ARE WE ABLE TO MEET THE NEEDS OF THE DIGITALISED FUTURE? AN ANALYSIS OF ICT USAGE AND SKILLS AMONG MALAYSIANS IN THE DIGITAL TRANSFORMATION ERA

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ABSTRACT

Digital platforms are changing the dynamics of businesses, services, and social networks. The COVID-19 pandemic has forced further the digitalization of everyday lives including businesses, government, and consumers. Are we able to meet the needs of the digitalized future as there exist a variety of digital divides and barriers among society? This article explores and analyses the ICT usage, access, equipment, and skills among Malaysians by age, gender, types of ICT activities, strata, sectors, and state, using data from the ICT Use and Access by Individuals and Households Survey Report (various years) published by the Department of Statistics, Malaysia. The research also identifies the parameters of digital transformation and digital economy in Malaysia and in other selected countries and illustrate the categories of phases of activities in the digital transformation process such as access to information, social network communication, e-commerce, such as internet banking and online orders of goods and services, e-government activities, etc. Preliminary findings show that the percentage of Malaysians using the internet has improved considerably, from 80.1% to 84.2% between 2017 and 2019. However, this level was much lower than that in Republic of Korea (96.2%), Japan (92.7%), Hong Kong (91.7%), and Singapore (88.9%), as of 2019. Only 72.1% of the Malaysians were using a computer, as compared to 83.0% in Republic of Korea and 82.7% in Hong Kong. While Malaysia has made improvements in digital transformation, particularly the usage of internet banking, ordering goods/services online, performing online courses, and seeking health information as well as information from government organizations, some other internet activities remain trivial. These include performing tasks to generate income, making medical appointments, and selling goods/services via e-Commerce. This study is significant to comprehend the current development of dgitalisation and digital transformation in Malaysia context. The study uses secondary data owned by Department of Statistic Malaysia. Due to this setting, there has been limited exploration to further investigate the context of digitalization and digital transformation in Malaysia. We close this paper with discussing the implications for policy, practice and research

Keywords: Digital Transformation, Digitalization, Digital Technology, Digitization

INTRODUCTION

Digital transformation has been an important phenomenon in many businesses with their strategic developments (Bharadwaj et al., 2013) and innovation through digital technologies (Hess et al., 2016). As a way to improve productivity and customizability (Andal-Ancion, Cartwright, & Yip, 2003), and to innovate business models using new technologies (Berman, 2012), practitioners and researchers paid attention to digital transformation. Demands for digital transformation crossed over the business areas and created external pressure on public administration. Public services and governments faced the need to transform their work process, service delivery, and archiving data. The worldwide trend of E-government and E-governance was also a big part of it.

Digital transformation means the fundamental changes using digital technologies. Therefore, the definitions of digital transformation emphasize a few elements of digital transformation such as technology, and values as the outcome. Mergel, Edelmann, and Haug (2019: 3) organized three elements to construct digital transformation which are i) "technology to transform service delivery", ii) "technology to transform organizational culture and relationships with citizens" (customers), and iii) "value creation as transformation outcome".

Once organizations started to use technology to transform service delivery, new business models emerged as platform economies (Mergel, Edelmann, and Haug, 2019). In the traditional forms, mainly the supplying side provided the service delivery so that big enough entities that can cover the delivery services were available to supply products. However, in the new form, the digital platform provides connections between the professional delivery services and small product suppliers so that small entities are available to supply products to end-users. For example, Grab provides real-time monitoring and communication so that small businesses can provide more services to diverse customers, and customers can easily find the product providers and information through the platform, Grab. In E-government, government services are processed and delivered by E-format, so that bureaucracies and citizens pursue efficiency, effectiveness, accountability and transparency.

Digital transformation leads to a change of paradigm which can be labelled as a technological revolution (Perez, 2010). It makes multi-directional communications between providers, consumers, government, citizens and other stakeholders available. The changing relationships created new culture focusing on more efficient and transparent communication and working process. Both businesses and public agencies with digital transformation faced direct requests from citizens or stakeholders to provide more efficient, integrated, and transparent services.

Through the transformation process above, business paradigms shifted to hyper-connected collaboration across value chain activities of "co-design, co-creation, co-production, co-marketing, co-distribution and co-funding" (Berman, 2012:6). Digital transformation is a holistic procedure including all kinds of comprehensive transformation above. Therefore, there were efforts to distinguish the phase of digital transformation as "a continuum of transition from analogue to digital to a full stack review of

policies, current processes, and user needs and results in a complete revision of the existing and the creation of new digital services" (Mergel, Edelmann, and Haug, 2019: 12; Verhoef et al., 2021).

Phases of Digital Transformation

Definitions or concepts of digital transformation are not systemically organized since various disciplines do research digital transformation in their respective ways simultaneously. Digital transformation had developed theoretically and physically both in actual life spaces and academic fields. Terms like digitization, digitalization, or digital transformation are used interchangeably (Mergel Edelmann, and Haug, 2019), and scholars emphasize different focuses from each other. Verhoef et al (2021) reviewed the meaning, concepts, and processes of digital transformation from the multidisciplinary literature and organized the phase of digital transformation into three stages by its focal factors, digitization, digitalization and digital transformation as a comprehensive business models.

Digitization is the process of recreating analogue information into a digital format such as a bit or byte data so that computers can store, read, calculate, transmit, transform, or process such information (Verhoef et al., 2021, Dougherty & Dunne, 2012; Loebbecke & Picot, 2015, Yoo, Henfridsson & Lyytinen, 2010). Moreover, digitization includes changing tasks related to produce or process information from analogue tasks to digital tasks (Li et al., 2016; Sebastian et al., 2017), or restructuring those tasks within the integration of IT, or developing cost-efficient resource configurations using IT (Vendrell-Herrero, Bustinza, Parry, & Georgantzis, 2017).

Digitalization refers to the advanced business processes leveraging digitized data and digital technologies. The business models are improving or developing using IT or digital technologies, and those digitalized business processes can alter the traditional forms of businesses (Li et al., 2016). IT is the key source to lead digitalization to create alter business models such as communication, distribution, or business relationship management (Ramaswamy & Ozcan, 2016; Van Doorn et al., 2010; Baraldi & Nadin, 2006). Therefore, digitalization emphasizes improved business processes using IT for cost savings, process improvements, and better performance (Verhoef et al., 2021).

