ASEAN DIGITAL MASTERPLAN 2025

ASEAN DIGITAL MASTERPLAN 2025

ASEAN as a leading digital community and economic bloc, powered by secure and transformative digital services, technologies and ecosystem

THE ASSOCIATION OF SOUTHEAST ASIAN NATIONS

1. THE VISION FOR ADM 2025

1.1 THE VISION

The next five years could see the ASEAN region make giant strides towards becoming both a digital economy and a digital society. A substantial portion of the ASEAN population now own broadband devices (either fixed or mobile); cloud services could make it possible to deliver innovative functionality at low cost; while the COVID-19 pandemic has opened the eyes of policy-makers, regulators and businesses alike to the advantages of digitally enabling a wide range of economic activities. But what will this digital economy and society look like?

First it means a society in which everyone in ASEAN is using digital services to enhance their daily lives – to interact with friends and family they cannot meet; to entertain themselves; to buy and sell things; to manage their money; to make better decisions; and in many cases to receive a better education and better healthcare through digital services.

Secondly it means ASEAN Member States (AMS) economies in which businesses large and small use digital services to make themselves more productive; to interact more quickly and cost effectively with partners in their value chains, and to use new ways to sell to consumers. It also means public bodies which offer a much wider range of easy-to-access and quick-to-use services to ASEAN citizens.

Thirdly it means a more prosperous ASEAN region as digital services make trade with other AMS fast and frictionless. This in turn allows the most innovative and efficient businesses in each AMS to expand more easily across the ASEAN region so as to offer a wider range of cheaper and better products to all ASEAN consumers.

Finally it means an ASEAN economy which is able to recover more quickly from the COVID-19 pandemic over the next few years (in line with the ASEAN Comprehensive Recovery Framework) and to do so in a way which is greener and more sustainable in the long-term.

The ADM 2025 envisions:

ASEAN as a leading digital community and economic bloc, powered by secure and transformative digital services, technologies and ecosystem

Achieving such a vision is a great prize which will require governments, regulators and market players to work together in complementary ways:

- Market players should continue to invest in new technologies, to innovate in the services they offer, and to compete to supply them to end users in new ways.
- Governments and regulators could work towards removing unneeded regulatory barriers to these market processes; to fund social measures for digital inclusion and digital skills; to build trust in digital services; to harmonise regulation and standards across ASEAN; and to promote awareness's of the value of digital services.

ADM 2025 specifies what actions AMS governments and regulators can take to best achieve the vision set out above. Put simply achieving the vision of a digital economy and a digital society requires three conditions to be met:

- There is high quality and ubiquitous **connectivity throughout ASEAN** - delivered through the underlying telecommunications infrastructure. Excellent, ubiquitous and high-speed connectivity is clearly essential to enable digital services. This means both improving infrastructure in those areas that are already connected and bringing connectivity to unconnected and underserved areas.

- The services which run over this connectivity must be **safe and relevant to the needs of end users**. This means removing barriers to innovation by market players, improving e-government services and developing services which are safe and can better support international trade. It also means building services which ASEAN consumers and businesses can trust.

- **The barriers** which now prevent many businesses and consumers from using digital services need to be removed. Separate actions are needed for businesses and for consumers – the two key users of digital services. For businesses the focus is on improving productivity through digital skills and for consumers on improving basic digital literacy and affordability so that digital services can be widely used.

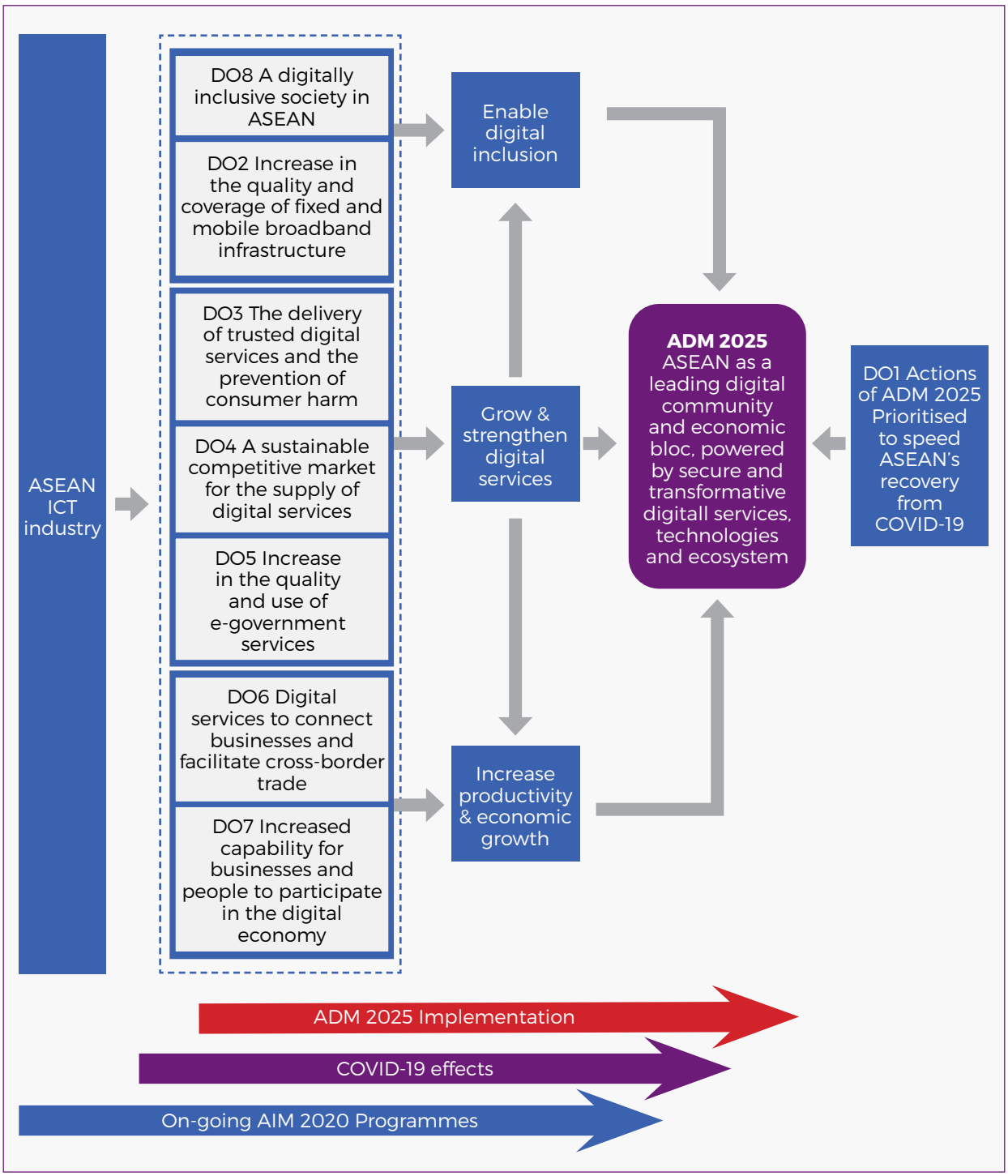
1.2 DESIRED OUTCOMES

To meet these three conditions ADM 2025 has specified eight desirable outcomes which the master plan should meet in the next five years. Figure 1.1 lists these eight outcomes and why they have been chosen. Section 3 then lists the enabling actions which are required to achieve the eight outcomes while Appendix A shows how they map onto the original ADM 2025 framework developed in 2019. It is important to note that these desired outcomes and enabling actions are complementary. This means that enabling actions are needed for all the desired outcomes if the ADM 2025 vision is to be achieved.

FIGURE 1.1: THE EIGHT DESIRED OUTCOMES FROM ADM 2025

Desired Outcome	Rationale for selecting the desired outcome
DO1: Actions of ADM 2025 prioritised to speed ASEAN's recovery from COVID-19	The use of better digital services by ASEAN will enable AMS economies to recover more quickly from the pandemic. Action is needed – both to ensure that the implementation of ADM 2025 is prioritised and regulations which hold back the use of digital services in many sectors is reformed.
DO2: Increase in the quality and coverage of fixed and mobile broadband infrastructure	An excellent telecommunications infrastructure is at the heart of any digital transformation. Achieving this outcome ensures that telecommunications infrastructure in ASEAN are upgraded to higher data rates capabilities and resilience in a timely and cost-effective manner and that their coverage is extended into rural areas.
DO3: The delivery of trusted digital services and the prevention of consumer harm	To ensure adoption of digital services, particularly in areas like health and finance, consumers need to trust these services. This is also true of new and emerging technologies. A key part of this is ensuring that cybersecurity and digital data governance best practices are adopted as widely as possible, both to mitigate the direct impact of a breach on business and consumers and to build trust.
DO4: A sustainable competitive market for the supply of digital services	To help realise the vision steps should be taken to ensure that the market for digital services is designed to encourage the sound and sustainable development of digital services and to enhance competitiveness of different players in the market.
DO5: Increase in the quality and use of e-government services	High quality and relevant digital services are needed across ASEAN. Market players will create many of these digital services. But AMS governments have an important role to play here – both in providing better e-government services and in making government data available to end users.
DO6: Digital services to connect business and to facilitate cross-border trade	Digital services can make a significant contribution to lowering trade barriers. This DO sets out measures which leverage telecommunications services and electronic commerce to help facilitate cross-border trade.
DO7: Increased capability for business and people to participate in the digital economy	Providing the ASEAN Community with better digital services to improve their productivity will boost the ASEAN economy. This DO focuses on stimulating innovative local supply and creative capabilities.
DO8: A digitally inclusive society in ASEAN	To unlock the full benefit of digital services, citizens and businesses especially MSMEs need to adopt and use these services. There are four main barriers to achieving access to digital services for everyone in ASEAN - lack of digital skills, high prices, lack of relevant services and content, and lack of available connectivity. This DO deals with the first two challenges.

FIGURE 1.2: ADM 2025



2. SHAPING ADM 2025 – THE GLOBAL CONTEXT

There are three main global issues which have shaped the design of ADM 2025:

- The COVID-19 pandemic, and the measures required to control it, have had a major impact on health and wealth around the world. The ASEAN region is no exception. How can ADM 2025 assist in the region's recovery from the pandemic?
- Climate change has become a major and increasingly urgent issue. Digital services have a significant role to play in reducing carbon emissions. How could this affect ADM 2025?
- Technology trends are largely global in nature. Some of these trends will have a significant impact on the way digital services are delivered and used in ASEAN over the next five years. So how should the enabling actions of ADM 2025 take them into account?

The analysis of these three global issues and their implications for the new masterplan are outlined below.

