partners with their peers, their community, and their local ecosystem. Almost a third of firms (29%) in several Asian cities turn to innovation labs to obtain ideas and advice, and another 18% work with incubators and accelerators.

This trend is supported in Seoul, where business associations and events were cited as the most helpful local resources for digital transformation by 28% of organisations. One example of this activity in action is from Hyundai. The company has participated in a range of groups including the ITU-T, a group devoted to creating new ICT standards, in order to facilitate collaboration between car and technology companies as new innovation continues to enhance the growth of the connected car industry. The government also will come up with a measure supporting the ecosystem of hydrogen vehicles and power supplies.

This is in line with its goal to have 80,000 hydrogen cars on the road by 2022, up from fewer than 2,000 in 2018, to catch up with economies such as China, Japan and Germany that are beefing up their hydrogen-powered transportation ecosystems. "The economy seeks to reach the top in hydrogen and fuel cells," Mr. Hong Nam-ki, Deputy Prime Minister and Minister of Economy and Finance said.

As for the market's conventional manufacturers, such as automobiles, displays, shipbuilding and petrochemicals, Minister Hong noted the government will have a separate measure ready by February to help them, aligned with creating a digital economy. In addition, services such as tourism, healthcare, gaming and logistics will be also supported by government.

Analysts say the government's signal to work with the private sector for job creation is positive. But it would take some time for the market to fully absorb the policy change.

The government concentrated to revitalize the economy by closely understanding to the market and pursuing regulatory reforms. There will be two projects worth nearly 4 trillion won in total (US$3.5 billion) planned in the private sector in the first half of this year. The business-interest groups and startups are supported with plans to accelerate ecosystems surrounding hydrogen, data analysis and artificial

intelligence. The government will seek to foster 10,000 professionals or developers in artificial intelligence. This is part of efforts to develop a digital economy, enabling entrepreneurs to create and provide services through their open-source platforms.

Moreover, the government wants to invest a 30 trillion won digital market, where startups and big companies can further grow using big data and artificial intelligence technologies by 2023. Thus, the main focus of government will soon create a business center or a hub for artificial intelligence and big data.

While digital transformation means different things to different firms, it broadly refers to the use of digital technology to improve productivity. It can be applied to manufacturing processes, marketing strategies and corporate organisations. So far in ROK, digital transformation has been adopted by most conglomerates, but this appearance remains doubts as to how much of such change can be affected to daily business operations.

According to Pooya Nikooyeh, a partner at McKinsey & Company's Korea office, said that while ROK has strong infrastructure for digital transformations, the companies still stand behind their global rivals. The reason is that the motivation of changing their business is not a lot. They have barriers of limited incentives to make a breakthrough change. In January, McKinsey announced that no single Korean company had been chosen as a "lighthouse factory" to lead the fourth industrial revolution. The standard for successful digital transformation had kept away from Korean enterprises until steelmaker Posco won with its smart factory technology.

The success of Chinese competitors on the lighthouse factory list in January had alarmed Korean companies to be necessary in digital transformation. The keys of Chinese companies are "openness and eagerness". They do more with changing traditional culture than the economy's system framework for business environment. The awareness of companies' leaders, especially CEOs play a vital role for digital transformation efforts. This will be more challenging when top executives' positions are restricted to only a few years.

According to 2006 data from Seoul-based research firm CEO Score, the top 30 Korean companies' CEOs served an average of about 2.5 years. The restricted tenure could discourage a top executive from making a bold decision that might risk his position in the company. The executive is more likely to seek out in-house solutions rather than partnerships with outsiders. In order to create innovation technology, the ecosystem with the partners or other companies will bring new changes to the clients by their internal digital transformation. Although they meet the difficult of changing new ways in applying advanced technology, they will have mindsets and experiences from the past to boost their active operations to catch up the world changes.

Box 2: Case study of a SME to make innovative Internet of Things (IoT)

- ***Internationalization: developing overseas market based on own R&D capability***

Nuri Telecom, which originated from the software in the early days of its founding, has developed hardware through the development period of seven years, pioneered the remote meter reading device market in ROK, developed Code Division Multiple Access (CDMA) and delivered it to Korea Electric Power Corporation (KEPCO). Since then, they have focused on program development and became a set maker of Full Set manufacturing, succeeding in developing a product package. Now they are facing more competition (KT, LG U+, etc.) in the field. After changing to "Nuri Telecom Co., Ltd." and aiming at overseas market within one year, it became the top export company in the domestic remote meter reading device market. Although it continues to do the business of Radio Frequency Identification (RFID) that is the foundation of Machine to Machine (M2M) IoT and has the capability to build the equipment and solution modem from the bottom to the top, now it is more of a service company than the equipment and solution company with the proportion of services (70%) and solutions (30%).

