Unlocking Malaysia's Digital Future: Opportunities, Challenges and Policy Responses

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Introduction

The impact of digitalisation on the global economy has been significant but uneven, both within and across economies. The implications are vast and numerous, affecting economic development, simultaneous job creation and destruction, and income and social inequality. Policy debates are no longer about whether we should embrace digitalisation, but rather how economies can maximise their utilisation, while at the same time address the pitfalls. The rapid pace of advancement in digitalisation is clearly evidenced in global data flows expanding 45-fold (McKinsey Global Institute, 2016), while global merchandise trade only grew 1.5 times, from 2005-2016.

This article provides an overview of the digital transformation in its current phase, assesses the digital landscape in Malaysia and draws out key policy implications for Malaysia to successfully incorporate digitalisation as an integral part of its economic development strategy.

Understanding the Digital Economy

There has yet to be a consensus on the definition of the digital economy. Definitions instead evolve when new digital trends emerge and disrupt the status quo. Characterisations of the digital economy began in the 1980s with mass produced personal computers. This was followed by advanced computerised manufacturing in the 1990s and e-commerce and off-shoring in the 2000s (UNCTAD, 2017). The current digital trend is centred on integrating digital technologies into daily life and business operations. Schwab (2016) puts it succinctly by describing this phase of digitalisation as technologies that fuse the digital, physical and biological worlds and permeate across industries and economies. These are underpinned by a myriad of technological trends, in particular, the Internet of Things (IoT), Big Data Analytics, Artificial Intelligence (AI) and Cloud Computing (Table 1).

Table 1

Technological Trends Driving the Digital Economy

	Definition	Examples of Applications	Frontrunners
Big Data Analytics	Real time analysis using high volume of data	• Transaction analysis for targeted advertising • Traffic management	• IBM (USA) • Oracle (USA) • SAP (USA)
Internet of Things	Sensor-enabled objects connected via Internet	• Remote monitoring • Wearables and autonomous cars	• Google (USA) • Samsung (Korea) • Intel (USA) • Siemens (Germany)
Cloud Computing	Large data pool stored on the web instead of hardware	• Alternative for acquiring and managing IT infrastructure • Web-based applications	• Microsoft (USA) • Amazon (USA) • Alibaba (PR China)
Artificial Intelligence	Software that learns and adapts	• Image recognition for early risk detection and treatment in medicine • Develop and execute investment strategies	• NVIDIA (USA) • Google (USA) • Baidu (PR China) • IBM (USA)

A Macroeconomic Perspective of the Digital Landscape in Malaysia

In Malaysia, households, businesses and the Government alike have embraced digitalisation. From 2005-2016, internet users doubled to 21 million; mobile-cellular penetration doubled to 44 million subscriptions; and fixed-broadband users doubled to 3 million (International Telecommunication Union, 2016). As at 2015, 83% of Government services are provided via online platforms (MAMPU, 2016).

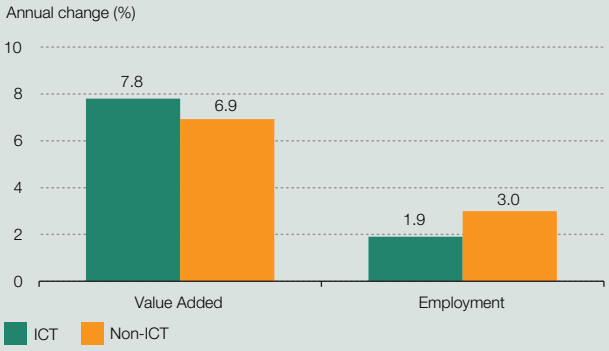
The pervasive nature of digital platforms makes it hard to capture the full extent of digitalisation in Malaysia. A useful start is the performance of the Information and Communication Technology (ICT)[1] sector, where technology intensity is high and digital activities are concentrated. As Chart 1 shows, from 2011-2016, the ICT sector's value-added growth outpaced that of non-ICT sectors (ICT: 7.8% vs non-ICT: 6.9%). Of note, e-commerce activities almost doubled over the same period (2016: RM74.6 billion; 2011: RM44.6 billion). This reflects the rising prominence of digital platforms and, more broadly, the role of technology in driving economic activity. Chart 1 also illustrates that while growth of value-added in ICT has outpaced non-ICT, in contrast, employment in ICT lags behind the non-ICT sectors. In one aspect, this suggests that ICT's productivity is higher vis-à-vis the non-ICT sector. On the other hand, it also potentially reflects the changing labour needs of the economy. Therefore, digital transformation and automation could render some segments of labour redundant and demand new skill requirements in jobs.