2.1 RECOVERING FROM THE PANDEMIC

INTRODUCTION

The COVID-19 pandemic has had a major impact on health, social interaction and economic growth around the world and the ASEAN region is no exception to this. This section provides an assessment of the implications of the COVID-19 pandemic on ADM 2025. These findings have helped shape the enabling actions (EAs) proposed under Desirable Outcomes (DOs) 1 to 8. The section also provides three additional enabling actions which are more general and which affect a substantial number of the other DOs. It draws on the following sources:

- The impact of COVID-19 in Southeast Asia, United Nations, July 2020;
- The economic impact of COVID-19 on digital infrastructure, ITU, July 2020;
- From containment to recovery, World Bank, 2020;
- Pandemic in the Internet age, ITU GSR-20 discussion paper, June 2020;
- Telecommunications and the virus, William Webb, June 2020; and
- Surveys of ASEAN key stakeholders for the ASEAN ICT Masterplan 2020 (AIM 2020) review and the ADM 2025 study.

The focus is on the impact of COVID-19 pandemic and ASEAN's responses to it, over the period from early 2021 to 2025 and short-term emergency measures[1] which AMS governments are taking to stimulate use of digital services.

[1] See for example *Pandemic in the Internet age*, ITU GSR-20 discussion paper, June 2020 and *ADB'S rapid COVID-19 response in Southeast Asia*, Asian Development Bank, Undated

THE HIGH-LEVEL ECONOMIC IMPACTS OF COVID-19

Before considering how the COVID-19 pandemic might shape ADM 2025, it is important to summarise the likely impact of the pandemic on ASEAN economies and AMS government spending.

It is clear that the COVID-19 pandemic will have a significant impact on economic growth. For example, the World Bank Study Of the impact of the COVID-19 pandemic on the East Asian region indicates that:

> *The pandemic and efforts to contain its spread led to a significant curtailment of economic activity. These domestic difficulties were compounded by the pandemic-induced global recession which hit EAP [East Asian and Pacific] economies that rely on trade and tourism hard. Country outcomes were generally related to how efficiently the disease was contained and how exposed countries were to external shocks. Output contracted by 1.8 percent in China in the first half of 2020 and by 4.0 percent on average in the rest of the region.*
>
> *COVID-19 will have a lasting impact on inclusive longer-term growth by hurting investment, human capital, and productivity. Public and private indebtedness, along with worsening bank balance sheets and increased uncertainty, are likely to inhibit public and private investment, as well as pose a risk to economic stability.*

These effects will be felt by individuals in terms of sickness, job losses, redundancy and reduced productivity. Where schools are required to close for significant periods it will also lead to a reduction in human capital in ASEAN. According to the World Bank the impact could be substantial:

> *Left unremedied, these consequences of the pandemic could reduce regional growth over the next decade by 1 percentage point per year.*

However, it is not yet clear how long these effects will last or how long particularly vulnerable sectors like tourism and air travel will take to recover[2] and how long it will take to vaccinate the ASEAN population to a level where economic activity can return to normal.

THE IMPACT ON THE DIGITAL SERVICES SECTOR

AMS governments

AMS governments will face challenges to balance their budgets as expenditure to support jobs, businesses and healthcare goes up while government tax revenue decreases. As a result, governments may face challenges in budgeting for desirable objectives such as addressing the digital divide, improving digital skills, the development of e-government services and government initiatives to improve productivity through use of digital services.

Market players

Market players may suffer a reduction in both revenues and profits. Demand for services has risen as a result of the COVID-19 pandemic but the ability of end-users to pay for services has fallen as people have lost jobs and businesses have closed. According to one survey of telecommunication CEOs:[3]

> *The annual negative revenue impact on telecommunication operators could be up to 10 per cent, with some services requiring 18 to 24 months to return to pre-COVID-19 levels.*

[2] Notwithstanding the pivot to domestic tourism a number of ASEAN markets are highly dependent on tourism. See https://theaseanpost.com/article/asean-focusing-domestic-tourism

[3] Delta Partners. May 2020, *Outlook for telecom operators post COVID-19. Global telecom executives survey.*

This will mean that investment in new services and infrastructure by market players is likely to fall. Whether revenues will fall further is uncertain but there is already a material loss of mobile roaming revenues to be overcome. Even if revenues do not fall in the longer term, the uncertainty created by the COVID-19 pandemic is likely to lead to reduced investment.

End-users

End-users have increased their use of digital services in ASEAN as a result of COVID-19. Responses to the ADM 2025 survey suggest that use has increased by between 10 and 50 per cent as employees work from home more; people access streamed video entertainment more frequently; online contact of all kinds have increased; and there is more use of e-education, e-shopping, e-banking and e-health. This effect is likely to persist long term, although the scale of the long-term ongoing increase is uncertain.

In Europe, with its high penetration of fixed broadband into homes, fixed broadband traffic has increased substantially (by 50 per cent or more) while mobile broadband traffic has declined slightly. This pattern is likely to be repeated in AMS like Singapore. However, in most AMS, where mobile is the dominant form of broadband access, there is likely to be a surge in mobile broadband traffic which may cause significant congestion. This is consistent with findings from Open Signal[4] which shows that mobile broadband speeds dropped significantly in ASEAN as the pandemic struck but are now gradually returning to pre-pandemic levels. The main issue in ASEAN appears to be for people who live in areas with poor or non-existent broadband services.

MITIGATING THE EFFECT OF THE COVID-19 PANDEMIC

Digital services have helped mitigate the impact of the COVID-19 pandemic on the ASEAN economy. According to a panel of experts convened by the ITU:[5]

> *While research on the contribution of digitisation to mitigate the impact of pandemics is limited, emerging evidence is compelling about its positive effects. In the medium term (e.g. 2021), countries with top connectivity infrastructure could mitigate up to half of the negative economic impact.*

[4] https://www.opensignal.com/2020/06/08/mobile-network-experience-during-the-COVID-19-pandemic-june-update and www.opensignal.com/2020/10/05/analyzing-mobile-data-consumption-and-experience-during-the-COVID-19-pandemic

[5] The economic impact of COVID-19 on digital infrastructure, ITU, July 2020

However, this effect is weaker in the AMS where there is a significant digital divide. According to the same source:

> *the digital divide has been highlighted as a critical barrier to the mitigation value of digitalisation. In particular, population unserved or partially served by broadband cannot benefit from home-based learning for children, telecommuting, access to e-commerce and healthcare information.*

THE IMPLICATIONS FOR ADM 2025

The COVID-19 pandemic has increased demand for digital services in ASEAN significantly. However, because of its recessionary impacts, the COVID-19 pandemic has also reduced the ability of some users to pay for these services.

The COVID-19 pandemic has made the development of world-class digital services across the ASEAN region crucial to the economic development and social cohesion of the ASEAN region. In particular, digital services are mitigating the economic losses caused by COVID-19, and those countries with the best broadband infrastructure are seeing the strongest mitigation.

The COVID-19 pandemic may weaken incentives to invest in digital infrastructure and services by both ASEAN market players and AMS governments. This makes it especially important to facilitate investment in digital infrastructure by market players.

Those without Internet access have suffered disproportionately from the effects of COVID-19. Measures to reduce or eliminate the digital divide - by tackling problems of availability, affordability, content relevance and lack of digital skills - have become significantly more important. Ideally, AMS with lower level of mobile population coverage would accelerate such investment. This consideration makes the enabling actions of DO 2 and DO 8 especially important to ADM 2025.

The massive impact which COVID-19 has had on government finances raises the risk that ADM 2025 might need to prioritise some of the EAs. At the same time, it is likely that, relative to other sectors of the economy digital service companies will fare reasonably well during the pandemic. But it is important that AMS governments:

- provide support to businesses seeking to uplift their digital capabilities to help mitigate the impact of COVID-19 pandemic on revenue;
- ensure that digital devices are affordable to promote digital inclusion; and
- fund social measures to improve digital inclusion.

AMS governments may therefore need to look more to global sources to help fund some of these domestic measures. This might include the World Bank and the International Finance Corporation (IFC) which are deploying a USD$2 billion line of credit and seeking investment opportunities. The ASEAN Development Bank has also put in place a substantial package to support South East Asia.[6]

[6] www.adb.org/sites/default/files/publication/631981/adb-COVID-19-response-southeast-asia.pdf

THE ROLE OF ADM 2025 IN SPEEDING RECOVERY FROM COVID-19

What role can the ADM 2025 play in ensuring that ASEAN recovers from the pandemic as speedily and effectively as possible? Most of the measures required - such as the right fiscal policy, financial support for employment and enterprises, and overall trade policy - clearly lie outside the scope of the masterplan. Some, such as developing better mechanisms for containing the pandemic through more effective track and trace systems, are both too short-term for inclusion in a five-year plan and very AMS specific. Others, such as the support which digital services might provide to make vaccination programmes effective, are still too uncertain for inclusion in the masterplan. Notwithstanding, some actions can be defined:

- As demonstrated above, the success of ADM 2025 in achieving its vision is central to a speedy recovery from the pandemic. This means that AMS governments need to support the masterplan on funding priority programmes. An enabling action is proposed to set out the economic case for such a policy and to seek funding from global bodies where appropriate. This is considered under DO1.

- Regulations may be preventing the take-up of digital services in some sectors in AMS. The experience of the pandemic is leading to the removal of some of these barriers and at least one AMS is conducting a systematic review to remove such regulations more widely. This issue is also considered under DO1.

- The poorest in society are likely to be those hardest hit by the after-effects of the pandemic. Access to digital services can do a lot to mitigate this impact. This makes it especially important to ensure the success of the enabling actions of DO2 and DO8 to promote digital inclusion.

- Access to e-education and e-health services have the potential to mitigate the effect of the pandemic and improve the well-being of the rural poor in many AMS. This makes the measures proposed in DO5 especially important in any pandemic recovery programme.

- The pandemic has affected global trade on which the ASEAN is especially dependent. It will be important to ensure the success of the enabling measures of DO6 to reinvigorate such trade.

- Stimulating greater use of digital services to help speed recovery from the effects of the pandemic will require end users to trust digital services more. DO3 deals with this issue noting that greater use requires more relevant services (DO5), higher levels of digital literacy (DO8), local as well as global services (DO7), and vigorous competition (DO4).