Nuri Telecom has the top-level technological capability of achieving the reading success rate of 99.8% in the test for its finished product in Sweden. The first example of M2M that it pursued is a remote meter reading device, which is an IoT solution product. The network equipment is constructed as a mesh network by mesh method, so that it can establish a flexible network that can be restored even if any one of them is damaged. In the AMI (Smart Grid) product line, which is an area of automatic meter reading device, exports accounted for more than 50% of total exports in 2015. As a product standard, AMI's share of exports grew from 41.1% in 2014 to 65.6% in 2015, and exports accounted for 69.3% in the third quarter. In terms of products, AMI exports accounted for 18.7% in 2014 and increased to 30.7% in 2015, and the proportion of exports of RFID was increased in 2016.

- ***Open innovation: cooperation with external parties and responses***

In the global market, Nuri Telecom is securing its competitiveness by partnering with large companies to deal with global competitors. In addition, the company could achieve sustained survival and growth with its strategy of securing price competitiveness and self-maintenance capabilities as well as various deployment cases. Currently, in the USA, large companies such as Itron and Silver Spring Networks are present with their installation of one million households, and there are more than 30 larger competitors. In contrast, Nuri Telecom covers a range from 100,000 to 300,000 households, but they have low-cost systems and price competitiveness. Thus, global companies also recognise Nuri Telecom as a competitor. Even in the more competitive heavy electric power sector, in the case of power generation, entering the consortium is the only way and the forces are not yet formed. Therefore, they need to participate in the market to be involved in the standard so that it can be within the entry barriers.

Symbol Technology, Alien, Matrics, Philips and TI are among the world's leading suppliers of RFID systems. In November 2004, Nuri Telecom was selected as a partner for Motorola (M&A of Symbol Technology) and Premier Solution and has actively conducted RFID and automatic recognition business. The survival strategy that Nuri Telecom considers and prepares in the IoT era is the response to the standard and cooperation. Europe requires to specify the standard and asks to back up its standard later if it is not there yet. Nuri Telecom follows the M2M international standard, and it is common for overseas customers to make a request first.

All electricity and service networks in ROK are tailored because electricity is post-paid. In contrast, in overseas, a prepayment system is common, and there are many places that use the charge system and the electricity is cut off when the charge is finished. Therefore, it is important to check the remaining charge with an electric shut-off meter or a charging system. Nuri Telecom is currently cooperating with 13 major companies. The disadvantage of collaborating with these partners is that Nuri Telecom has to comply to their specific standards. Thus, Nuri Telecom has always been developed and distributes products considering these standards because it is necessary to change these standards when entering the overseas market. If it does not meet the standards, Nuri Telecom will always be asked by buyers to explain the reasons and future strategies. At present, Nuri Telecom has its own customization capability to meet overseas standards and certification.

- ***Disruptive innovation: Business management (BM) development and response.***

It is the BM that Nuri Telecom is prepared for the global market. In ROK, it is common to receive a new concept, but overseas markets are being asked to present a BM. It is very important to respond quickly to technical standards or BM depending on the economy, and Nuri Telecom has strong competitiveness in this respect. In the process of doing business, Nuri Telecom is aware of the need for a new BM of the rich or poor economies, and it is currently expanding its business in developing economies. In the places where the cooperative relationship exists among the global consultative body, there are large corporations that maintain cooperative relations in developing databases (DBs) and chips. There are also companies in competitive relations. The future orientation is moving

toward smart things. In this area, Japan has M2M capability. Nuri Telecom is preparing for the technology roadmap and continue to refine it over the next three years.

Technology has been developed through continuous modification and chip development is a great know how. These technologies are difficult to disclose and do not yet have to be shared or released. For example, in the case of a chip, it is a perfect solution when it is required to make a correction. This takes a lot of time and requires combining various points of view. Large companies that collaborate demand sharing of these technologies, but in that case, it is difficult to keep the business together. To strengthen its own capabilities, it provides strong compensation for developing patents inside to secure them, and the R&D research team conducts company R&D by participating in domesticsal R&D. Solution development is also a result of obtaining the domestical R&D order. Thus, it has a commercialization process in technology development and operates a separate team for this.