Given the pervasiveness of the ICT sector's development for the broader economy, it is necessary to evaluate the linkages between ICT and other sectors in the economy. This is done using the input-output Cumulative Production Structure (CPS) framework to estimate backward and forward linkages[2].

Chart 2 shows multipliers of the backward and forward linkages between ICT & Computer Services[3] and other sectors of the economy. Two key trends are observed: Firstly, the backward linkage multipliers have increased, showing that as the range of ICT and computer services have expanded significantly since 2005, so have the resources that it draws from other sectors in order to provide the services. Secondly, forward linkages have also increased. This reflects firms' increased use of internet, e-commerce and other online services as an integral aspect of their business operations.

Chart 1: Malaysia's Value-Added and Employment in ICT and non-ICT (Avg. Growth 2011-2016)

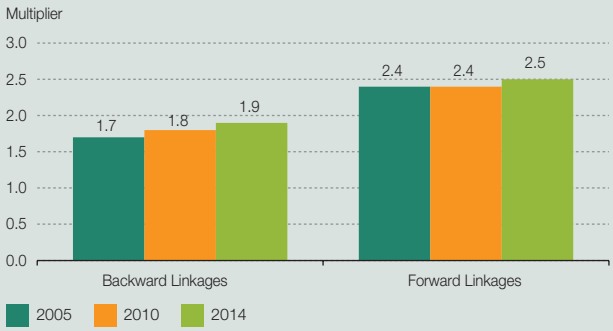
Higher productivity in ICT activities



Source: Department of Statistics, Malaysia (2017)

Chart 2: Backward and Forward Linkages between ICT & Computer Services and Other Sectors in Malaysia

Increasing spillovers from ICT to the broader economy



Source: Bank Negara Malaysia and Department of Statistics, Malaysia

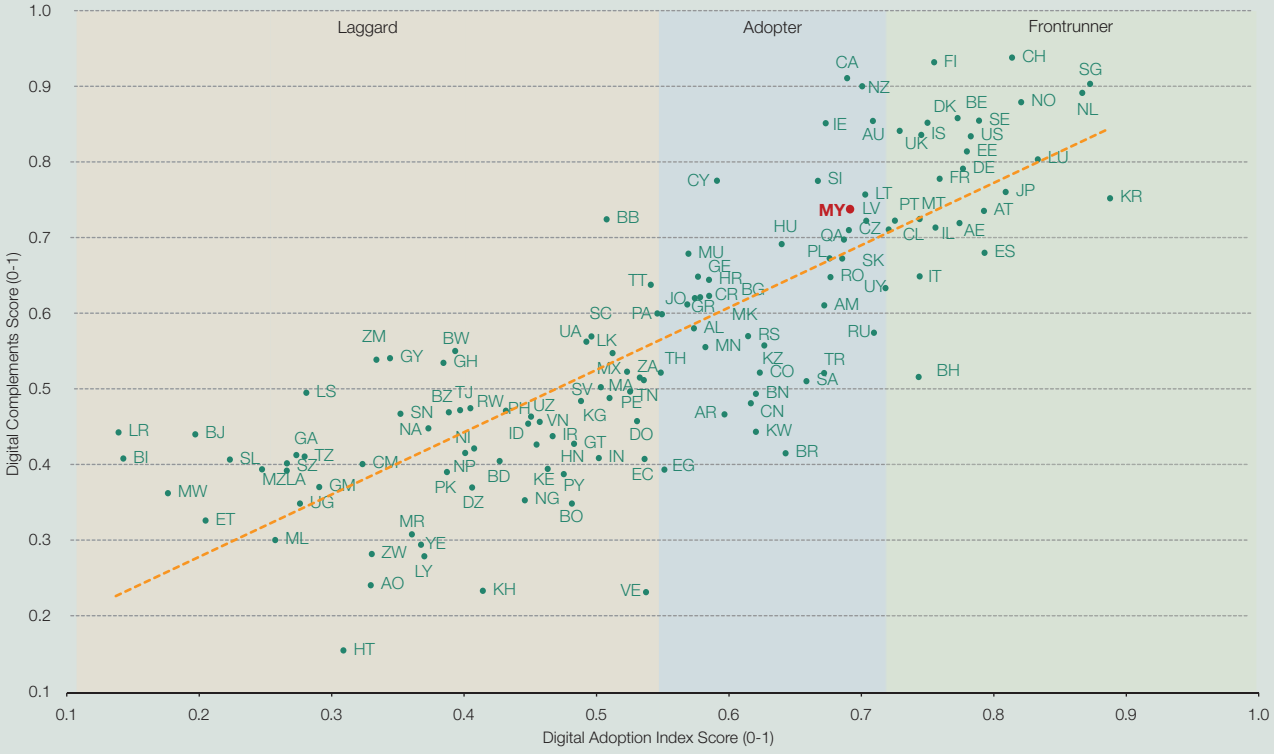
[1] ICT refers to value-added from ICT manufacturing, ICT services, ICT trade, content and media and other industries.
[2] "Backward linkage" describes the digital services sector's use of resources from other sectors as an input of production. "Forward linkages" describes other sectors' use of resources from the digital services sector as an input of production.
[3] This refers to services such as the internet, computer programmes and services provided via online platforms.