- The COVID-19 pandemic will weaken investment incentives by both market players and governments. To counteract this, enabling actions are proposed under DO2 to facilitate investment, while safeguarding national interests. These barriers include:

  - restrictions on foreign ownership and control of operators;
  - the high cost of passive infrastructure deployment e.g. planning permissions and rights-of-way;
  - restrictions on the IMT spectrum available and allocated in ASEAN when compared with international best practice;
  - the lack of the digital dividend in 700 MHz spectrum band in those ASEAN markets which have not yet undertaken the analogue to digital TV switchover (e.g. Indonesia and Cambodia); and
  - telecommunications regulations which dampen investment incentives for the main market players. To quote the ITU panel of experts *"Regulatory frameworks may need to be adjusted to stimulate investment whilst maintaining a "sensible" level of competition"*

2.2 DEALING WITH CLIMATE CHANGE

The threat of climate change is a global issue to which the ASEAN region is especially vulnerable. Six of the 20 most vulnerable countries in the world are AMS.[7] These countries are at particular risk of flooding, rising seas, landslides, intense heat waves and damage to fishing and agriculture.

The use of digital services can play a vital role in climate change mitigation. The use of smart phones and laptops to reduce travel, and to enable working, shopping, and banking from home are obvious examples. The Internet of Things (IoT) has a vital role to play in making buildings more energy-efficient, in enabling smarter use of transport systems, and in improving stock control. While its use consumes electricity, the ratio of energy saved through use of digital services to the energy consumed in using them is growing. According to the GSMA[8] this ratio – the enablement ratio – grew from 5:1 in 2015 to 10:1 today.

Much of work on climate change mitigation in ASEAN is being coordinated through the ASEAN Working Group on Climate Change and implemented through the actions specified in the ASEAN Socio-Cultural Community Blueprint 2025. This might for example include the development of a framework for the protection of digital infrastructure during a national disaster.

The main role of ADM 2025 in climate change mitigation is simply to promote greater use of digital services so that the reduction in carbon emissions grows as a result of the enablement ratio. This objective is built into all the enabling actions of the ADM 2025.

There is one specific additional action which ASEAN can take – to ensure operators operate their networks as energy efficient as possible. The evidence here is already encouraging. As Figure 2.1

[7] Indonesia, Thailand, Myanmar, Malaysia, Vietnam and the Philippines
[8] GSMA, 2020, *The enablement effect*

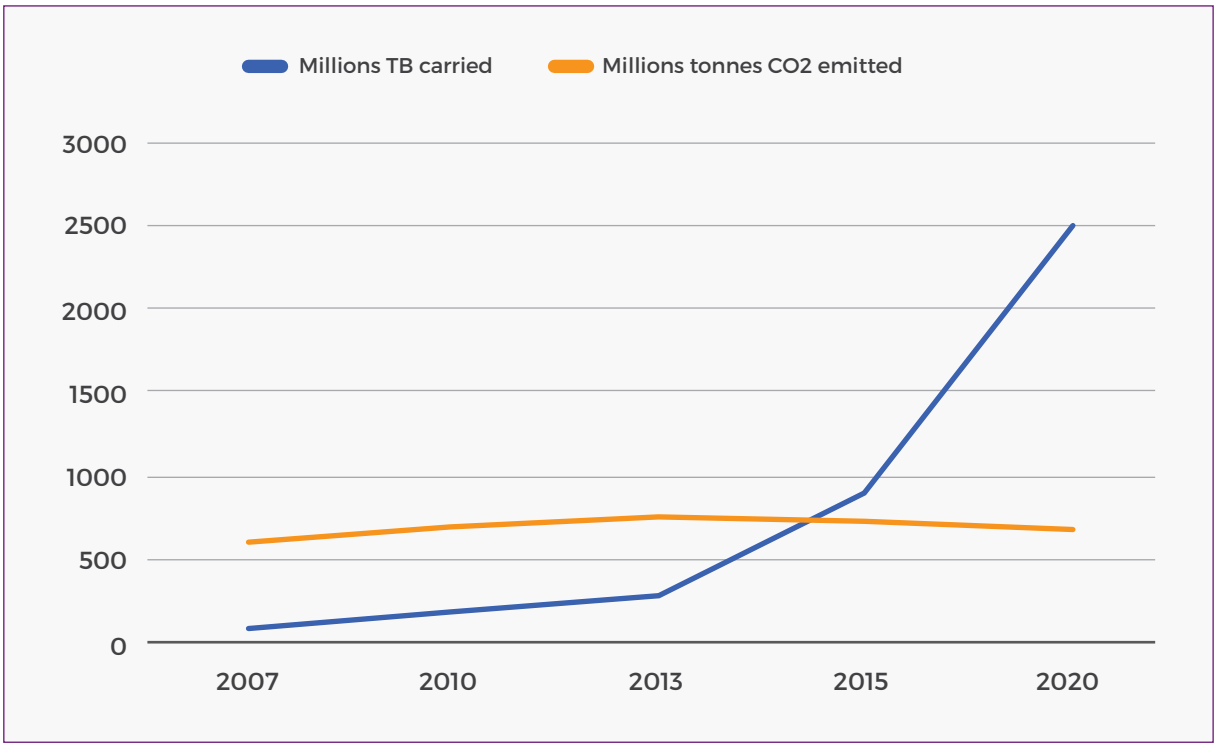
shows, the amount of data traffic generated by digital services globally has grown enormously over the past seven years while the amount of electricity consumed in carrying this growing traffic has fallen slightly since 2013 as:

a) global vendors have made their equipment more energy-efficient;

b) global digital platforms like Google, Facebook Microsoft and Apple have made their data centres more efficient and moved from fossil fuels to renewable energy; and

c) operators have paid much more attention to running their networks in an energy efficient way.

FIGURE 2.1: CARBON FOOTPRINT OF ICT GLOBALLY[9]



Initiatives to accelerate effects a) and b) are largely out of the control of ASEAN. But ASEAN can take one simple enabling action on c). That is each AMS could require all their main operators to report on:

- the electricity consumed in running their networks each year;
- the proportion of this electricity which comes from renewable resources; and
- the amount of data traffic carried over their network.

This information can then be collated centrally to monitor trends, and to identify where there are problems which require action. This action is clearly within the scope of ADM 2025 and is specified as an enabling action within DO2.

[9] Ericsson, 2020, *A quick guide to your carbon footprint*

2.3 GLOBAL TECHNOLOGY TRENDS

The desired outcomes and enabling actions which make up ADM 2025 are shaped by global digital trends and their impact on the way digital services are delivered in future. In the view of some experts[10] the main technology trends which will be important over the next decade are set out in Figure 2.2 below.

FIGURE 2.2: TECHNOLOGY TRENDS OVER THE NEXT 10 YEARS

Important existing trends that will continue	Future trends
Internet: Will continue to be there in its current form and evolve to provide a wide range of Cloud services.	AI: Will be very powerful in specific problem areas
Connectivity: Has mostly reached the point of delivering all we need where it is geographically available	Big Data: Valuable in delivering new insights through data analytics
Virtual Reality and Augmented Reality: VR will remain niche but AR might play a larger role	Robotics: Could automate more
Robotics: Currently widely used in manufacturing	Autonomous vehicles: Will evolve slowly and have limited impact by 2025
IoT: Will deliver productivity gains and better working devices	3D printing: Could substantially reduce time to market of new products

The implications of these trends are that already much of the world is connected to the Internet at data rates and with devices that allow for virtually unlimited forms of interaction. The use of Big Data and AI is rapidly delivering new capabilities such as immediate language translation and intelligent responses from devices like smart speakers (such as Amazon's Echo). Ever more intelligent devices and rapid innovation in applications and over-the-top services are certain.

The implications for business models and organisations vary. Today's large digital companies such as Google and Amazon will continue to dominate well into the future. Connectivity providers such as mobile operators will become utility-like, and their suppliers will struggle. This suggests the need for:

- A market study to access the economics of connectivity providers and if interventions are required, for example by changing regulation, facilitating mergers or enabling greater resource sharing. See especially Desired Outcome 2 in Section 3.
- Where appropriate, regulation to check the dominance of the global digital entities, or to facilitate regional variants. See Desired Outcome 4.
- Methods to encourage innovation, primarily in OTT services. See Desired Outcome 7.
- Education for citizens, consumers and businesses to ensure they stay up-to-date in a world of rapidly changing digital services. See Desired Outcomes 7 and 8.

[10] See for example W. Webb, "Our Digital Future", Amazon 2019

3. DESIRED OUTCOMES & ENABLING ACTIONS

Figure 3.1 summarises the proposed Desired Outcomes (DOs) and Enabling Actions (EAs) and the sections which follow give more detail.

FIGURE 3.1: A SUMMARY LIST OF THE DESIRED OUTCOMES (DOS) AND ENABLING ACTIONS (EAS)

DO/ EA	Description	Importance
DO1	Actions of ADM 2025 prioritised to speed ASEAN's recovery from COVID-19	
1.1	Make the economic case for prioritising ADM 2025 actions	H
1.2	Assess the economic case for facilitating use of digital services that would help recovery from the COVID-19 pandemic	M
DO2	Increase in the quality and coverage of fixed and mobile broadband infrastructure	
2.1	Encourage inward investment in digital and ICT	H
2.2	Move towards best practice permission and access rights for local and national infrastructure including submarine cable repair	H
2.3	Facilitate adoption of region wide telecommunications regulation best practices by market players to provide regulatory certainty	M
2.4	Ensure adequate international Internet connectivity.	M
2.5	Reduce the carbon footprint of telecommunications operators in ASEAN	M
2.6	Ensure increased and harmonised spectrum allocation across the region.	H
2.7	Adopt regional policy to deliver best practice guidance on AI governance and ethics, IoT spectrum and technology.	M
2.8	Develop regional mechanisms to encourage skills in integrated and end-to-end services	M
2.9	Establish a centre of excellence for best practice rural connectivity.	H
DO3	The delivery of trusted digital services and the prevention of consumer harm	
3.1	Enable trust through greater and broader use of online security technologies	H
3.2	Build trust through enhanced security for finance, healthcare, education and government	M
3.3	Identify improvements in legal and regulatory measures on the management of protection of data and other data-related activities that could be harmful.	H
3.4	Improve coordination and cooperation for regional computer incident response teams	H