- ***Moving from self-evolving type to the mixed type in driving innovation: response from the technology development perspective***

Among the total 56 patents, registered based on applicants, it holds eight registered patents related to telecommunication and possesses strong competence in terms of technology. It usually carries out independent R&D, but it also conducts joint R&D although it is rare. However, as the need for security technology development is raised through recent interviews, it judges that there is an increasing need to cooperate with security technology companies to develop technologies to replace existing foreign solutions. This judgment is based on recognition that past R&D alone is difficult to survive in the global market competition, and shows that outside-in innovation is required through cooperation with external parties.

In the case of RFID, Ubiquitous sensor network (USN) and IoT, the technology required in terms of internal capabilities is security technology. This technology is used by purchasing the foreign solution, and thus the cooperation is urgently needed to secure it.

Nuri Telecom considers the need for an energy storage system (ESS) technology that saves energy by using big data. It ponders on how to provide a competitive solution and service to energy management solution (EMS) in the electricity, water and gas energy management. Although there are overseas branches, it is difficult to publicize and there are many strong competitors. Thus, it is necessary to make a pilot. However, it is also a big problem that large companies are not interested in.

In order to enforce creative economy policy, Korean Government implemented the process of “Creative Economy” establishment. The Ministry of Science, ICT and Future Planning (MSIP) and related authorities announced the Action Plan for the Creative Economy on June 4th, 2013 for initiative of major government projects. This policy presented government’s vision and three objectives (creation of jobs and market, reinforcement of creative economy global leadership, and a society that respects creativity), six strategies and twenty-four promotional tasks. In July 2013, the Third Science and Technology Basic Plan aimed to link the quality of life to R&D plan including technology transfer, commercialisation and job creation as well as medium and long term plan of science and technology realm.

Furthermore, the “Three-Year Plan for Economic Innovation” in March 2014 was suggested three main directions for future economic policies and 11 tasks for promotion directions. The plan contains more detailed action plans for the realization of the creative economy, such as the proposal of an annual action roadmap until 2017. In the plan, innovation centers were mentioned in 17 local governments in ROK because of the growth and overseas expansion of SMEs in specialized regional industry fields through connection and cooperation across economic innovation subjects. In 2015, the objectives of job creation and human’s perception achieved their remarkable outcomes by governance efficiently.

However, there has been very insufficient interaction between committee and innovation center. In particular, duplicate investments for similar regional R&D programs have been pointed out as a major

problem of low investment efficiency, which was caused by the dual governance for regional R&D management and coordination. The challenge of policy continuity is also concerned to the creative economy. The issues need to be addressed such as quantitative outcomes that cannot reach qualitative outcomes; obsession with outcomes creation in a short term and lack of a new continuous growth engine. The limitation of leaders' tenure cannot support and invest R&D research in a long term. Hence, it is essential to create continuous economy policies to get effective outcomes in local administration.

II. Australia

Based on 7 strategies and 4 main aspects related the Australian policy on the Chapter III, the economy can converge essential factors to do best practices in the context of the global digital economy.

Furthermore, Australia consumers are fast adopters and avid users of digital services and technologies. Many of the benefits of digital technology improve the consumers' demands directly, without appearing in GDP measures. There are many examples of innovation by Australian enterprises, but most are not at the forefront of digital invention and production. Enterprises have high levels of access to the internet and a sizable proportion of companies use the internet for sales. Therefore, adoption of digital technologies changes widely by industry and by companies within industries. The rate of dissemination of different digital technologies likely impacts the costs and benefits of their application on industry and rational individual decisions on enterprises.

There are some benefits for consumers and enterprises from technologies including more convenience, lower prices, more choice and better information:

- **More convenience**

There are many examples of the convenience offered by digital technologies. Services such as Google Maps allow visitors to cities to find their way around and help residents to select the fastest routes to work, home or play. Google Maps was estimated to save each driver (and their passengers) 13.5 hours on the road, 13 hours on public transport and 2.5 hours of walking in the 2014-2015 (AlphaBeta2015). Other services free people and firms from the need to own physical goods or invest in storage. Rather than having shelves full of invoices and accounts, firms can now store all their financial information electronically using cloud storage services and process it using cloud-based accounting packages (e.g MYOB and Xero). Instead of owning large numbers of CDs or buying individual songs and storing them on a hard drive, people can now use (free or subscription-based) music streaming services (e.g Spotify and Apple Music) to immediately access a huge variety of music. Similarly, online services (e.g. Texture and Kindle Unlimited) allow subscribers to access new editions and back catalogues of many magazines and newspapers, freeing up bookshelves, coffee tables, recycling depots and rubbish dumps.