Digital Transformation refers to the change to develop comprehensive new business models over a company or an industry. Whereas digitalization is the changing of task processes, digital transformation describes a company-wide change or new business logic to create and capture value (Pagani & Pardo 2017; Zott &Amit, 2008). Therefore, some scholars argue strategy is more important than technologies in digital transformation (Kane et al., 2015).

Strategies for Digital Transformation

When we pursue the most advanced phase of digital transformation as comprehensive business models and life systems, we need to develop good strategies to consider our digital resources and capacities. To design strategies for digital transformation, digital resources such as digital assets, digital agility and digital networking capability need to be considered (Verhoef et al., 2021).

Through the continuous evolving from digitization toward digital transformation, organizations can accumulate their digital resources. By digitization, organizations can create their digital assets such as the storage of data, communication infrastructure and information system. The basic infrastructure, such as the server, broadband internet, telecommunication technologies, internet providers is critical to make digitization available. Based on those infrastructures, organizations can digitize their businesses, working processes or services. By digitalization, organizations can build their digital agility. It is related to the ability to detect business opportunities by understanding and using digital technologies (Lee et al., 2015; Tallon & Pinsonneault, 2011; Lu & Ramamurthy, 2011). Organizations restructure their working system by combining digital assets with the other organizational resources and develop new organizational systems, business models, and customer-oriented values (Sambamurthy et al., 2003; Teece, 2010; Karimi & Walter, 2015).

Digital networking capability is needed to bring more users or more targeted customers via digital means. Once organizations successfully digitalize their system, they need to attract, select, connect, monitor and engage network stakeholders such as customers, suppliers, and competitors (Thomas, Autio, & Gann, 2014; McIntyre & Srinivasan, 2017). Another important capability is big data analytic capability. Since most of all functionalities of digital technologies use digital data, the ability to collect and analyse big data is critical to make evidence-based decisions (Loebbecke & Picot, 2015; Dremel et al., 2017).

Development in Digital Transformation

The year 2020 was an exciting decade for global societies as we were facing an existential global health crisis. It is the beginning of the high utilisation of digital technology due to the COVID-19 pandemic, specifically when almost all regions have implemented lockdown. Many sectors have to be closed down, social and economic activities were restricted, and very minimum movements were allowed. Hence, most of the world society have to divert their daily life and activities towards digital technology. During this period, there was an inevitable surge in the use of digital technologies. Human behaviours were identified to have been shifted from offline to online, specifically on shopping, learning, working, and entertaining. They result to accelerate the diffusion of emerging digital technologies (Vargo et al, 2020). People relied heavily on internet-based services to communicate, interact and continue their daily life from their homes. During this period, the internet services were recorded to have achieved maximum usage of 100 per cent compared to pre-lockdown levels, which were relatively recorded at 40 per cent (De et al., 2020). Hence, it is not extreme to say that digital technology has totally changed how we live in the era of the pandemic.

Not long before the pandemic arrived, the world has been prepared to go for a more digital technology lifestyle. This digital revolution has transformed many aspects of the life of human beings. As of 2020, with the total world population at 7.87 billion, 66.9 per cent (4.8 bilion) are mobile phone users, growing at an annual rate of 5.7 per cent. Interestingly, on average, global internet users spend 7 hours daily browsing online (DataReportal, 2021). This data shows the high reliance on digital technology among the world society, which indicates the importance of this transformation to many aspects of life. Despite the high number of digital technology utilisation, this transformation has expanded the digital divide and created greater inequality that has been already existed in the society (United Nation, n.d.), between citizens who have access to technology with those who cannot enjoy the privilege (De et al., 2020). Nevertheless, digital technology indeed contributes to facilitating and streamlining our daily life, especially during the pandemic. United Nations (n.d.) highlighted that digital advances can support people to achieve the Sustainable Development Goals, which is considered inclusive for all world citizens. It could help in accelerating extreme poverty, promoting decent work and achieving universal literacy. It is also important to pay attention to the future development, whereby the ageing population is to be happened within less than 10 years. However, the major questions are still unanswered. Are we ready for this change? Do we have the capability to satisfy the needs of the digitalised future?

In Malaysia, the development of digitalisation can be traced way back, as early as 1994. During this period, Prime Minister's Department has appointed a consultant team to come out with strategies for Malaysia to become a developed nation in 2020 (Minges & Gray, 2002). Many information and communications technology (ICT) projects were planned and developed during Mahathir's era. Multimedia Super Corridor and MIMOS, among others, are the living proof to see the commitment from the government to achieve goal to be a digitalised country in the near future. Western countries have started their digital journey earlier than Malaysia, yet Malaysia is able to catch up with the development despite many shortcomings and constraints. Embarking into digital and technology help Malaysia to move forward and advance. The country is able to be part of the Industry 4.0 that required digital and industrial revolution in many sectors (MIDA, 2021a). This is an important key to attract more digital investors and businesses to come and play in the local market. Due to its importance to put effort in increasing the investment in digital market, Malaysian government established Digital Investment Office (DIO) to facilitate digital investments in Malaysia. This office is responsible to create digital investments awareness and strengthen coordination among investment promotion agencies, as well as, to facilitate programmes for promotion in attracting new investment in current fast-evolving segment (MIDA, 2021b). Looking at this initiative from the government, it shows that the government is serious to work on digital industry. This would not only benefit the industry itself, but also interest other sectors especially the Malaysian citizen through various economic and social sectors such as gig economy, digital teaching and learning and digital entrepreneurs.

Fast development in digital technology has startled Malaysia to cope with the changes. Digital era has changed the way how Malaysians used to live. The transformation is not only on the tools that they use, but also other aspects of life. This has affected the entire nation due to limited digital infrastructure to accompany the fast development. The government through Malaysian Communications and Multimedia Commission (MCMC) has come up with the national digital infrastructure plan, Jalinan Digital Negara (Jendela) to work on formulating and implementing a plan to provide wider coverage and better quality of broadband experience for the Rakyat. Jendela is developed to focus on three areas: (1) education and productivity (for home-based learning); (2) businesses, government and service-based industries (to help SMEs and B2Bs recover and diversify), and; (3) communities and societies (keep the rakyat connected with families and friends). After its commencement in September 2021, Jendela managed to install 456,757 premises with fixed broadband coverage and it is still progressing (myjendela.my, 2021).