DO/ EA	Description	Importance
3.5	Promote consumer protection and rights in relation to e-commerce	H
DO4	A sustainable competitive market for the supply of digital services	
4.1	Continue to identify opportunities to harmonise digital regulation to facilitate cross-border data flows	H
4.2	Deepen collaboration between ICT and competition regulatory authorities across ASEAN on the ICT sector and digital economy	M
4.3	Monitor developments in regulation of digital platforms in other jurisdictions	L
DO5	Increase in the quality and use of e-government services	
5.1	Establish ASEAN wide reporting on the level of use of e-government services in line with ITU requirements	H
5.2	Help make key government departments more productive through their internal use of ICT and e-services	H
5.3	Explore how to introduce digital identities in each AMS in a way which safeguards civil liberties	H
5.4	Help developing AMS improve the quality of their e-government e-services	M
5.5	Improve the cohesion of AMS by making key government e-services interoperable across the ASEAN region	L
DO6	Digital services to connect business and to facilitate cross-border trade	
6.1	Facilitate compliance and secure the benefits of telecommunications services and electronic commerce in line with relevant ASEAN trade agreements	H
6.2	Support trade digitalisation through seamless and efficient flow of electronic trade documents (e.g. invoices) and goods within ASEAN	H
6.3	Assess the net benefits of including IR 4.0 technologies in trade facilitation processes	M
6.4	Reduce regional business travel costs, by lowering roaming rates for mobile data services across ASEAN	M
6.5	Promote e-commerce trade in ASEAN, enhance last-mile fulfilment cooperation, and improve competitiveness in the digital economy	M
DO7	Increased capability for business and people to participate in the digital economy	
7.1	Continue to support the advancement and harmonisation of ICT qualifications across ASEAN	L
7.2	Promote development of advanced digital skills, such as coding, hackathons, innovative challenges	M
7.3	Develop a framework that encourages the development and growth of digital start-ups in ASEAN	H
7.4	Progress the work on smart cities begun in AIM 2020	M
DO8	A digitally inclusive society in ASEAN	
8.1	Ensure citizens and businesses have the skills and motivation to use digital services	H

DO/ EA	Description	Importance
8.2	Reduce affordability barriers to getting online	M
8.3	Reduce accessibility barriers to getting online	M
8.4	Encourage deeper adoption and use of 'vertical' digital services	L

3.1 DO1: ACTIONS OF ADM 2025 PRIORITISED TO SPEED ASEAN'S RECOVERY FROM COVID-19

All the available evidence suggests that:

- AMS governments will come under pressure to cut spending, given the impact which the pandemic has on government budgets; and
- use of better digital services across ASEAN enables AMS economies to recover more quickly from the pandemic.

Action is needed at AMS ministerial levels to ensure that ADM 2025, which is specifically designed to stimulate use of digital services, is prioritised - both in terms of the relatively modest funding of the enabling actions of ADM 2025 and the more substantial spending required by each AMS government to implement these actions – for example on the social measures proposed in the masterplan. At the same time an ASEAN level study is needed to identify where regulations in other sectors might be reformed to stimulate use of key digital services.

EA1.1: MAKE THE ECONOMIC CASE FOR PRIORITISING ADM 2025 ACTIONS

In any planning to optimise development of the digital services sector, it is important to make the economic case for prioritising social measures to stimulate use of digital services. This should help the ASEAN economies recover more quickly from the pandemic. AMS can then use this material in funding discussions with dialogue partners.

EA1.2: ASSESS THE ECONOMIC CASE FOR FACILITATING USE OF DIGITAL SERVICES THAT WOULD HELP RECOVERY FROM THE COVID-19 PANDEMIC

Regulations may be preventing the take-up of digital services in many sectors of an AMS economy. The experience of the pandemic is leading to removal of some of these barriers and at least one AMS is conducting a systematic review to remove such regulations more widely. An ASEAN level study is needed to identify main areas where regulatory reforms[11] could stimulate the use of digital services, help recovery from the pandemic and act as a catalyst for action at the individual AMS level.

[11] For example, there are regulations in some countries which require the annual general meeting of a company to be held with shareholders face-to-face. As a result of the pandemic these regulations have been relaxed in some countries to allow AGMs to be held remotely.

3.2 DO2: INCREASE IN THE QUALITY AND COVERAGE OF FIXED & MOBILE BROADBAND INFRASTRUCTURE

An excellent telecommunications infrastructure is at the heart of any digital transformation. Achieving this Outcome ensures that ASEAN telecommunications infrastructure is upgraded to higher data rates and capabilities in a timely manner.

EA2.1: ENCOURAGE INWARD INVESTMENT IN DIGITAL AND ICT

Surveys suggest that one of the key reasons for insufficient deployment of telecommunications networks is a lack of investment. Where there is insufficient investment funding available nationally, there may be benefits in encouraging investment from other AMS and/or from elsewhere in the world. In particular, enabling and encouraging pan-ASEAN telecoms operators can allow leading operators to tap into global sources of investment, as well as benefit from economies of scale and employment of best practice techniques across the region. Encouraging increased take-up of broadband can also stimulate increased investment. In light of this, ASEAN could work with other sectorial bodies to promote cross-border investments.

EA2.2: MOVE TOWARDS BEST PRACTICE PERMISSION AND ACCESS RIGHTS FOR LOCAL AND NATIONAL INFRASTRUCTURE INCLUDING SUBMARINE CABLE REPAIR

In order to deploy new and repair infrastructure there is often a need for rights of access. For example, for fixed network, the right to dig up roads and for wireless, access to street furniture while for mobile networks this may be planning permission for new mast sites. The same is true for submarine cable repair. Such access rights can be complex, with delays and variations across countries and across regions within a country. Difficulties in gaining rights is often mentioned as the most significant issue impeding the deployment of infrastructure. To encourage the adoption of best practices to improve rights across the region, ASEAN may consider commissioning a project to identify best practices and agreement to a pan-ASEAN set of processes and rights.

EA2.3: FACILITATE ADOPTION OF REGION WIDE TELECOMMUNICATIONS REGULATION BEST PRACTICES BY MARKET PLAYERS TO PROVIDE REGULATORY CERTAINTY

Lack of common regulation can make intra-region operation complex and expensive. Developing consistent regulation across the ASEAN region would both encourage inward investment and enable countries to understand and adopt best practice. The ASEAN Telecommunication Regulators' Council (ATRC) should develop and codify best practice as a resource for national regulatory authorities. This could be achieved by understanding all regulations in each country, comparing the regulations and agreeing on which could be pan-ASEAN best practices. ASEAN should commission a project to (1) detail current telecommunications regulation in each ASEAN country (2) determine best practice (3) aim for a pan-ASEAN set of regulations.

EA2.4: ENSURE ADEQUATE INTERNATIONAL INTERNET CONNECTIVITY

A substantial amount of data traffic is international and hence there needs to be excellent international fibre-optic connectivity. Much has been done in ASEAN to interconnect countries, but the demand for bandwidth continues to grow and it is important to continually review and upgrade international fibre links. ASEAN should establish a project to identify connectivity gaps and detail how this might evolve in future.

EA2.5: REDUCE THE CARBON FOOTPRINT OF TELECOMMUNICATIONS OPERATORS IN ASEAN

While much of climate change is related to issues much broader than telecommunications, there is one specific action ASEAN can take – to ensure operators operate their networks as energy efficiently as possible. This action puts in place a mechanism to measure and report on key metrics allowing comparison and alignment with best practice across the region.

EA2.6: ENSURE INCREASED AND HARMONISED SPECTRUM ALLOCATION ACROSS THE REGION

Having sufficient and suitable spectrum is key to many initiatives including introducing 5G, using mobile to deliver coverage and connectivity in rural areas and enabling IoT solutions. While there is much discussion and intra ASEAN initiatives, more could be done. ASEAN should build on the AIM2020 work to deliver the harmonisation recommended, provide guidance on best practice licensing and award, and continue to assess future harmonisation needs.

EA2.7: ADOPT REGIONAL POLICY TO DELIVER BEST PRACTICE GUIDANCE ON AI GOVERNANCE AND ETHICS , IOT SPECTRUM AND TECHNOLOGY

At present, if an entity such as an airport wished to deploy an IoT solution they would have numerous choices as to the frequency bands they use and the connectivity including Wi-Fi, Sigfox, LoRa, LTE-M, NB-IoT and 5G MMC. This choice is unhelpful since it risks the airport selecting the wrong technology that subsequently becomes obsolete and it prevents strong economies of scale for the terminals. A regional agreement on best practices to encourage innovative technology for IoT connectivity, coupled with regional harmonisation on the spectrum needed could resolve this issue.

As ASEAN moves towards developing its digital economy, a trusted ecosystem is key - one where businesses can benefit from digital innovations while consumers are confident to use AI. A regional guide that helps address key governance and ethical issues when deploying AI solution could be developed to promote understanding and trust.

EA2.8: DEVELOP REGIONAL MECHANISMS TO ENCOURAGE SKILLS IN INTEGRATED AND END-TO-END SERVICES

An entity such as an airport also requires a complete solution, including equipment, terminals, software, integration into their IT system and on-going management. This is often best provided by a mix of operator, system integrator, airport experts and apps providers. AMS could consider which skills and which providers are lacking across their country and region and put in place regional mechanisms to encourage their emergence; for example, through intelligent procurement of Government services and through the development of approved pan-ASEAN shortlists for particular providers.

EA2.9: ESTABLISH A CENTRE-OF-EXCELLENCE FOR BEST PRACTICE RURAL CONNECTIVITY

Some AMS are still grappling with issues of limited connectivity in rural areas. There are many ways this can be improved including through fibre deployment, enhanced copper networks, Fixed Wireless Access, use of mobile coverage and satellite solutions. ASEAN should establish a centre of excellence which will allow countries and operators to understand the approaches that work best for them and benefit from expertise in their planning and deployment.

3.3 DO3: THE DELIVERY OF TRUSTED DIGITAL SERVICES AND THE PREVENTION OF CONSUMER HARM

To encourage adoption of digital services, particularly in areas like health and finance, consumers need to trust these services. This is also true of new and emerging technologies. A key part of this is ensuring that cybersecurity and digital data governance best practices are adopted as widely as possible, both to mitigate the direct impact of a breach on business and consumers and to build trust.

EA3.1: ENABLE TRUST THROUGH GREATER AND BROADER USE OF ONLINE SECURITY TECHNOLOGIES

AMS could establish a programme for the measurement and improved use of secure networking technologies. This will involve creating a reliable index and measurement regime for critical online security technologies and their deployment throughout the region. By 2023, AMS could aim to deploy routine, public and reliable measurements of key security technology indicators. By 2025, the metrics could guide other regional project work in the deployment of security technologies.

EA3.2: BUILD TRUST THROUGH ENHANCED SECURITY FOR FINANCE, HEALTHCARE, EDUCATION AND GOVERNMENT

In the four essential industry sectors, finance, healthcare, education and government; ASEAN should build trust by developing trust and security frameworks for these industries. With the cooperation of industry stakeholders in the region, ASEAN could support the development of best practices and aim for a unified certification approach to trust and security in these industries. In some of these key verticals, additional measures will be needed to help encourage trust and manage potential risks. Technologies that pertain to users' health should have to secure certification while in other key verticals, specially created security response teams can respond to cybersecurity incidents quickly.