- **Lower prices and new ways of trading**

Platforms are systems that match buyers, sellers, advertisers and other participants, creating or expanding trade in goods and services. They are distinct feature of the digital era. Examples include Tinder, which matches singles for chats and dates, Trade Me and Gumtree, which match sellers to buyers, and Uber Eats, which creates three way matches of restaurants, clients and drivers.

While the idea of platform is not new, digital platforms can have global expansion, connecting greater numbers of potential participants than earlier technologies. Platforms standardise terms and conditions, and most simplify payment. They have also introduced innovative ways to reduce risks for participants. Apple's App Store, for example, uses automated quality control software to screen out apps that might contain malware. Tinder holds contact details but does not share them until both parties to a match agree. Airbnb uses identity checks and reputational scoring to reduce risks to property owners and renters.

Such digital platforms can create trade in goods and services that were previously untradeable, such as ridesharing services or short–term rentals of spare rooms in private homes. This increases the productivity of those assets, and of the wider economy.

Platforms collect substantial amounts of data about how their services are used and by whom. This data can serve many purposes, including personalizing the service, improving service quality and targeting advertising. Data can also be sold to third parties. Revenue from advertising and data sales can subsidise services for consumers, even making them free. Google's business model, for example, is to support search services and sell advertising.

New technologies can reduce the prices faced by consumers and firms to zero. In the case of photography, the development of digital cameras, falling costs and their inclusion into smartphones, saw the number of photos taken worldwide increase from 80 billion in 2000 to 1.6 trillion by 2015. The price per photo over the same period fell from 50 cents to zero. These price reductions were accompanied by quality and convenience improvements, such as less waste, immediate processing and free photo touch-up software (Varian 2016). On the other hand, shops developing film have all but disappeared.

- **More choice**

Small market in Australia can typically only support a limited number of goods and services. Online retail services such as Amazon, Book Depository and Alibaba increase the effective size of the market, by allowing Australian residents to find and purchase many kinds of products than are available locally. Similarly, internet search and advertising services allow Australian enterprises to access more potential customers at lower costs than traditional methods of advertising and marketing.

- **Better information**

Digital technologies can improve information flows to consumers and enterprises, allowing them to make better decisions. Review platforms and functionalities allow people to access and generate more updated information about the quality of goods and services (e.g TripAdvisor, as opposed to physical travel guide books). Aggregator websites allow consumers to easily compare products by price or other attributes.

Markets for digital goods and services also tend to exhibit a 'winner-takes-most' dynamic, which could lead to a growing concentration of wealth in a small number 'superstar' firms (Autor et al.2017). On the other hand, market dominance is often temporary in technology markets, as demonstrated by the decline of many famous firms including IBM, Nokia, Blackberry and Myspace.

However, new technology brings potential risks as well as benefits, and digital technologies are no exception. Some of these risks can have very serious implications, in particular for vulnerable people and children who can be exposed to offensive materials online or approached by people with malicious intent through social media and online game forums (UNICEF 2018).

From the perspective of enterprises, there are new potential risks brought about by cyber-attacks and the need to keep data safe. Review functions – generally a positive feature, and especially important for SMEs seeking to build a reputation – can also be misused or have unintended consequences.

Hence, government needs to support enterprises, especially SMEs to build capacity of these firms. Interventions that target digital capabilities alone are unlikely to make much difference of firm performance. Moreover, OECD data shows that solely increasing firms' use of high-speed broadband will not boost adoption of other digital technologies. Rather, to broaden the dissemination of digital technology, governments need to pursue structural policies that reduce barriers to entry and do not restrict the reallocation of labor and capital to innovative industries (Andrews, Nicoletti and Timiliotis 2018). Such policies are likely to generate benefits across the economy.