However, digital gap is a worrisome problem in Malaysia (Ahmad et al, 2019). Not many could enjoy the advancement, while the majority are left far behind, especially in rural and remote areas (Umar & Jalil, 2012) which are always neglected in digital development projects. This is much more obvious during COVID-19 pandemic (Nguyen et al, 2020), when high reliance on digital technology has abandoned the underprivileged ones (Hunsaker et al., 2019). Unequal development affects the extension of the digital transformation. This makes the transformation itself less practical as the population coverage is limited. The arrival of Industry 4.0 is another challenge for Malaysia to follow. Despite the acceptance of Industry 4.0 technologies, countries like Malaysia are facing difficulties and barriers to implement it. These barriers include coordination difficulty, resistance, lack of talent, cybersecurity, lack of benefits, technology uncertainty, data acquisition, and restricted technology diffusion (Sharma et al., 2018). Multiple challenges without appropriate strategies on how to address it will put the country into a deep hole. Hence, it is important to revisit the ground, to understand who and where the digital technology is (un)available. Dilman (2016) described this as "how can we get somewhere without knowing where we are now?', where it is very much relevant to this current context. It is important to know where we are now, and this will provide a clear picture of what we have achieved and what other things that need to be looked into.

METHODOLOGY

This study explores and analyses the digital transformation, such as the ICT usage, access, equipment, and skills, among Malaysians by strata, gender, and types of ICT activities, based on the review of the various years of ICT Use and Access by Individuals and Households Survey Report published by the Department of Statistics, Malaysia (DOSM). The survey reports of 2013, 2015, 2017, 2019, and 2020 are downloadable from the DOSM portal. In addition, the report published by the World Bank on the digital economy in Southeast Asia will be used to compare the levels of ICT use and access to information, social network communication, e-commerce (internet banking and online orders of goods and services), and e-government activities in Malaysia with the neighboring countries to gauge the digital transformation process in our country.

## ANALYSIS I: THE DIGITAL TRANSFORMATION BY DIGITALIZATION IN MALAYSIA

Are we able to meet the needs of the digitalized future as there exist a variety of digital divides and barriers among society? In the country, as shown in Figure 1 and Figure 2, the percentage of mobile phone ownership and usage increased steadily in both urban and rural areas. The urban areas (97.2%) naturally have a higher percentage than rural areas (93.4%) in ownership while usage in urban areas (98.5%) is higher compared to a lower percentage in rural areas in 2020. Nevertheless, it is worth noting that the percentage of rural individuals using a mobile phone has increased remarkably over the past five years, and the level is just slightly lower than that in urban areas.

Males always show a higher percentage of mobile phone ownership than females since the year 2015. Nevertheless, the increment in ownership is more pronounced among females. The gender gap has reduced to only 2.7 per cent in 2020, as compared to 3.9 per cent in 2015.
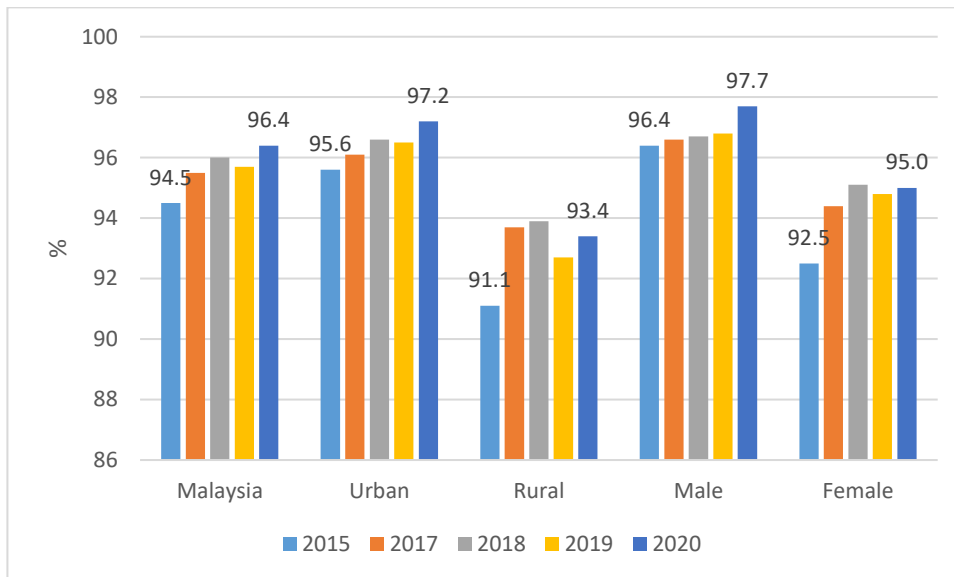
Source: DOSM

Figure 1: Percentage of individuals owning mobile phone by strata and gender, 2015-2020
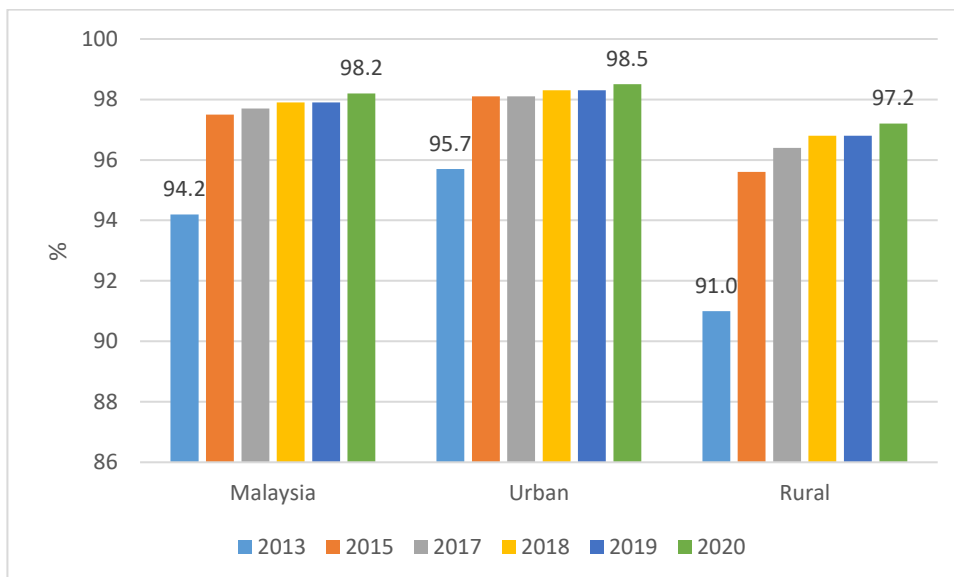
Source: DOSM