EA3.3: IDENTIFY IMPROVEMENTS IN LEGAL AND REGULATORY MEASURES ON THE MANAGEMENT OF PROTECTION OF DATA AND OTHER DATA-RELATED ACTIVITIES THAT COULD BE HARMFUL

AMS should build on the ASEAN Framework on Personal Data Protection (2016) and ASEAN Framework on Digital Data Governance to build harmonised principles-based data protection and privacy regulations and frameworks, including on data management and cross-border data flows. This will facilitate cross-border digital trade by encouraging user trust in sharing their personal data. ASEAN should build on the Implementing Guidelines for the ASEAN Cross Border Data Flows Mechanism (2021) to develop, recognise and implement a suite of data transfer mechanisms to facilitate cross-border data flows. This would improve the region's ability to assure the eventual interoperability of standards with APEC CBPR, the European Union's GDPR amongst others. ASEAN could develop a framework for common policies for extremely large collections of data and the use of machine learning and AI on those collections.

EA3.4: IMPROVED COORDINATION AND COOPERATION FOR REGIONAL COMPUTER INCIDENT RESPONSE TEAMS

Expand and extend the existing coordination between individual country computer response teams and fully establish a regional CSIRT for ASEAN.

EA3.5: PROMOTE CONSUMER PROTECTION AND RIGHTS IN RELATION TO E-COMMERCE

Moving towards convergence on consumer rights and protection would help facilitate cross-border trade and reassure consumers in the region that products are safe and their rights are recognised in other member states. Building on progress to date, ASEAN may consider strengthening collaboration with relevant sectoral bodies to work out pan-ASEAN arrangements for cross-border judgement recognition and enforcement for both private and public actions to foster trade and consumer trust.

3.4 DO4: A SUSTAINABLE COMPETITIVE MARKET FOR THE SUPPLY OF DIGITAL SERVICES

To help realise the vision steps should be taken to ensure that the market for digital services is designed to encourage the sound and sustainable development of digital services and to enhance competitiveness of different players in the market

EA4.1: CONTINUE TO IDENTIFY OPPORTUNITIES TO HARMONISE DIGITAL REGULATION TO FACILITATE CROSS-BORDER DATA FLOWS

ASEAN should build upon existing work by commissioning a research project to map remaining barriers to cross-border digital data flows within ASEAN.

Once the barriers are mapped and prioritise, ASEAN could identify opportunities to either align regulation (e.g. in respect of data localisation requirements) or develop mutual recognition of data protection regimes. In the meantime, regulatory sandboxes could be explored as an option to facilitate cross-border data flows (such as the RPS).

EA4.2: DEEPEN COLLABORATION BETWEEN ICT AND COMPETITION REGULATORY AUTHORITIES ACROSS ASEAN ON THE ICT SECTOR AND DIGITAL ECONOMY

The digital economy creates a set of cross-cutting issues for regulators and competition authorities. These authorities should engage in deeper collaboration on digital issues and seek to promote and develop a series of principles for regulating the ICT sector and the wider digital economy.

EA4.3: MONITOR DEVELOPMENTS IN REGULATION OF DIGITAL PLATFORMS IN OTHER JURISDICTIONS

Other jurisdictions around the world are reflecting on how to encourage innovation and competition in digital markets and implementing initiatives on this. ASEAN should regularly review such efforts, and monitor the design and impact of any measures introduced. This will allow ASEAN to identify approaches that are the most effective for the region and avoid those that are not.

3.5 DO5: INCREASE IN THE QUALITY AND USE OF E-GOVERNMENT SERVICES

High quality and relevant digital services are needed across ASEAN. While market players will create many of these digital services, AMS governments have an important role in making digital services relevant to all citizens and so removing one of the main barriers to digital inclusion.

EA5.1: ESTABLISH ASEAN WIDE INDICATORS OF THE LEVEL OF USE OF E-GOVERNMENT SERVICES IN LINE WITH ITU REQUIREMENTS

It is important to create a reliable index for levels of use of government e-services in all AMS from 2021 so as to provide a benchmark against which to monitor the success of e-government services in ASEAN. There are existing UN and ITU indicators, which can be used here.

EA5.2: HELP MAKE KEY GOVERNMENT DEPARTMENTS MORE PRODUCTIVE THROUGH THEIR INTERNAL USE OF ICT AND E-SERVICES

Digitalisation can significantly improve government services and make government departments more productive. ASEAN should therefore create best practice guidance on the digital transformation of internal government functions and data handling so as to increase the productivity of government organisations – with a focus on helping developing AMS.

EA5.3: EXPLORE HOW TO INTRODUCE DIGITAL IDENTITIES IN EACH AMS IN A WAY WHICH SAFEGUARDS CIVIL LIBERTIES

Digital identities can make digital services easier to both use and implement. ASEAN should propose a study that will lead to published principles for introducing full functionality digital ID systems which:

- can be used for transactions as well as information in both public and private sectors; and
- will work across the ASEAN region through mechanisms such as mutual recognition.

EA5.4: HELP DEVELOPING AMS IMPROVE THE QUALITY OF THEIR E-GOVERNMENT E-SERVICES

Creating high quality e-government services which are valued by the population will stimulate take up of digital services in general. As such, it will be important to identify best practice in terms of which e-government services are most useful and how best to implement them in a cost-effective way.

EA5.5: IMPROVE THE COHESION OF AMS BY MAKING KEY GOVERNMENT E-SERVICES INTEROPERABLE ACROSS THE ASEAN REGION

As the same e-government services are implemented across all 10 AMS, it will become increasingly important to identify the most promising candidates for pan-ASEAN interoperability of e-government services and to assess the benefits and barriers to making each of them interoperable between AMS.

3.6 DO6: DIGITAL SERVICES TO CONNECT BUSINESS AND TO FACILITATE CROSS-BORDER TRADE

Digital services which support international trade in goods and services and e-commerce; both intra ASEAN and external to ASEAN is critical to the economic success of the region and is the focus of this DO. Key focus areas that are consistent with regional policies are securing the benefits of IR4.0 technologies, securing the benefits of ASEAN's trade agreements supporting e-commerce, and cross-border trade and enhancing last-mile fulfilment cooperation.

EA6.1: FACILITATE COMPLIANCE AND SECURE THE BENEFITS OF TELECOMMUNICATIONS SERVICES AND ELECTRONIC COMMERCE IN LINE WITH RELEVANT ASEAN TRADE AGREEMENTS

ASEAN's free trade agreements on telecommunications services will improve access by ASEAN firms in the telecommunications and ICT sectors. It will also substantially lower the barriers to current market players from other participating countries investing in the ASEAN region. Both will enhance and further trade digitalisation in the region and should generate substantial benefits for ASEAN.

With this in mind EA6.1 is a study, to be completed before the end of 2021, which will:

- identify the steps needed for compliance with ASEAN trade agreements in relation to the telecommunications and ICT sectors;
- list the steps needed in each AMS to revise legislation and regulations and other supporting ancillary activities at the ASEAN and AMS levels to secure the benefits of ASEAN trade agreements in relation to the telecommunications and ICT sectors such as the ASEAN Agreement on E-commerce and ASEAN Digital Integration Framework Action Plan (DIFAP); and
- set a timetable for implementing these changes and a mechanism for monitoring progress.

Other trade agreements will also be assessed in this process.

EA6.2: SUPPORT TRADE DIGITALISATION THROUGH SEAMLESS AND EFFICIENT FLOW OF ELECTRONIC TRADE DOCUMENTS (E.G. INVOICES) AND GOODS WITHIN ASEAN

Digital transformation of organisations and businesses has brought about opportunities for improving efficiency and expanding customer bases in a digital economy. It is increasingly important for ASEAN to grow deeper trust and collaboration among the AMS, digitalise trade facilitation processes and enable digital transaction for our businesses to trade and transact digitally and securely, including across borders with other businesses and customers. EA6.2 proposes a study which will:

- build on the existing digitalisation of import and export procedures, such as the ASEAN Single Window;
- improve the level of automation of import and export procedures for goods in all AMS;
- track progress using the ASEAN Seamless Trade Facilitation Indicators (ASTFI) and other trade facilitation indices from exemplar third party sources to measure progress; and
- identify best practices, guidelines, policies or case studies on creating and adopting new business services that enable digital transactions and facilitate cross-border trade.

EA6.3: ASSESS THE NET BENEFITS OF INCLUDING IR 4.0 TECHNOLOGIES INTO TRADE FACILITATION PROCESSES

EA6.3 proposes a study which, in partnership with the relevant AMS ministries and proceeding in parallel with EA2, considers the feasibility, costs and benefits of using IR 4.0 technologies to automate trade processes further.

EA6.4: REDUCE REGIONAL BUSINESS TRAVEL COSTS BY LOWERING COMMON ROAMING RATES FOR MOBILE DATA SERVICES ACROSS ASEAN

ASEAN has tried for many years, with partial success, to establish common roaming charges across the region. Achieving this goal fully should have significant benefits in reducing business travel costs and giving a much-needed boost to the COVID-19-stricken ASEAN tourism sector.

Before making any recommendation this study would need to:

- review previous ASEAN initiatives to reduce roaming charges so as to identify the barriers to change; and
- re-examine the costs and benefits of achieving the proposed goal, perhaps using the experience of the EU in making a similar move as a guide.

EA6.5: PROMOTE E-COMMERCE IN ASEAN, ENHANCE LAST-MILE FULFILMENT COOPERATION, AND IMPROVE COMPETITIVENESS IN THE DIGITAL ECONOMY

Promoting e-commerce is important in driving demand for goods and services to grow the digital economy in ASEAN. It is estimated that digital integration could uplift the region's GDP by US$1 trillion by 2025[12]. Thus, to further enhance the e-commerce cross-border trade among AMS, the ASEAN digital sector should collaborate with other relevant sectors to

- promote e-commerce trade among AMS, enhance last-mile fulfilment cooperation, and improve competitiveness in the global economy;
- identify best policies, practices (including but not limited to e-commerce order fulfilment processes) and case studies that will benefit ASEAN businesses, especially SMEs;
- study the AMS logistics in the digital economy value chain, as well as improving postal and courier delivery standards to protect the buyers and sellers; and
- form a regional virtual network of e-commerce parcel collection points with data exchange through an interoperable platform to facilitate last-mile fulfilment across borders, thereby extending the reach of local merchants selling overseas.

[12] Advancing towards ASEAN digital integration, Bain & Company, Inc. 2019.

3.7 DO7: INCREASED CAPABILITY FOR BUSINESS & PEOPLE TO PARTICIPATE IN THE DIGITAL ECONOMY

In order to drive increases in productivity by building digital capabilities, it is critical to facilitate and encourage ASEAN businesses and people to increase use of digital tools and systems. This is the primary focus of this DO – noting that digital productivity for government is covered under DO5 and digital productivity for citizens is covered under DO8.