Malaysia's Competitive Positioning in the Global Economy

To analyse whether Malaysia's digital progress has kept pace on the global front, it is necessary to benchmark Malaysia with other countries. Chart 3 presents a summary of digital adoption and key complementary enablers that support digital activities. These measures are from the World Bank's Digital Adoption Index (DAI), which reflect accessibility and usage of digital services by consumers, businesses and the Government. Among the key complementary enablers are strong human capital, a facilitative regulatory environment for businesses to compete, governance standards and forward-looking organisations. Countries are classified as "frontrunners", "adopters" and "laggards"[4]. This analysis reveals Malaysia as an "adopter" country. While in some respect, this places Malaysia's digital progress as comparable with some advanced economies, the economy still lags notable "frontrunners" such as the United States, Estonia, South Korea, Japan and Singapore.

Chart 3: Digital Adoption and Complements Score Comparison

Malaysia as an "adopter" country lags behind "frontrunners"



Note: Selected "frontrunners" include United States (US), Estonia (EE), South Korea (KR), Japan (JP) and Singapore (SG). Selected "adopters" include Australia (AU), PR China (CN), Brazil (BR), Russia (RU) and Thailand (TH). Selected "laggards" include Mexico (MX), Vietnam (VN), Philippines (PH), Indonesia (ID) and India (IN).

Source : World Bank (2016)

[4] Frontrunners are the top 20%, adopters are the 20-50% and laggards are the bottom 50% of the DAI.

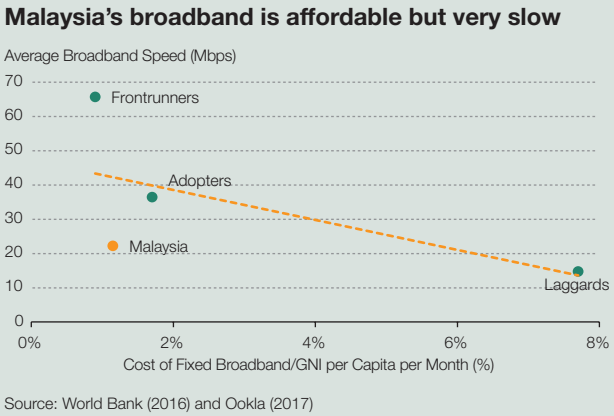
Malaysia must aspire to become a "frontrunner" on the digital front to fully unlock the economic benefits. E-commerce gives firms and consumers access to global markets. The migration to such platforms may also result in structurally lower prices, due to enhanced price discovery and the reduced reliance on intermediaries ("middlemen") to distribute goods and services. The Gig economy facilitates more flexible work arrangements, while online job platforms reduce demand-supply mismatches in the labour force. Capacity in Big Data Analytics and AI tap into previously unutilised information to yield new insights for decision making. Cumulatively, these technological developments will yield more efficient and productive economic outcomes. It is estimated that these technologies can contribute USD15 trillion-USD33 trillion per year to the global economy by 2025 (McKinsey, 2013). For Malaysia, transitioning the economy to "frontrunner" status can yield significant additional growth dividends of between USD100 billion-USD136 billion per year by 2025.

Delving deeper into the factors that propel economies to "frontrunner" status reveals that these economies have successfully addressed three key structural features to support their progression. Firstly, fast and affordable broadband. Secondly, talent tailored for digital progress. Thirdly, high digital adoption among consumers and businesses.