Figure 2: Percentage of individuals using mobile phone by strata, 2013-2020

Comparatively, those who own and use mobile phones are higher than the usage of computers (desktop, laptop, and tablet) as demonstrated in Figure 3 and the trend of usage is also increasing year on year. Computer usage in rural areas is less prevalent. About 61% of the rural individuals using a computer in the year 2020, as compared to 85.3% in the urban areas. Correspondingly, the internet usage in the rural areas is also much lower than that in the urban areas, in which 79.4% and 92.4% of individuals using

the internet in the rural and urban areas, respectively. The internet can be accessed through mobile phones, and this explains the much higher internet usage than computer usage in both urban and rural areas.
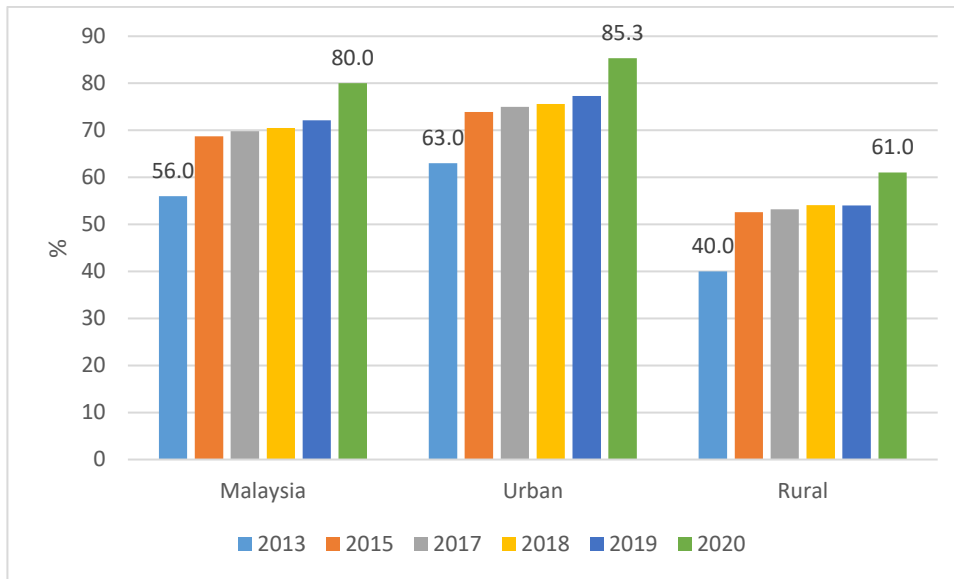
Source: DOSM

Figure 3: Percentage of individuals using computer by strata, 2013-2020
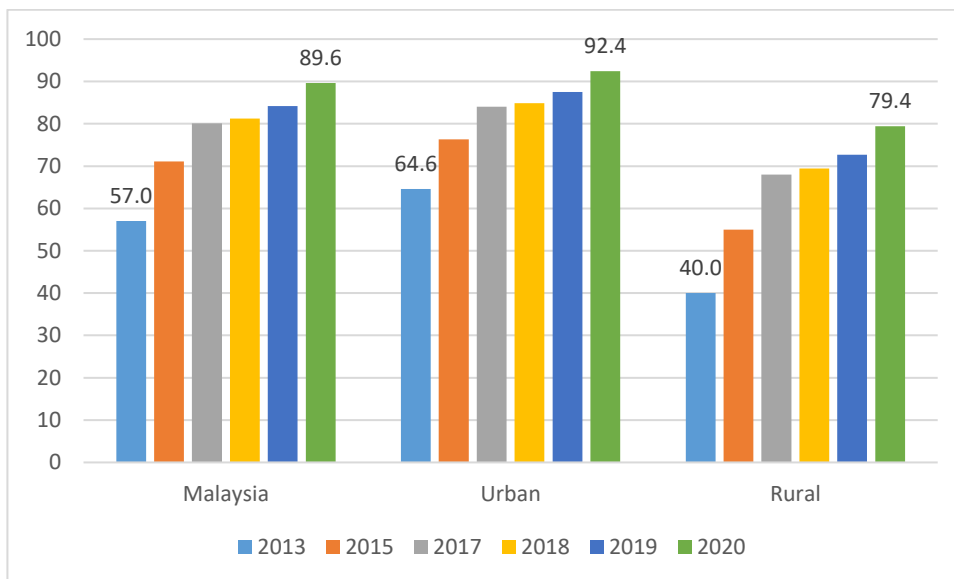
Source: DOSM

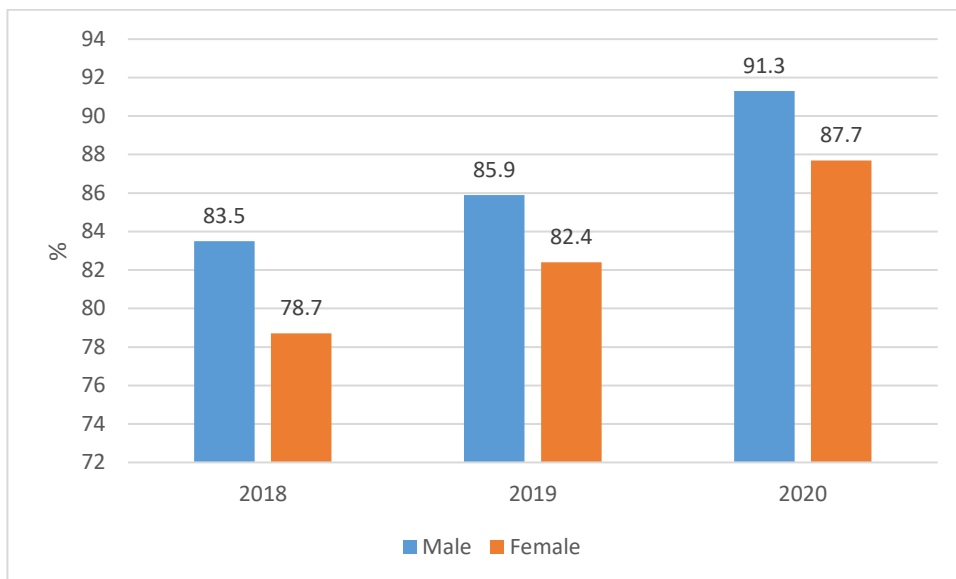**Figure 4: Percentage of individuals using internet by strata, 2013-2020**