EA7.1: CONTINUE TO SUPPORT THE ADVANCEMENT AND HARMONISATION OF ICT QUALIFICATIONS ACROSS ASEAN

Given early positive outcomes of ASEAN projects, ASEAN should continue to support the work done on ICT Mutually Accepted Skill Standards (MASS) the ASEAN Qualifications Reference Framework (AQRF) and using this work to develop and promote common curriculum standards and cross-ASEAN accreditation to encourage worker mobility. This should extend to ICT qualification definition, regional accreditation, common curriculum development across the region at all levels, and to the broader STEM categories especially those closely related to ICT occupations and qualifications.

EA7.2: PROMOTE DEVELOPMENT OF ADVANCED DIGITAL SKILLS, SUCH AS CODING, HACKATHONS, INNOVATIVE CHALLENGES

Advanced digital skills are in demand by employers, include those outside of the 'traditional' ICT sector. AMS can work together to develop syllabuses for coding/programming training courses that will teach these desirable skills. Cross-ASEAN recognition of coding courses and qualifications would make these studying these skills more attractive to ASEAN citizens. This should extend to hackathons, innovation challenges and other similar activities to build an ecosystem of innovative problem solvers.

EA7.3: DEVELOP A FRAMEWORK THAT ENCOURAGES THE DEVELOPMENT AND GROWTH OF DIGITAL START-UPS IN ASEAN

Supporting innovation is about individuals and rewarding their insights, dedication and commitment, building on AIM2020 projects, ASEAN digital sector should develop a framework which encourages the development and growth of digital start-ups.

EA7.4: PROGRESS THE WORK ON SMART CITIES BEGUN IN AIM 2020

- Continue the work already begun under the ASEAN Smart Cities Network (ASCN) programme.

- In accordance with the statement by The East Asia Summit Leaders' Statement on ASEAN Smart Cities (15 November 2018):
  - promote greater city-to-city level interactions through the ASCN platform; and
  - establish and promote mutually beneficial partnerships, among ASEAN, the non-ASEAN EAS participating countries, and other multilateral institutions in mobilising resources and expertise to implement smart cities projects.

- While the AIM2020 undertook some projects in the smart city space, the COVID-19 pandemic is likely to provide greater impetus to the adoption of such systems and applications in ASEAN urban areas. Best practice guides and standards for smart city development should be developed.

- Of particular importance is to undertake studies in order to identify post COVID-19 approaches for:
  (i) suitable international and policy models and practices for smart city development, including in areas such as IoT, machine-to-machine (M2M), and sensor technologies;
  (ii) adopt optimal standards for smart city developments, such as for IoT, M2M, and sensor technologies, and related policies; and
  (iii) the suitability of representative ASEAN cities for micromobility initiatives and the necessary telecommunications and ICT systems and support for doing so. This would extend concepts like Jakarta's Car Free Day, Ho Chi Minh's Nguyễn Huệ walking street and Hanoi's Hoàn Kiếm Lake walking streets.

3.8 DO8: A DIGITALLY INCLUSIVE SOCIETY IN ASEAN

One aspect of realising this vision is to ensure continued adoption and use of digital services among ASEAN citizens. Digital communications technologies are widely acknowledged to be an important driver of productivity and economic growth. In order to unlock the full benefit of digital services, citizens and business, especially MSMEs, need to adopt and use these services.

EA8.1: ENSURE CITIZENS AND BUSINESSES HAVE THE SKILLS AND MOTIVATION TO USE DIGITAL SERVICES

An ASEAN resource centre for promoting digital inclusion could help AMS overcome skill and motivation barriers by providing easy-to-access toolkits and resources for teaching basic digital skills. These could be used by schools, community centres and charitable organisations to help users learn these skills and overcome motivational barriers.

The resource centre could also carry out research projects into digital inclusion issues specific to the ASEAN region.

EA8.2: REDUCE AFFORDABILITY BARRIERS TO GETTING ONLINE

While the cost of getting online (in terms of both a connection and devices) has fallen over time, it still remains out of reach for many citizens. Policies can help ensure that community Internet services are available in rural areas, and that those from lower incomes are also able to benefit from digital services. Another key issue is ensuring schools have Internet access for use by both pupils (digital literacy skills) and adults (affordable access).

ASEAN should therefore develop policies for establishing village Internet centres and seeking funding from global development agencies, and develop policies for getting broadband-connected computers into schools and community centres.

EA8.3: REDUCE ACCESSIBILITY BARRIERS TO GETTING ONLINE

Accessibility presents a barrier to making full use of digital services, particularly for disabled users. For some users, the typical touchscreen interface is difficult to use, and many functions and services are inaccessible.

AMS can work together to help promote the creation, deployment and adoption of accessible services, and ASEAN governments can lead by example with accessible government e-services. ASEAN can carry out research into accessibility technologies and establish a code of practice for accessible government services in AMS.

While governments cannot force privately provided services to be accessible, a publicly-available accessible code of practice will help firms understand what is needed to make their products and software accessible.

EA8.4: ENCOURAGE DEEPER ADOPTION AND USE OF 'VERTICAL' DIGITAL SERVICES

ASEAN is already carrying out substantive work on digital services such as finance, including payments infrastructures and regulatory initiatives. The ADM 2025 can build upon this by helping to give users the necessary digital skills to take advantage of digital finance services and other emerging services. The digital inclusion centre should include modules for a wide range of digital services e.g. a module on digital financial inclusion, which could provide guides and resources on how to educate users on carrying out digital transactions.

4. IMPLEMENTING ADM 2025: A COHERENT PLAN

4.1 INTRODUCTION

Building on the recommendations of the AIM2020 review, there is a need for a coherent plan for implementing, monitoring, and measuring the success of ADM 2025. This will require:

- a process to manage implementation of ADM 2025 – during the commissioning phase, when monitoring progress in the implementation of the plan, in identifying problems, and in suggesting remedial actions where possible;
- an implementation timetable; and
- metrics against which to measure the success of each desired outcome and the success of the masterplan overall.

4.2 MANAGING THE MASTERPLAN

The project management team, presumably drawn from ASEAN Secretariat (ASEC) led by the ASEAN ICT Centre (AICTC), might need to:

- develop the concept and scope of each enabling action to be commissioned and then agree a clear specification and set of deliverables;
- Seek agreement from the AMS on the metrics to be used to measure the extent to which each DO has been achieved (see Figure 4.2 for initial proposals)
- monitor progress and findings for each EA. Which EAs have been started, which completed and what findings and issues have emerged;
- monitor progress against the overall timetable of Section 4.3;
- measure the success of each desired outcome and the success of ADM 2025 overall using the metrics proposed in Section 4.4; and
- produce an annual report setting out progress to date and suggesting remedial actions where appropriate.

4.3 THE TIMETABLE FOR ADM 2025

Earlier sections have set out over 37 EAs spread across eight desired outcomes. Clearly, not all of these actions can be undertaken immediately and hence there is a need for prioritisation, by understanding which actions are most important and identifying any linkages between them.

FIGURE 4.1: THE PROPOSED TIMETABLE FOR IMPLEMENTING THE ADM 2025

EA	Description	H1 2021	H2 2021	H1 2022	H2 2022
1.1	Make the economic case for prioritising ADM 2025 actions	Establish case for full funding of ADM 2025		AMS use in financing discussions	
2.1	Encourage inward investment in digital and ICT	Survey AMS	Publish framework		AMS adopt framework
2.2	Move towards best practice permission and access rights for local and national infrastructure including submarine cable repair	Survey AMS	Publish framework		AMS adopt framework
2.6	Ensure increased and harmonised spectrum allocation across the region		Report on harmonised spectrum		
2.9	Establish a centre of excellence for best practice rural connectivity			Plan for Centre of Excellence	Implement Centre of Excellence
3.1	Enable trust through greater and broader use of online security technologies			Develop index for security	
3.3	Identify improvements in legal and regulatory measures on the management of protection of data and other data-related activities that could be harmful				Develop big tech approach
3.4	Improve coordination and cooperation for regional computer incident response teams	Establish CSIRT		Promote best practice	

Figure 4.1 sets out the proposed timetable for implementing the ADM 2025. Two types of action are indicated – those which involve study by an ASEAN level project team, and those which involve subsequent actions by the individual AMS. The timetable shows the high importance EAs only (as specified in Figure 3.1 above). ASEC and commissioning AMS are free to schedule medium and low importance EAs as they see fit, subject to the dependencies specified in Appendix E

	H1 2023	H2 2023	H1 2024	H2 2024	H1 2025	H2 2025
Mid term review	AMS spectrum plans aligned					
		AMS use CoE				
	AMS deploy security metrics				All AMS use metrics	
		Develop safe harbour legislation		Make AMS-level recom-mendations		
	AMD start to adopt					

3.5	Promote consumer protection and rights in relation to e-commerce		Develop position			
4.1	Continue to identify opportunities to harmonise digital regulation to facilitate cross-border data flows			Research barriers to trade		
5.1	Establish ASEAN wide reporting on the level of use of e-government services in line with ITU requirements	Develop indices				
5.2	Help make key government departments more productive through their internal use of ICT and e-services		Study situation		Publish best practice	
5.3	Explore how to introduce digital identities in each AMS in a way which safeguards civil liberties		Study best practice		Publish principles	
6.1	Facilitate compliance and secure the benefits of telecommunications services and e-commerce in line with relevant ASEAN trade agreements	Assess compliance	Publish outcome		AMS start to adopt	
6.2	Support trade digitalisation through seamless and efficient flow of electronic trade documents (e.g. invoices) and goods within ASEAN		AMS comply with com-mitments			
7.3	Develop a framework that encourages development and growth of digital start-ups in ASEAN					
8.1	Ensure citizens and businesses have the skills and motivation to use digital services		Plan resource centre		Implement centre	

ASEAN level project

AMS implementation of findings

	Mid term review	AMS start to adopt					
			AMD start to remove				
			AMS start to adopt				
			AMD start to adopt				
		Develop tax frame work		AMS start to adopt			
			AMS use centre				

In addition to this timetable there is a requirement for a mid-term review during 2023. This should assess factors such as the state of COVID-19 recovery by each AMS; any unanticipated events; and the state of ADM 2025 implementation at the time. It should then make clear recommendations for revised priorities on EAs or any new EAs which are required.