Fast Affordable Broadband

High broadband speed is vital for digital technologies such as the IoT, AI and Cloud Computing to thrive. A market structure that encourages competition among internet service providers ensures high quality and affordable broadband. Chart 4 shows that while broadband in Malaysia is relatively affordable, its average speed is more comparable to that of a "laggard" economy.

Chart 4: Broadband Speed and Affordability Comparison



Source: World Bank (2016) and Ookla (2017)

Talent Tailored for Digital Progress

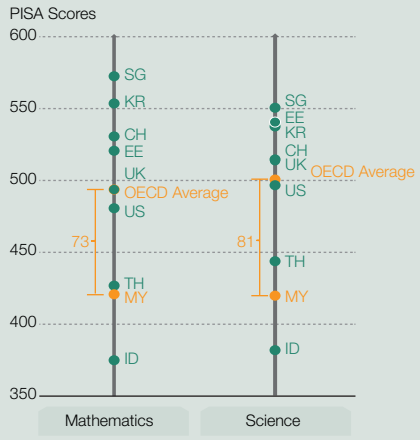
The digital transformation will have a polarising effect on the labour market, with both winners and losers. Labour with requisite skills to participate in this transformation will earn wage premiums between 10-16% (Lim, Wong, Rasep and Selvarajan, 2017). However, research shows that 54% of jobs in Malaysia, of which 80% are mid-skilled jobs, face a high-risk of being automated in the next 10-20 years (Ng, 2017), and that a vast majority of jobs within a decade will require ICT skills (Berg and Frey, 2016).

Developing requisite skills for the digital economy requires a strong foundation in technical subjects such as Science and Mathematics. Currently, Malaysia's standards in technical subjects are improving but still lag most advanced economies (Chart 5). Looking ahead, Chart 6 shows that Malaysia's universities will create substantially more graduates in the Arts and Social Sciences and less so in Science, Technology, Engineering and Mathematics (STEM) and technical fields. Left unaddressed, this development will perpetuate a skills mismatch as economic activity becomes more technologically and digitally advanced.

Chart 5: PISA Scores Comparison

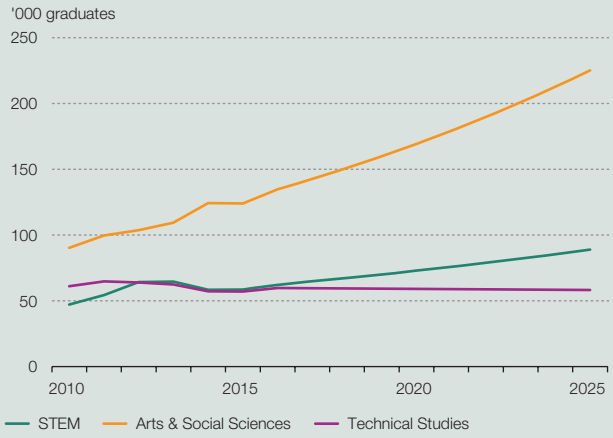
Chart 6: Projected Trend of Graduates

Talent transformation in Malaysia must adapt to thrive in the digital economy



Note: PISA refers to the Programme for International Student Assessment

Source: OECD (2014)



Note: STEM graduates refer to Science and ICT graduates

Source: Ministry of Higher Education and staff estimates

High Digital Adoption

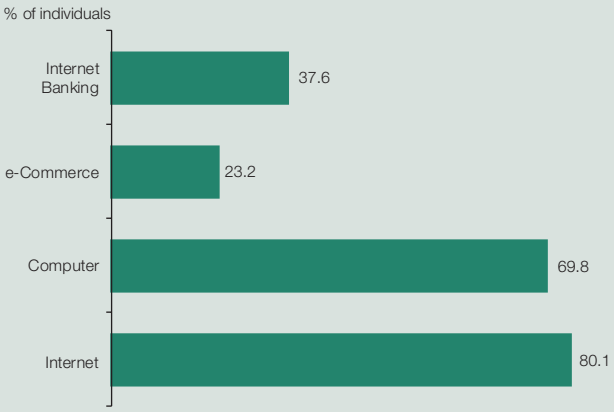
Digital adoption in Malaysia must improve to progress further in the digital economy. Although there is a rising trend in consumers' use of digital services such as e-commerce and internet banking, these figures still remain relatively low (Chart 7). Furthermore, the majority of internet usage in Malaysia is confined to the consumption of content (e.g. downloading movies/music, social media and games), rather than productive activities such as the creation of new content (e.g. mobile applications). For example, 81.2% of Malaysia's internet users download media and play games. In contrast, internet usage in more productive activities - professional networking (9.1%), content creation (11.8%) and learning from formal online courses (4.8%) - is substantially lower.