Malaysia achieved a higher percentage of internet usage than its neighbouring countries of Thailand and Indonesia, as shown in Figure 5. However, the level remains much lower than that in Republic of Korea (96.2%), Japan (92.7%), Hong Kong (91.7%), and Singapore (88.9%), as of 2019. Only 72.1% of the Malaysians were using a computer, as compared to 83.0% in Republic of Korea and 82.7% in Hong Kong (figure not shown).
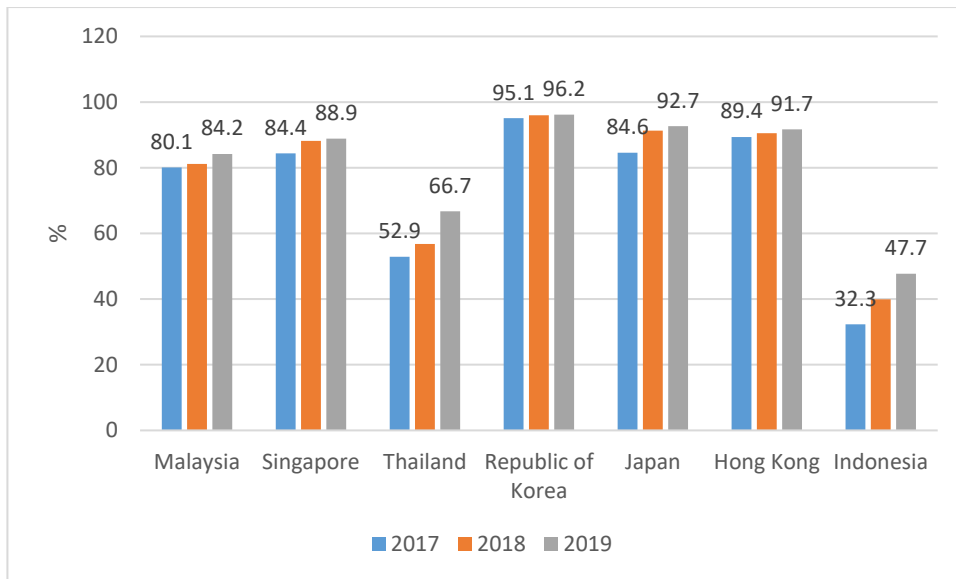
Source: DOSM

Figure 5: Percentage of individuals using internet by country, 2017-2019

In terms of internet usage by gender, males experience higher usage than females as shown in Figure 6 by 3.6% in 2020. Nevertheless, the gender gap has reduced from 4.8% in 2018 due to the greater improvement in internet usage among females. Similarly, in many of the selected countries as shown in Figure 7, the males surpassed the females in using the internet.

Source: DOSM

Figure 6: Percentage of individuals using internet by gender, Malaysia, 2018-2020
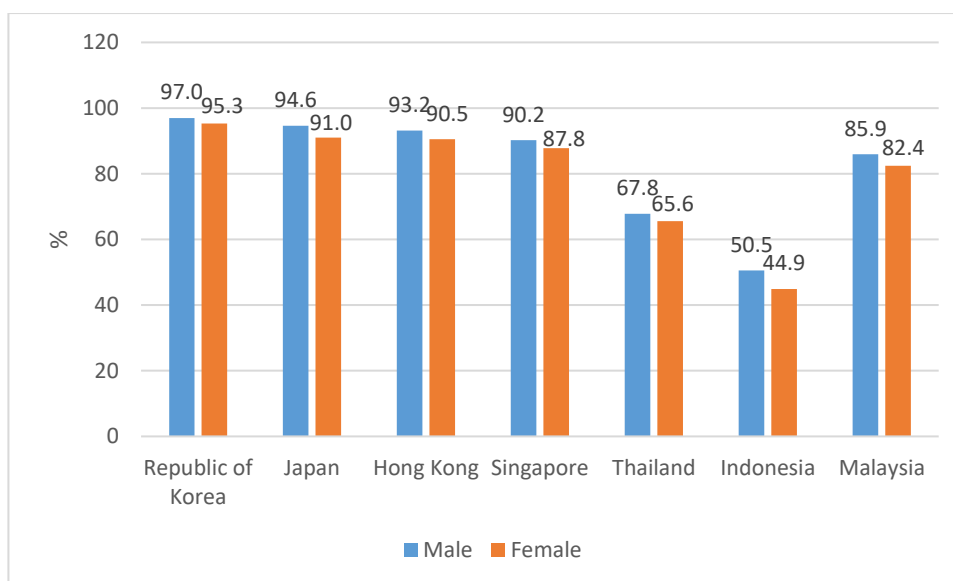
Source: DOSM

Figure 7: Percentage of individuals using internet by gender and country, 2019

Table 1 shows the percentage of households with access to ICT services and equipment. Each access is experiencing an increase year-on-year utilising both fixed and mobile broadband though mobile broadband seems to be the favourite as this could be due to the more attractive packages offered through the mobile phone usage and ownership deals. There is a significant drop in the percentage with access to a fixed-line telephone, from 31.1% in 2013 to 22.4% in 2020. Correspondingly, mobile phone access is almost universal as it is getting more affordable and convenient to use a mobile phone than a fixed-line telephone. This is followed by a sharp rise in the percentage with access to mobile broadband, from 61.9% to 89.7% between 2015 and 2020.

Table 1: Percentage of ICT access by Household, Malaysia, 2020

	2013	2015	2017	2018	2019	2020
Access to ICT services and equipment						
Computer	59.4	67.6	74.1	71.7	71.3	77.6
Internet	58.6	70.1	85.7	87.0	90.1	91.7
Mobile phone	97.0	97.9	98.1	98.2	98.2	98.6
Fixed-line telephone	31.1	28.8	28.6	26.5	23.5	22.4
Pay-TV channel	56.1	68.7	72.3	73.1	75.8	78.9
Television	98.2	98.4	98.5	98.6	97.6	98.5
Radio	78.1	92.1	94.9	95.7	97.2	98.5
Access to Internet						
Fixed (wired) broadband	-	24.7	29.1	-	30.7	34.2
Mobile broadband	-	61.9	84.2	-	87.1	89.7