Not all technology adoption will be positive for every firm. Governments should focus on building and strengthening environments that enable firms to make their own policies about which technologies will benefit them, and which ones will not. In December 2018, the Australian Government launched its Digital Economy Strategy, 'Australia's Tech Future'. The Strategy sets out a vision for how businesses, government and the community can work together to maximise the benefits and opportunities enabled by advanced digital technology. The strategy identifies the further actions required to ensure all Australians can thrive in a global digital economy as below:

- Ensuring education and training meets current and future needs, to help businesses take advantage of digital opportunities and leave no Australian behind;
- Facilitating investment in enabling digital infrastructure;
- Improving access to, and use of, data while maintaining strong data safeguards;
- Improving trust, confidence and security around digital activities;
- Ensuring regulatory frameworks are flexible, adaptable and fit-for-purpose;
- Delivering digital government services that are secure, fast and easy to use; and
- Championing an open, free and secure cyberspace internationally.

To illustration, the Government is building small businesses digital capability through the Small Business Digital Champions initiative, launched in March 2019. The program will assist selected small businesses to transform their operations using hardware, software and digital training. Case studies of "Digital Champions" and their digital transformation to inspire and help other small businesses to "go digital". This program will support 100 Australian small businesses to receive a comprehensive digital transformation of their business valued at up to A$18,500. In fact, 15 of the 100 businesses have been selected to become Digital Champions and will receive additional support from a high-profile Digital Mentor. Digital Mentors will share their experiences and provide guidance and insight on how to get the most out of the digital transformation.

The digital transformation will include an assessment of the business' needs, development of a personalised digital transformation plan and digital assistance that may include hardware, software, online content development or digital training to help them thrive in their particular field. The experience of the Digital Champions will be filmed over the 12-month period and showcased to the Australian small business community through online interactive case studies to highlight and share the benefits that digital technology can have for small business.

Good industry standards for block chain technology are essential to fostering an innovative and competitive environment and establishing market confidence in the technology. Standards Australia that is leading the development of international standards was appointed by the International Organisation for Standardisation (ISO). A block chain and industry standards roadmap has been produced to enhance the development of international standards. There are 39 economies, with 11 Standards currently at various stages of development, in which the Australian Government is making a fund to the development of these standards.

Box 3: Case study of digital information to connect trade transactions

Trade Community System (TCS) is a project to design and create a data sharing platform for containerised trade that promises ‘trusted end to end visibility of the supply chain’. The architects of the TCS (PwC, Australian Chamber of Commerce and Industry and Port of Brisbane 2018, p.6) argued that the existing inefficiencies are driven primarily by a lack of information sharing.

The main problem is the information asymmetry which currently plagues Australian supply chains. A lack of information exchange and connections between importers and exporters with their supply chain service providers created inefficiencies and made the limitation of the supply chain. This matter is shown by the World Bank’s ranking of Australia’s trading across borders performance, where we have fallen from 34th (2011) to 95th (2018) in eight years.

According to ANZ Bank (2017), the limitations and risks arising from a lack of digital information sharing include:

- Processing and cash flow are slow in checking documents, couriering the foreign documents and receiving the inspecting documents of firms or banks.
- Using traditional paper is susceptible to forgery, and can be altered to prevent internal controls or sanctions and money laundering checks.
- Accessing to finance is reduced in open account trade suppliers and send physical trade documents directly to an end buyer rather than using the banking system. Banks (and

regulators) thus have less visibility of the transaction. SMEs may find it harder to access trade finance if they do not have a visible trade transaction history,

The goal of the TCS is to improve information flows by standardising data on all aspects and steps of the container shipping process, and by creating mechanisms to move data between stakeholders (PwC, Australian Chamber of Commerce and Industry and Port of Brisbane 2018). The envision that, in the longer term, the platform could provide:

The data analysis of exporters and importers can benchmark their consignments' movements along trade routes against other enterprises using the same routes, and compare logistics providers across and within routes.

Fraud-resistants (e.g block chain based) record management systems for vessel journey histories and container contents, cooperation with Department of Home Affairs systems for smoother and faster reporting, and more up to date data for risk management.

The databases of historical management and scheduling systems are recorded, so that data input at the departure port would flow to all others connected with the same route (e.g the arrival port, the shipping line, the freight forwarder or the container owner).

A logistics booking platform, with data connecting to the above sources, so that the availability of vessels, staff and ports would always be up to date.