Malaysian businesses have not fully capitalised on the potential of e-commerce and use of websites for marketing. Only a minority have an online presence. Fixed broadband connectivity still lags behind advanced economies (Chart 8).

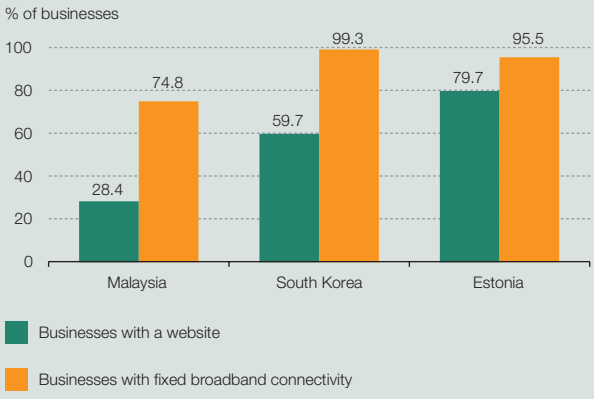
Chart 7: Consumer Digital Adoption (2017)

Chart 8: Business Digital Adoption (2015)

Digital adoption must improve to progress further in the digital economy



Source: Department of Statistics, Malaysia



Source: Department of Statistics, Malaysia and OECD

Policy Implications for Malaysia

Acknowledging the importance of the digital economy, the Government is undertaking concerted efforts to spur digital transformation. The Malaysia Digital Economy Corporation (MDEC) is tasked to spearhead Malaysia's Digital Hub and various Technopreneurship programmes to attract global and local tech start-ups. This resulted in related investments of RM16.3 billion in 2016. The Digital Free Trade Zone (DFTZ) initiative launched in 2017 under the National eCommerce Strategic Roadmap aims to boost SME export contribution to USD38 billion and create 60,000 jobs by 2025. To advance progress in Big Data Analytics, the ASEAN Data Analytics eXchange (ADAX) initiative trains companies and facilitates experimentation of new solutions. On talent, MDEC has developed university and industry-led partnerships to build the requisite expertise in data professionals and cybersecurity.

Lessons drawn from the recent experiences of "frontrunner" economies on digital adoption highlight some immediate policy priorities for Malaysia. Firstly, the education system must emphasise lifelong learning, stimulate more interest in STEM degrees and make ICT literacy skills mandatory (e.g. computational math, robotics, peer-to-peer learning). For instance, the Thomas Jefferson High School for Science and Technology in the US has research labs with experienced computer scientists across all subject areas (e.g. astrophysics and oceanic). As the skills requirements change, Government policy and firms must incentivise upskilling by providing and rewarding skills upgrade via Massive Open Online Courses. A coordinated national framework to continuously upskill the workforce, as adopted by Singapore's Skills Future Programme, will help at-risk workers be redeployed. Currently, only a mere 13% of existing workforce receive upskilling training (HRDF, 2016).

Secondly, a universal digital infrastructure is needed to encourage more digital adoption and participation. This infrastructure consists of high-speed network connectivity, a digital ID, an efficient digital payment network and open data systems. These building blocks allow secure digital identification and authentication for digital services delivery (including legal services to transfer property, telemedicine and financial services). This will reduce costs of services delivery. A notable case study is Estonia, through its public and private sector partnership to develop the "X-Road Initiative" (See box below).

Estonia's Digital Success – "X-Road Initiative"

Almost everything in an Estonian's life is seamlessly integrated digitally, from signing and sharing legal property documents, obtaining medical data records, setting up a company, obtaining banking services, participating in legislation, to the simplest of tasks such as paying for parking. The nation envisions being a borderless country. Anyone can apply for its e-residency digitally. This allows for value creation undertaken in any part of the world to register with Estonia and enjoy privileges such as access to the European Digital Single Market.

Their digital infrastructure, X-Road, leverages on a decentralised approach. A blockchain system allows for a common platform for various databases to openly share data through a unique digital ID. Private and public entities who wish to develop online solutions can apply to join X-Road and leverage on common system services (e.g. unique electronic ID) (Vassil,K. 2015). A fundamental premise is building societal trust through the empowerment of individual data ownership. Citizens can check on who has accessed their data. A demonstrated track record of innovations in cybersecurity also engenders trust in the system through the use of proprietary block chain technology, cybersecurity stress testing and data safe havens.