Source: DOSM

ICT skills among Malaysians and internet activities performed have improved over time. However, upon scrutiny, the kind of internet activities and ICT skills are very basic rather than depicting higher level skills as shown in Figures 8 and 9. Malaysians frequently use the internet to participate in social networks (over 95% since the year 2018). Most Malaysians are familiar with the use of copy and paste tools to duplicate or move information within a document.
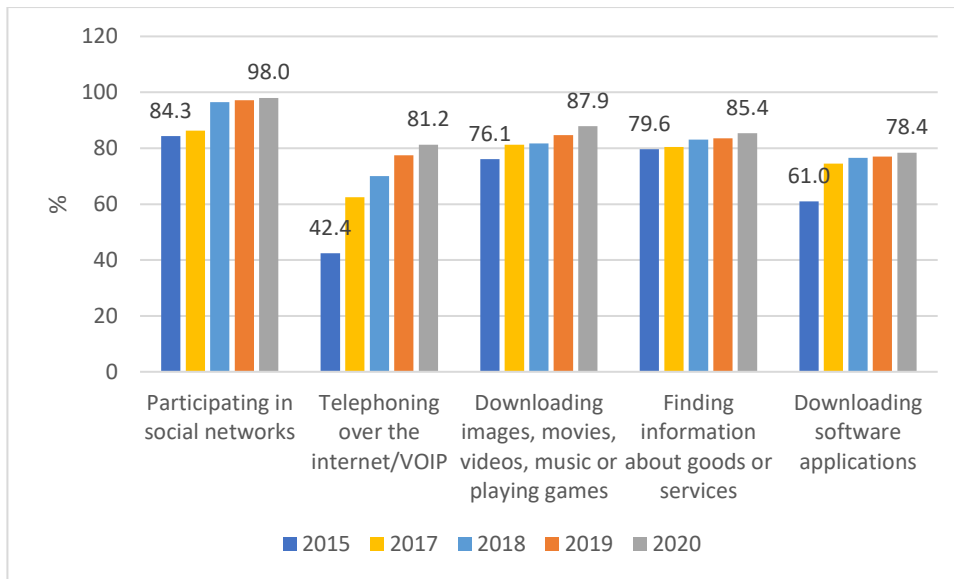
Source: DOSM

Figure 8: Percentage of individuals using internet by top 5 internet activities, 2015-2020
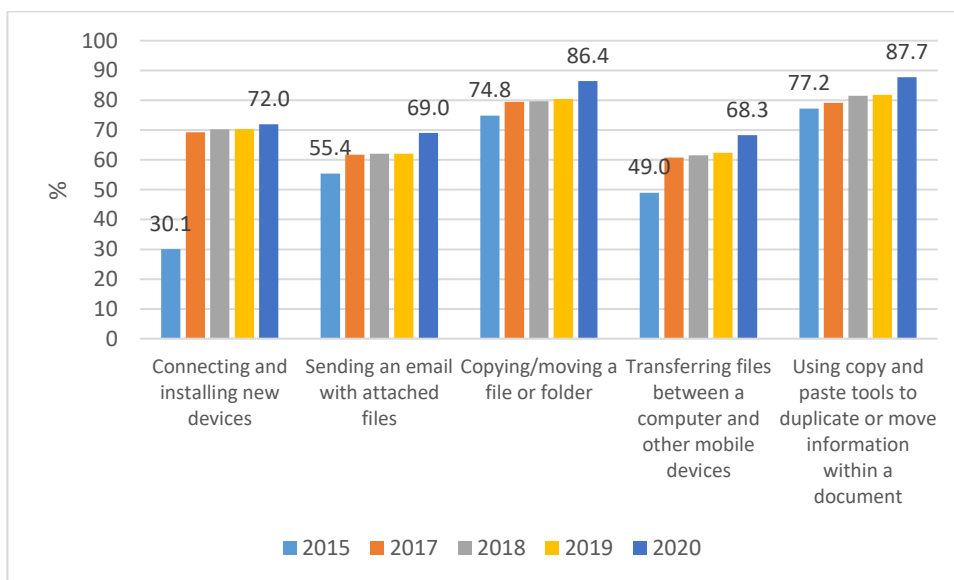
Source: DOSM

Figure 9: Top 5 ICT, 2015-2020

While Malaysia has made improvements in digital transformation, particularly the usage of internet banking, ordering goods/services online, purchasing goods/services via e-Commerce, performing online courses, and seeking health information as well as information from government organizations, some other internet activities remain trivial (Table 2). These include performing tasks to generate income, making medical appointments, and selling goods/services via e-Commerce.

The significant increase in certain online activities was due to the Covid-19 pandemic that prohibited physical interaction. This calls for the attention to develop stable internet access and connection to facilitate the heavy usage of the internet as the "e-activity" trend is likely to continue in the near future.

Table 2: Percentage of individuals performing selected internet activities, 2019-2020

Internet Activities	2019	2020
Using internet banking	50.5	61.9
Ordering goods/services online	22.5	54.4
Purchasing goods/services via e-Commerce	35.2	45.0
Doing a formal online course	8.1	18.0
Doing an informal online course	9.5	20.8
Seeking health information	45.3	61.9
Getting information from government organizations	45.6	52.9
Performing tasks to generate income	3.3	8.3
Making a medical appointment	4.5	10.7
Selling goods/services via e-Commerce	2.0	5.9

Analysis II: Digital Transformation as Strategies in Malaysia

According to a World Bank Report in 2019 (Figure 1), almost all governments in Southeast Asia have produced high level plans at the country levels experiencing various stages of policies and implementation while Figure 2 demonstrates the evolution of digital policies in Malaysia.

PHILIPPINES

The national digital strategy focuses on improving Internet connectivity across the country by reducing the geographical digital divide and ensuring affordability. It has set clearly defined targets on this front including:

- Universal broadband access for all public schools by 2016
- All central business districts to have broadband coverage with average download speeds of 20 Mbps by 2016
- Broadband access with average download speed of at least 2 Mbps for 80 percent of household customers throughout the country by 2016
- The Government also aims to upgrade and improve government ICT infrastructure and procedures to allow for integrated government operations

SINGAPORE

The iN2015 masterplan has been issued to make the transition into "An Intelligent Nation, A Global City, Powered By Infocomm." The blueprint sets out clear objectives and targets including:

- To be number one in the world in harnessing infocomm to add value to the economy and society
- To realize a twofold increase in the value-add of the infocomm industry to S$26 billion
- To realize a threefold increase in infocomm export revenue to S$60 billion
- To create 80,000 additional jobs
- To achieve 90 percent home broadband usage
- To achieve 100 percent computer ownership in homes with school children

THAILAND

The Thailand Digital Economy and Society Development Plan was launched in 2014 to achieve address development challenges and adapt and seize economic opportunities. The plan is being realized over a 20-year time frame through four phases: (1) Digital foundation; (2) Inclusion; (3) Full Transformation; and (4) Global Digital Leadership. Focusing specifically on digital economy, Thailand's priorities include the following areas:

- Promoting online community stores
- Coaching SMEs to go online
- Developing digital clusters
- Push digital technology start-ups for innovative products and services

VIETNAM

Digital economy strategy was issued in 2015 to achieve outcomes by 2020. This strategy includes the following objectives and actions:

- Push online presence for 60 percent of the country's businesses
- 80 percent of companies should allow customers to order through mobile apps or internet sites
- 30 percent of the population should be shopping online and electronic payments should be available for 70 percent of utilities and at all supermarkets
- Allocate US$1 million to startups, allowing new companies to apply for up to 70 percent of their capital needs from the government
- Enhance trust from customers
- Protect intellectual property rights, create a national management system for e-billing, prepare students for the digital economy, and pass regulation on mobile apps and mobile commerce

Source: World Bank Report, 2019

Figure 1: Digital Economy Masterplan in Southeast Asia
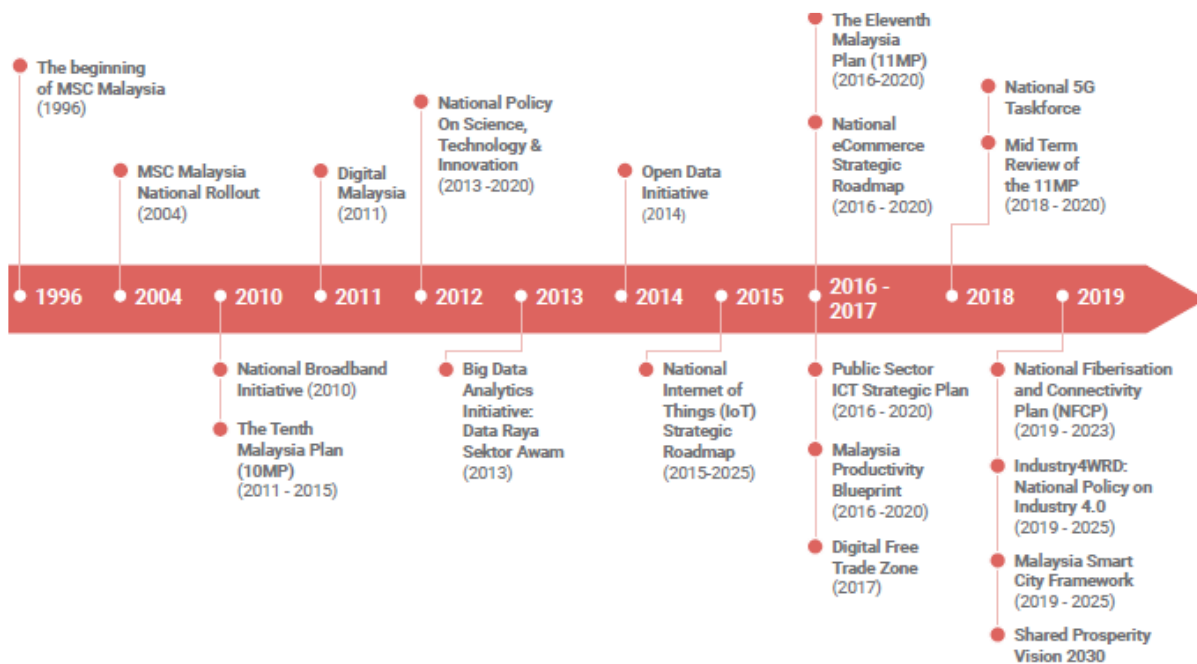
Figure 2: Evolution of Digital Policies in Malaysia

The industry evolution has begun in Malaysia since the late 1990s, and progressively till the current Industry 4.0 to embrace the various phases of digital, green, and circular economy resulting in the masterplan or blueprint of Malaysia Digital Economy (Figure 3) launched in 2021 demonstrating the parameters of the digital economy in terms of thrusts and strategies to be employed.