In conclusion, the digital transformation will bridge the gap between participants and embrace the latest technologies in applying the best practices to further focus efforts. Thus, both governments and enterprises need to create positive movements to increase public and private sectors in cooperation completely. This development will bring economies forwarding to smart cities, modern societies and skilled employees in the Industrial Revolution 4.0.

CHAPTER 5: WAY FORWARDS

It is agreed that electronic commerce and Internet / Digital Economy have the potential to provide an extraordinary stimulus to the growth and trade in the Asia-Pacific region. However, APEC economies are facing challenges in taking best use of benefits due to digital divide among APEC members. The 3 recommendations discussed below address selected challenges currently affecting the regional e-commerce and digital economy development.

I. Update Domestic Legislations for Digital Economy as a Solution and Raise Consumer's and Business's Awareness

While e-commerce legislation has been more updated and consolidated among APEC members, it is well recognized that digital economy legislation should be more focused in coming time. New digital technologies have been created new platforms that are not regulated in the present legislation. However, technologies can bring about both positive and negative impacts as well as opportunities and challenges which much depend on domestic regulations are chosen by Governments. Therefore, it is required APEC members should have quick responses to the new facts and trends with the aim of maximizing benefits of digital economy. Appropriate policies will be served as a good solution for Government to facilitate digital economy.

In addition, enhancing awareness of consumers and companies is also needed to support beneficiaries and stakeholders to understand about policies and regulations. Capabilities building programs should be accelerated by Government, authorities and relevant organizations in order to educate and train all stakeholders about new policies or regulations on e-commerce and digital economy. Government and authorities should embark raising awareness about policies as well as providing guidelines to encourage consumers and business to ensure safe transaction on Internet.

II. Promote Coherency and Interoperability among Different Legislations

APEC members have been made a lot of progress in adoption of laws as mentioned in the previous chapters, which have been creating a diverse picture of e-commerce legislation in the region. Some arguments said that this diversity is creating more challenges for regional development of e-commerce (WEF, 2017).

In terms of regulations and policies for Internet / Digital Economy, it seems somehow behind with the digital transformation taking place in economies. The Report on Digital Economy of UNCTAD said that even in developed economies, few approaches have been tried and tested (UNCTAD, 2019). Domestic policies play an important role in helping economies to create more values in the digital era. Policies will be the key for Governments to shape the digital economy by defining the game through close dialogues with related stakeholders.

Under the current context, it is necessary to create a coherent and interoperable legislation environment in the region to bridge the digital divide as well as facilitate domestic laws and regulations on relating issues. One of the solutions that APEC members can consider is to promote international standards, mutual recognition of e-signatures, electronic contracts and particularly cross-border data privacy. APEC Cross-Border Data Privacy Rules (CBPR) system can be referred as a helpful mechanism to be further improved to facilitate data protection in the region.

Besides, APEC economies should align domestic laws with international standards such as OECD guidelines and UN guidelines on Consumer Protection which serve as main international reference framework. As for economies still lacking the e-commerce legislation to provide appropriate online legal protection, they should soon adopt those required legislative instruments to support ecommerce and enhance trust in online transactions among business and consumers.

III. The Need for a Greater International Collaboration

Promoting cross-border e-commerce, towards digital economy, requires a strong and effective cooperation among APEC members and between each economy's enforcement authorities. Therefore, the joining of international organizations, forums will help economies update information, share experience and best practices. International cooperation framework is also a place for APEC members to prepare at best to cope with cross border issues while developing e-commerce and digital economy. In this connection, economies should consider opting into the APEC ODR Framework and encourage their enterprises to make good use of the APEC ODR Framework.

There is also a need to enhance law-makers capacity by asking the assistance from other international and regional organizations such as UNCITRAL, UNCTAD, etc. International workshop should be held with the participation from dedicated training institutions such as the United Nations Conference on Trade and Development (UNCTAD), through, in particular, its Trade training program on legal aspects of e-commerce, UNCTRAL about Model Laws and trust services. Capacity building efforts among the APEC members should be strengthened so that more economies are able to develop and modify their domestic legislation. Such capacity building activities can help strengthen knowledge and experience of policy and on the legal issues of e-commerce and digital economy, allowing them to formulate laws in line with regional frameworks.