Having a secure payment system and an efficient financing mechanism are essential for an advanced digital economy. To accelerate the country's migration to e-payment, Bank Negara Malaysia has anchored strategies to displace cash and cheques, by encouraging online credit transfers and promoting wider adoption of debit cards. The Bank is also formulating the Interoperable Credit Transfer Framework (ICTF) to ensure seamless fund transfers between banks and e-money wallets, to drive greater adoption of mobile payments[5]. Peer-to-peer financing built on alternative credit scores and a vibrant venture capital ecosystem have been successful in financing digital start-ups, as evidenced in PR China and UK.

[5] Refer to Chapter on Cross-Sector Developments in the 2017 Financial Stability and Payment Systems Report for detailed discussions of the Bank's progress in payment system and fintech initiatives.

The private sector also plays an important role in stimulating innovation. This can be achieved through building partnerships to share data and resolve common concerns such as interoperability, common technical standards and cybersecurity. A good example is the establishment of the Industrial Internet Consortium, led by global major technology companies such as Intel, Cisco, AT&T, IBM and General Electric, which brought together industry players, academia and Government entities to modernise the manufacturing, healthcare, energy and agriculture sectors.

Thirdly, regulations must continue to be modernised to encourage innovation, investments and participation in the digital ecosystem. Privacy and cybersecurity issues must be addressed to engender trust. In the EU, the General Data Protection Regulation (GDPR)[6] has increased consumer control over data use to manage privacy concerns. All firms, including those outside the EU, who deal with EU citizens must obtain explicit consent on data use ("pre-ticked boxes or inactivity" do not qualify as consent), explain its use and uphold consumers' rights to have their private information be "forgotten". More importantly, consumers can transfer their data across online service providers (i.e. data portability), which spurs competition. While these principles emphasise greater accountability on firms, there are potential implications to the exports of services and cross-border data flows. These include higher cost of doing business from compliance and higher barriers to competition (e.g. the need for data localisation could impact non-EU service providers in cloud computing services). Thus, countries such as New Zealand and Switzerland have developed complementary legal frameworks on data protection to be mutually recognised as a jurisdiction with 'adequate' privacy laws.

Cybersecurity breaches have wide economic, social and sovereign implications. This is evidenced by cyber-attacks on the Bangladesh Bank's SWIFT system in 2016, Equifax (a major credit bureau in the United States) in 2017 and Ukraine's power grid in 2015. The global costs of cybercrime in 2014 was estimated to be between USD375 billion to USD575 billion, or about 0.6 percent of global GDP (McAfee, 2014). In Malaysia, cybersecurity breaches more than doubled in the last 8 years (2017: 7,962 cases; 2009: 3,564 cases) (MyCERT, 2018). A notable incident that occurred in 2014 involved a major data breach of more than 46.2 million mobile subscribers that resulted in a compromise of confidential personal information. Recognising the detriment of this threat, Malaysia plans to introduce cybersecurity laws to tackle the rising incidences of cybercrime. Practices such as mandatory reporting of breaches and stress testing of cybersecurity measures should be adopted to improve security standards and influence the development of a necessary market for cybersecurity insurance. Data is essential. Limited visibility on data breaches and the losses incurred prevent actuarial estimation of the cost of digital risks.

Regulations in the broadband market are critical for a competitive market structure to enable the provision of affordable and high quality digital infrastructure. These include adequate competition in the wholesale market and fair pricing mechanisms between the wholesale and retail markets. Fair access to infrastructure between incumbents and new players could spur investments. The Nationwide Fiberisation Plan (2017-2019) to enable high-speed broadband connectivity is a step in the right direction.

Conclusion

Digital technologies are now wide-spread and pervasive. New opportunities have emerged beyond e-commerce to robots and AI, which are quickly becoming indispensable in some industries. Malaysia has achieved some early success. Modernising regulations, empowering talent with future skills and universal access to world-class infrastructure will accelerate the pace of digitalisation and unlock the next frontier of productivity gains, higher income and social transformation. As a small open economy, Malaysia's competitiveness is no longer limited to its traditional physical factor endowments - land, capital and labour, but will be enhanced by its penchant for unlocking ideas and innovation in the digital economy. Malaysia will thrive with the opportunities that lie ahead with these digital frontiers.

[6] The regulation outlines that failure to comply would result in penalty to the firms of 4-10% of global revenue or €10-20 million, depending on the level of non-compliance.

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