Figure 3: Masterplan of Malaysia's Digital Economy Blueprint

Source: Mastercard Wallet Survey Results 2016.
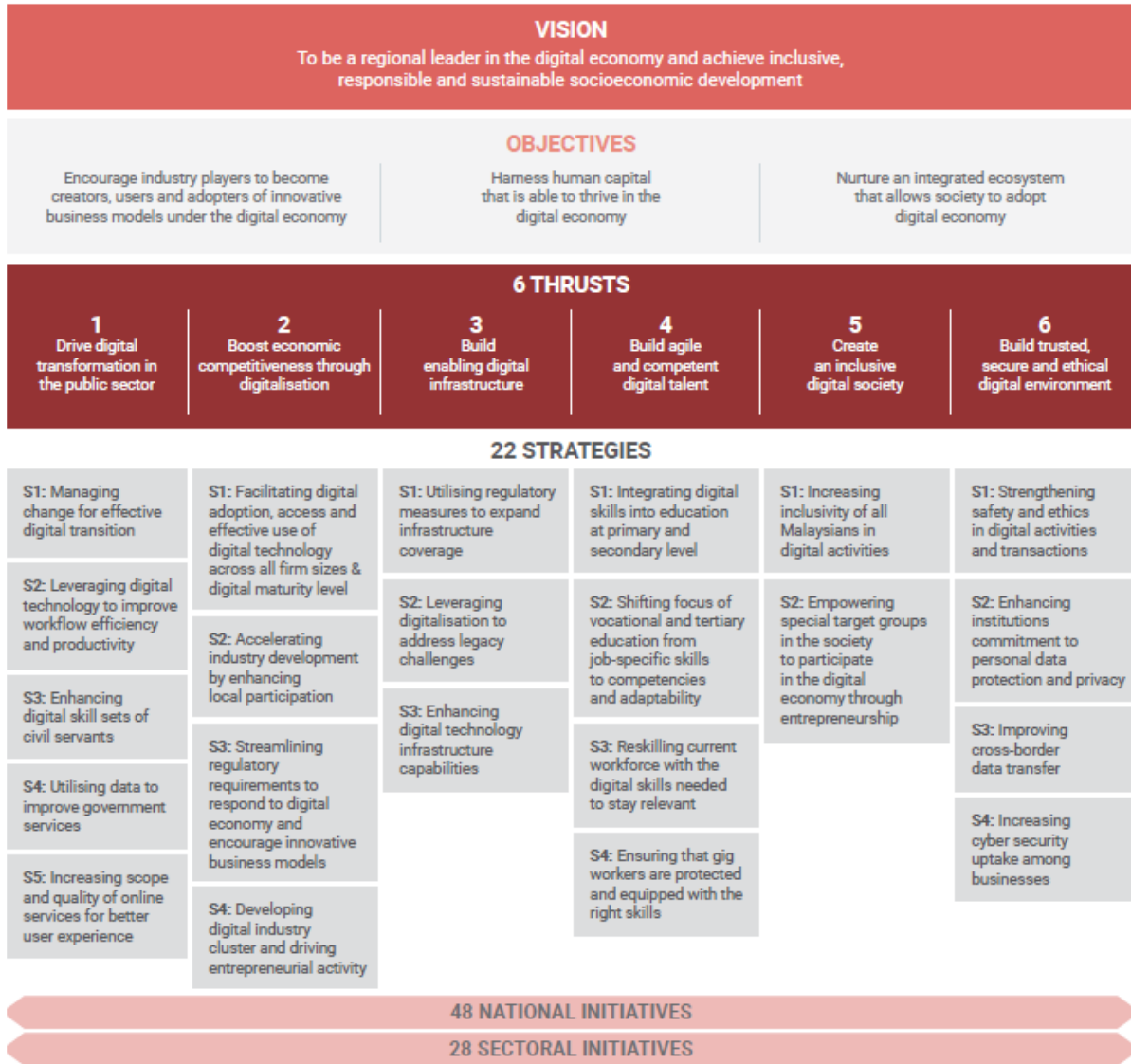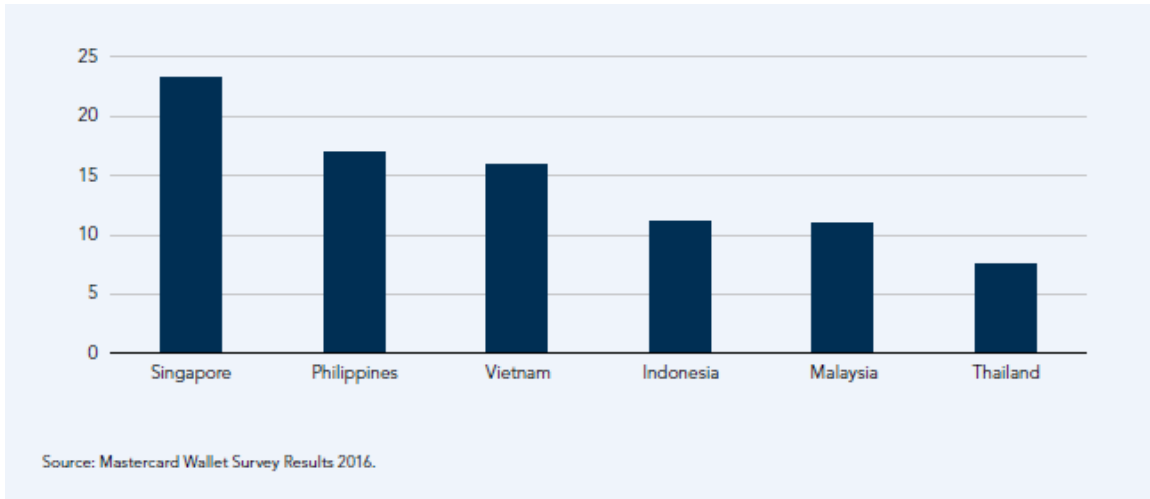
Source: World Bank Report 2019

Figure 4: Percentage of population using digital wallet (2016)

In this rapidly expanding age of information and communication technology (ICT), access to and the use of digital technology is unavoidable. Figure 4 shows the digital wallet usage across the region with Singapore being the highest, which further underlines the potential growth for countries in the region and in recent years, the market is further expanded for instance, in Malaysia where digital payment solution is a necessity as shown by this pandemic where e-payment transaction volume per capita in Malaysia reached 169.9 in 2020 representing a 13.5% increase from the year before.
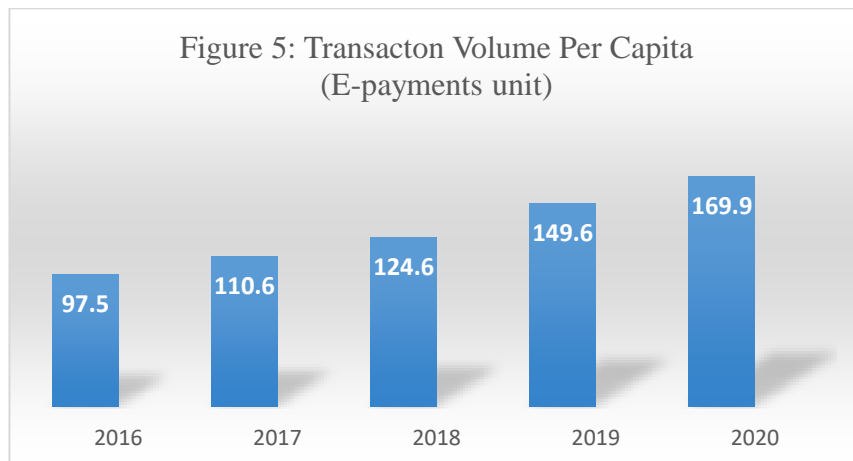
Source: Bank Negara Malaysia

Figure 5: Transaction Volume Per Capita

CONCLUSION

In this paper, we articulate the technology usage in the lives of the population who assumes the common usage of digital technology and the multifunctionality of the practice. While Malaysia has made improvements in digital transformation, particularly the usage of internet banking, ordering goods/services online, performing online courses, and seeking health information as well as information from government organizations, some other internet activities remain trivial. These include performing tasks to generate income, making medical appointments, selling goods/services via e-Commerce, and cybersecurity. We have yet to see significant venturing into the new business of designing and automation solutions such as fintechs and other successful global tech companies (for example, Amazon, Ant Group, Baidu, Tencent, Grab, etc.) and alike in Malaysia. This is crucial if we want to become a high-income country, automation is the way ahead through strategic innovation and digital platforms for greater customer and citizen engagement to be better positioned to thrive and be more resilient. In this paper, we reveal a gap between the level of digital skills required in the labour market and the actual level of digital skills in young people and other groups in the population despite the efforts to improve their skills though we are still undergoing this process development of digital transformation and related policymaking. Initiatives to foster digital skills and creativity are therefore recommended to bridge this digital divide.

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