References

1. Australian Government (2018), Australia's Tech Future: Delivery a strong, safe and inclusive digital economy

2. New Zealand Government (2017), The Business Growth Agenda: Building a Digital Nation – Part of BGA Building Innovation

3. IMF working paper (2019), China's Digital Economy: Opportunities and Risks

4. Eu-Japan for Industrial Cooperation (2015), Digital Economy in Japan and the EU – an assessment of the common challenges and the collaboration potencial

5. OECD (2018), Japan: Promoting inclusive growth for an ageing society

6. GSM Association (2019), Digital Transformation: The role of mobile Technology in Papua New Guinea

7. IMF working paper (2019), China's Digital Economy: Opportunities and Risks

8. Innovation and Technology Bureau, Hong Kong, China (2017): Smart City Blueprint for Hong Kong

9. Innovation and Technology Bureau, Hong Kong, China (2018): Innovation Hong Kong

10. Office of the Government Economist Financial Secretary's Office, Hong Kong, China (2019): Half-Yearly Economic Report 2019

11. Korea Economic Institute of America and the Korea Institute for International Economic Policy (2015), Korea's economy volume 30

12. AlphaBeta(2015), *Google Economic Impact Australia*, https://media.wix.com/ugd/f01257_178469dfca6e48ef9ae11f34efb2ff0b.pdf (accessed 22 August 2019);

13. Andrews, Nicoletti, G. and Timiliotis, C. (2018), Digital technology diffusion — a matter of capabilities, incentives or both?, OECD Economics Department Working Papers no. 846, 1476;

14. APC (2016b), Digital disruption: what do governments need to do?, Australian Government, Canberra, https://www.pc.gov.au/research/completed/digitaldisruption/digital-disruption-research-paper.pdf (accessed 25 September 2019);

15. Australian Government, Australia's Tech Future Report: Delivering a strong, safe and inclusive digital economy, https://www.industry.gov.au/sites/default/files/2018-12/australias-tech-future.pdf (accessed 26 August 2019);

16. Autor, D., Dorn, D., Katz, L.F., Patterson, C. and Van Reenen, J. (2017), The Fall of the Labor Share and the Rise of Superstar Firms, Working Paper, May, 23396, National Bureau of Economic Research, http://www.nber.org/papers/w23396 (accessed 26 August 2019);

17. Doo-won, C. (2015), "Building a creative economy: The creative economy of the Park Geun-hye administration", Korea's economy, Korea Economic Institute of America, Vol. 30, pp. 35-47, http://roshankhaneh.net/wp-content/uploads/2019/03/2-1041.pdf (accessed 2 October 2019);

18. Hunt, M. (2019), Republic of Korea commits US$4bn to bolster tech sectors, https://www.globalgovernmentforum.com/south-korea-commits-us4bn-to-bolster-tech-sectors/ (accessed 10 September 2019);

19. Jamrisko, M. and Lu, W. (2018), The US drops out of the top 10 in Innovation Ranking, https://www.bloomberg.com/news/articles/2018-01-22/south-korea-tops-global-innovation-ranking-again-as-u-s-falls, accessed (27 August 2019);

20. PwC, Australian Chamber of Commerce and Industry and Port of Brisbane (2018), *Proof of Concept for a National Trade Community System*, Brisbane, Australia;

21. Shin, D. (2017), "An exploratory study of innovation strategies of the internet of things SMEs in Republic of Korea", Asia Pacific Journal of Innovation and Entrepreneurship, Vol. 11, No. 2, pp. 171-189;

22. Telstra (2018), Digital transformation in Republic of Korea: A focus on digital skills and entrepreneurship,https://www.telstraglobal.com/uk/insights/blogs/blog/digital-transformation-in-south-korea-a-focus-on-digital-skills-and-entrepreneurship (accessed 6 September 2019);

23. UNICEF (2018), 'Digital dangers: The harms of life online', The State of the World's Children 2017: Children in a Digital World, https://www.un-ilibrary.org/children-and-youth/state-of-the-world-s-children_82edf4c7-en (accessed 23 September 2019);

24. Varian, H.R. (2016), 'A microeconomist looks at productivity: a view from the Valley', https://www.brookings.edu/wp-content/uploads/2016/08/varian.pdf (accessed 9 September 2019);

25. https://www.mckinsey.com/business-functions/operations/our-insights/automation-robotics-and-the-factory-of-the-future;

26. Accenture (2018), Foster Innovation with Enterprises Robotics, https://www.accenture.com/_acnmedia/pdf-71/accenture-robotics-pov-web.pdf.