4.4 METRICS OF SUCCESS

The success of each desired outcome will depend upon how well the combination of its EAs work. Figure 4.2 presents a proposed set of metrics which might be used to measure the success of each DO. With the exception of DO1, these metrics are objective measures of market outcomes rather than inputs. Some of them are available on a global basis; others will require bespoke surveys conducted across the region - for which budget needs to be allocated. It will be important to measure each indicator, each year for each AMS. Where possible it will also be important to measure how the same metrics are changing annually in selected benchmark countries from outside ASEAN to see how international best practice is changing.

FIGURE 4.2: METRICS FOR SUCCESS OF THE DOS

Desired Outcome	Metrics	Source
DO1: Actions of ADM 2025 prioritised to speed ASEAN's recovery from COVID-19	A compelling economic case for increased AMS government spending to promote use of digital services	Not required
DO2: Increase in the quality and coverage of fixed and mobile broadband infrastructure	Presence of national initiative on digital inclusion in each AMS	ASEAN survey
	Improvement in fixed and/or mobile broadband population coverage for those AMS with less than 95% availability.	ITU
DO3: The delivery of trusted digital services and the prevention of consumer harm	Regional survey results showing increase in trust of digital services measured annually.	ASEAN survey
	Reduction in impact of cyber-security issues measured annually.	ASEAN survey
DO4: A sustainable competitive market for the supply of digital services	Growth in number of ASEAN companies providing digital services measured annually.	ASEAN survey
	Growth in spending on digital services measured annually.	ASEAN survey

Desired Outcome	Metrics	Source
DO5: Increase in the quality and use of e-government services	UN index on scope and quality of e-Government services	UN
	ITU index on use of e-Government services	ITU
DO6: Digital services to connect business and to facilitate cross-border trade	Annual surveys on impact of trade barriers show reduction.	ASEAN survey
	Annual growth in international trading.	Trade stats
DO7: Increased capability for business & people to participate in the digital economy	Number of graduates with digital skills measured annually.	ASEAN survey
	Number of hackathons arranged and the level of participation from across ASEAN	ASEAN survey
DO8: A digitally inclusive society in ASEAN	Increase in internet use (proportion of the population that uses the internet regularly)	ITU
	Increase in broadband adoption, including key digital verticals	ITU
	Improvement in digital skills across population measured bi-annually.	ITU

Measuring the success of the overall masterplan is also required. Given the overall vision for ADM 2025 this means measuring the **level of use** of digital services. Such services cannot be widely adopted without infrastructure and skills: hence measuring the adoption of services effectively measure the combined effect of all elements of ADM 2025. By comparing the level of use of services with that in other regions it will also be possible to assess whether ASEAN has become a world leader or is among the leaders.

Metrics for the adoption of digital services are available on a yearly basis from entities such as the World Bank and the ITU. These can be used to construct metrics for:

- the level of use of digital services by **consumers** in each AMS and in countries representing international best practice over time; and
- the level of use of digital services by **businesses and governments** in each AMS, and in countries representing international best practice, over time.

These metrics can then be used to measure what progress each AMS, and the ASEAN region as a whole, has made in moving towards international best practice. This offers a simple and effective understanding of the likely success of ADM 2025.

APPENDIX A
THE APPROACH TO DEVELOPING ADM 2025

A.1 OUR APPROACH

A key requirement of the development of ADM 2025 was to make it *"more robust, innovative and outcome-based"* than its predecessors (building on the lessons identified in the AIM 2020 review). To do this we identified a number of key challenges. These were:

- To develop measures which take account of the wide differences between the level of development of digital services in the 10 AMS.
- To prioritise those measures which address the main barriers to the development of digital services in ASEAN.
- To focus masterplan measures on activities where AMS governments and regulators can be most effective.
- To ensure that these measures are specific and measurable so that progress against them can be monitored.

With these challenges, and taking into account the global context in which the ADM 2025 development takes place (see Section 2) we have taken an approach to developing ADM 2025 with the following characteristics:

- **an evidence-based approach.** There are countless enabling actions which could be included in ADM 2025. But which are the important ones? We examined the rich set of indices available on the ASEAN digital services markets to identify where AMS are failing to meet international best practice – either in terms of levels of availability and use of digital services, or in terms of the enabling actions which are needed to achieve these levels;
- **an approach which focuses on actions where governments and regulators can make a real difference.** This needs to recognise that:
  - much of the development of digital services in ASEAN depends upon the activities of market players. In this case the main role for government bodies is to remove barriers that prevent market players from developing digital services fully; and
  - some government or regulatory actions are best left to individual AMS rather than being implemented on a pan ASEAN basis;
- **an approach which leads to specific outcomes.** Where possible we set quantifiable targets for the desired outcomes and enabling actions included in the master plan – targets which take into account the very different starting points of the 10 AMS;

- **an approach which distinguishes means from ends.** Using the strategic thrusts specified in the RFP, we identified targets for the availability and use of digital services[13] and distinguish these from the enabling actions which are needed to achieve these objectives[14];

- **a recognition of the importance of the climate crisis.** Ensuring digital services contribute very significantly to mitigating the impact of climate change, but also that the digital sector itself reduces carbon emissions; and

- **a COVID-19 relevant approach.** We considered how the COVID-19 might impact digital services development in ASEAN and how these impacts might shape the choice and nature of the actions which go into the master plan.

A.2 APPLICATION OF THE APPROACH AND THE DEVELOPMENT OF A FRAMEWORK

Whereas the original project envisaged the building out of the ADM 2025 Framework as provided to the project team, largely taking the first three 'steps' of the plan development (Vision / Objectives & Outcomes / Strategic Thrusts) as given, it became obvious that a tighter, more focused approach was needed due to:

- the need to account of the impact of COVID-19 pandemic that has eliminated in-person meetings and substantially affected stakeholder engagements, and that has resulted in a much shorter timeframe for the study; and

- the key take outs derived from the AIM 2020 review.

We defined a simplified and coherent process for developing ADM 2025 based on the approach set out above and specified below. Our approach is shown in Figure A.1 and is as follows:

A.2.1 STEP 1: DEFINE THE VISION FOR ADM 2025.

We adopted the vision from the output of the ADM 2025 Framework:

"ASEAN as a leading digital community and economic bloc, powered by secure and transformative digital services, technologies and ecosystem."

Achieving the vision will require:

- widespread and high-quality digital infrastructure AND

- relevant digital services which support economic and social development AND

- an ASEAN population with the skills needed to use these digital services and a workforce with the skills needed to develop and implement them

[13] See for example W. Webb, "Our Digital Future", Amazon 2019

A.2.2 STEP 2: IDENTIFY DESIRED OUTCOMES (DOS)

We build out and group the Desired Outcomes under each of the three pillars of:

- Infrastructure
- Services
- Skills.

A.2.3 STEP 3: DETERMINE THE ENABLING ACTIONS (EAS)

What Enabling Actions are required within ADM 2025 to achieve each Desired Outcome. There are likely to be multiple EAs for each DO.

A.2.4 STEP 4: PROVIDE A HIGH-LEVEL SPECIFICATION OF THE EAS AND POSSIBLE PROJECTS

It was not immediately clear whether the plan should stop at the level of Enabling Actions, or whether it would be useful to define, describe and specify sub projects which might be undertaken to successfully achieve / support each of the multiple EAs. From our experience and reading of the AIM 2020 review are conscious of:

- not having a plethora of detailed 'projects' (or EAs): a 'spray gun approach' where the focus and energy across the region gets dissipated and nothing meaningful is achieved;
- the need to bring some priority to actions; and
- the expectation that there will be 'projects' or EAs that might be common across multiple DOs.

The EAs will need their own set of monitoring/ success measures and be able to fit into a proposed delivery timeline. We also needed to think how we recognise the mid-term review (2023): do we explicitly provide mid-term targets or just provide 2025 targets which can be interpreted at mid-term?

FIGURE A.1: OVERVIEW OF THE APPROACH TO DEVELOPING ADM 2025

A.3 COMPARING THE OUTCOME OF THE ADM 2025 DESIRED OUTCOMES AND ENABLING ACTIONS AGAINST THE ADM 2025 FRAMEWORK

A.3.5 MAPPING ADM 2025 FRAMEWORK INTENDED OUTCOMES TO ADM 2025 DESIRED OUTCOMES

ADM 2025 Framework Intended Outcomes	ADM 2025 Desired Outcomes
1. **Digital transformation of traditional sectors** Maximise opportunities for value creation from digital transformation for both society and industry. (E.g.: Digital economy)	All DOs
2. **Fair and competitive digital market** A fair and healthy digital ecosystem where intellectual property rights are respected and to establish fair regulations. (E.g.: Over-the-Top Service players)	DO4, DO6
3. **Secure and trusted digital environment** ASEAN as a trusted digital ecosystem where transactions and information exchanges are safe, secure, and trustworthy. (E.g.: Cybersecurity, Digital Data Governance);	DO3
4. **Inclusive, sustainable and accessible digital ecosystem** Reduce disparity in accessibility and affordability to digital technology ensuring sustainability;	DO2, DO8
5. **Digital savvy citizens** Create digitally literate citizens empowered to use digital technologies and services for personal and professional betterment	DO8, DO7
6. **ASEAN as a competitive digital economic bloc** To ensure all AMS take coordinated actions to build a regionally integrated digital economy to accelerate intra-regional trade and growth, and enable local businesses to grow domestically, regionally and globally	DO1, DO5, DO6, DO7

A.3.6 MAPPING ADM 2025 FRAMEWORK STRATEGIC THRUSTS TO ADM 2025 DESIRED OUTCOMES

ADM 2025 Framework Strategic thrust	ADM 2025 Desired Outcomes
1. **Digital Connectivity and Infrastructure**	
• Enhancing accessibility, quality and affordability of infrastructure;	DO2
• Next-generation infrastructure;	DO2
• Universal design;	DO2
• Equitable access.	DO2 DO8

ADM 2025 Framework Strategic thrust	ADM 2025 Desired Outcomes
2. Digital Transformation	
• Smart digital environment;	DO2 DO5 DO7
• Emerging technologies (e.g.: AI, IoT, 5G, cloud computing, big data, etc.);	DO2 DO6
• Digital innovation;	All DOs
• Digital government and society;	DO5
• Digital literacy;	DO8
• Reskill, upskill and new skills;	DO7 DO8
• Micro Small and Medium Enterprises (MSMEs).	DO6 DO7
3. Resilience, Trust and Security	
• Network resilience and Cyber Security standards and best practices;	DO3
• Network resilience and Cyber Security capacity building and awareness raising;	
• Addressing risks and threats of emerging technologies;	
• Critical information infrastructure protection (CIIP);	
• CERT Cooperation;	
• Personal Data Protection and privacy;	DO3
• Emerging Threats i.e. fake news, misinformation, etc	See **note 1**
4. Digital Policy, Regulation and Standards	
• Digital innovation sandbox;	DO7
• Cross-border data flow;	DO6
• Policies, regulation and standards in the digital economy (E.g.: governance and ethics, standardisation, big data, allocation and use of scarce resources, etc.);	DO1 DO2 DO3 DO4 DO5 DO6
• Green Digital Initiative;	See **note 2**
• Disaster management;	See **note 3**
• Measurement tools.	Embedded in relevant EAs
5. Cooperation and Collaboration	
• Cross-sectoral collaboration;	
• Technology developers;	Specified in descriptions of individual EAs
• Dialogue Partners;	
• International organisations;	
• Civil society and public awareness;	
• Other relevant stakeholders.	

Note 1: This is being addressed by the ASEAN Ministers Responsible for Information (AMRI). See for example the *Declaration on a Framework to Minimise the Harmful Effects of Fake News* (2018) and *Joint Statement of the ASEAN Ministers Responsible for Information to Minimise the Negative Effects of Coronavirus Disease 2019 (COVID-19)* issued 25 August 2020.

Note 2: If the vision of ADM 2025 is achieved, ASEAN economies should be able to produce higher levels of economic prosperity: this lowers levels of carbon emissions

Note 3: achieving the vision of ADM 2025 will make AMS able to deal with local and regional disasters better.

APPENDIX B
DESIRED OUTCOMES

B.1 DESIRED OUTCOME 1: ACTIONS OF ADM 2025 PRIORITISED TO SPEED ASEAN'S RECOVERY FROM COVID-19

All the available evidence suggests that:

- AMS governments will come under pressure to cut spending, given the impact which the pandemic has on government budgets; and
- greater use of better digital services across ASEAN enables AMS economies to recover more quickly from the pandemic.

Action is needed at AMS ministerial level to ensure that ADM 2025, which is specifically designed to stimulate use of digital services, is prioritised - both in terms of the relatively modest funding of the enabling actions of ADM 2025 and the more substantial spending required by each AMS government to implement these actions – for example on the social measures proposed in the masterplan. At the same time an ASEAN level study needed to identify where regulations in other sectors might be reformed to stimulate use of key digital services.

ENABLING ACTION 1.1: MAKE THE ECONOMIC CASE FOR PRIORITISING ADM 2025 ACTIONS

In any planning to optimise development of the digital services sector, it is important to make the economic case for prioritising social measures to stimulate use of digital services. This should help the ASEAN economies recover more quickly from the pandemic. AMS can then use this material in funding discussions with dialogue partners.

The communications ministry of each AMS will need to convince the finance ministry of the case for full funding as an important measure to promote economic recovery from the pandemic. To do this it will need to use the available evidence, some of which is summarised in Section 2.3 above , to make the economic case for full funding of the enabling actions proposed in ADM 2025;

This economic analysis can then be used to support funding discussions with dialogue partners.

MEASUREMENT: Compelling economic case created

IMPORTANCE: High

ENABLING ACTION 1.2: ASSESS THE ECONOMIC CASE FOR FACILITATING USE OF DIGITAL SERVICES THAT WOULD HELP RECOVERY FROM THE COVID-19 PANDEMIC

Regulations may be preventing the take-up of digital services in many sectors of an AMS economy. The experience of the pandemic is leading to removal of some of these barriers and at least one AMS is conducting a systematic review to remove such regulations more widely. An ASEAN level study is needed to identify the main areas where regulatory reforms could stimulate the use of digital services, help recovery from the pandemic and act as a catalyst for action at the individual AMS level.

All sectors of the economy are subject to regulations which are designed to protect the public interest. Much of these regulations have been around for decades before digital services became available. Some regulations remain important; others prevent or make difficult the use of digital services. As such, it may be in the public interest to review them.

COVID-19 has made the need for such a review of regulation more important. A digital service can often offer an alternative to existing mechanisms which minimises the probability that the virus will spread. For example, providing there are no regulations to prevent it, doctors can use videoconferencing rather than face-to-face meetings for their consultations and AGMs for shareholders can be held on a virtual basis. Reviewing sector regulation to enable key processes to move to digital services is clearly a role for individual AMS and we understand that at least one AMS is discussing such a programme. But there is a good case for initiating a project at the ASEAN level - to identify what legislative change in which sectors would have the greatest effect. This could then act as a catalyst for AMS level initiatives. Such a project might:

- identify the obvious regulatory barriers to use of digital services through a survey of selected industries in the services sector and of digital service providers
- assess the regulatory changes needed to remove barriers to use of digital services
- consider the benefits and costs of making these changes from a public interest perspective
- recommend (say) the top five or 10 regulatory changes which would most benefit ASEAN.

MEASUREMENT: Report identifying priority sectors and legislation for change delivered

IMPORTANCE: Medium

B.2 DESIRED OUTCOME 2: INCREASE IN THE QUALITY AND COVERAGE OF FIXED AND MOBILE BROADBAND INFRASTRUCTURE

An excellent communications infrastructure is at the heart of any digital transformation. Achieving this Outcome will ensure that ASEAN telecommunications infrastructure are upgraded to higher data rates and capabilities in a timely manner.

B.2.1 INTRODUCTION

There are many aspects to a world-class communications network including fixed infrastructure such as fibre, advanced mobile communications systems, IoT connectivity, international interconnection via land and sub-sea cabling and more. In this DO we consider those actions which, taken at an ASEAN level, can help individual countries enhance their communications infrastructure.

B.2.2 THE CURRENT POSITION

Ongoing initiatives in ASEAN

The table below shows where the 10 AMS are now in terms of broadband connectivity and investment levels.

FIGURE B.1: BROADBAND CONNECTIVITY ACROSS ASEAN MEMBER STATES [*-UPDATED DATA FROM COUNTRY]

AMS	GDP/capita	LTE coverage	Fixed broadband	International bandwidth	Telecoms investment
		2019	2019	Average 2017-19	Average 2010-18
	US$	Pop %	House %	kbits/s/pop	$/pop
Myanmar	1,408	76%*	1%	3	Not available
Cambodia	1,643	80%	6%	18	23
Laos	2,535	43%	7%	14	15
Vietnam	2,715	97%	77%	66	Not available

continues..

Philippines	3,485	94%	19%	11	14
Indonesia	4,136	98%	14%	22	13
Thailand	7,808	98%	51%	71	27
Malaysia	11,415	93%	44%	56	73
Brunei	31,087	95%	69%	170	Not available
Singapore	65,233	100%	113%	806	157

Singapore is a world leader in the supply of digital connectivity. Other AMS such as Lao PDR and Myanmar have some way to go. The level of investment is very much a function of GDP per head as the table shows. It would be unrealistic to expect all AMS to invest in connectivity improvements at the same level. Investment is particularly challenging while COVID-19 is affecting AMS economies – both in terms of reducing income to AMS governments and reducing end users' ability to pay for services because of recession and unemployment. Many national initiatives are underway to address various aspects of connectivity such as the Pelan Jalinan Digital Negara (JENDELA) (National Digital Network) initiative in Malaysia.

FIGURE B.2: WITH REFERENCE TO AIM 2020

AIM 2020 Action Points	AIM 2020 Description	AIM 2020 Target/Project	AIM 2020 Final Review Completed Score	AIM 2020 Final Review Valuable Score
Initiative 4.1: Fostering broadband access and connectivity	Ensuring an ASEAN connectivity backbone is in place	4.1.1.1. Identify new digital divides, such as access and cost, brought about by new technologies (67%)	4.6	5.9
		4.1.1.2. Mapping of priority locations (cities, provinces) requiring broadband deployment for private sector participation; host discussion to highlight opportunities for private sector participation in broadband development and deployment (33%)	4.2	5.0
		4.1.1.3. Support IPv6 adoption by partnering with stakeholders to raise awareness of its importance (53%)	5.1	5.5

		4.1.2.1. Convene dialogue with relevant stakeholders to identify key issues faced with submarine cable repairs in ASEAN (33%)	5.2	7.4
		4.1.2.2. Develop a template for Service Level Agreements (SLA) for submarine cable repair (27%)	7.3	7.0
		4.1.2.3. Develop a framework on expedited protection and repair of submarine cables and to increase the resilience of ASEAN's information hardware (40%)	4.4	5.0
Initiative 6.1: Create a conducive environment for business	Support the development of the AEC in ICT products and services	6.1.3.1. Promote spectrum management harmonisation in ASEAN (e.g. 700 MHz band, International Mobile Telecommunications (IMT) and related next versions) (50%)	5.5	5.1
		6.1.3.2. Study spectrum usage for newly emerging technologies and strengthen cross-border spectrum management and coordination (44%)	4.4	4.4

FIGURE B.3: THE WEIGHTINGS USED ARE SHOWN BELOW.

Response to 'has this task been completed'	**Nothing done**	**Some work**	**Significant work**		**Work near completion**	**Completed**
Score	0	2	5		9	10
Response to "to what extent has the work produced valuable results'		No value	Some value	Valuable	Highly valuable	Extremely valuable
Score		0	2	5	6	10

As can be seen, initiatives around the submarine cable have broadly been completed and have been seen as valuable – the basic framework for maintaining the existing cable infrastructure appears to now be in place.

Some work was undertaken on digital divides and opportunities for private sector involvement in addressing these, but these have a relatively low completeness score suggesting there is much still to do here.

Initiatives took place around spectrum harmonisation and usage, and these have a medium-low completeness score and value score, again suggesting further work. In any case, these are on-going activities that repeat as new spectrum bands and issues arise.

Key indicators of rural connectivity

Many AMS have rural areas where connectivity is poor or non-existent. Extending coverage into these areas helps remove a digital divide[15] and enables ubiquitous delivery of digital services.

In considering extending connectivity it is important to distinguish between:

- Universal access in which the population of a rural village can access broadband at (say) a local telecentre.
- Universal service in which each member of the village has broadband access on an individual or household basis.

The former is clearly an easier policy goal to achieve than the latter. Moreover, it is likely to be the appropriate goal for most AMS given the scale of the rural population, the limited level of broadband connectivity currently available in rural areas, and the low levels of income in these areas[16]. In combination these factors mean that there is a substantial problem that cannot be addressed entirely through commercial supply.

[15] In tackling the digital divide there are also issues of affordability, relevance of digital services and levels of basic digital skills which are tackled elsewhere in ADM 2025

[16] And in poorer neighbourhoods located within urban and suburban areas

Extending connectivity is broadly a matter of economics – generally the reason that coverage is not provided is that it is uneconomic for commercial entities to do so. The measures set out in the previous objective may help overcome this barrier, for example:

- Harmonise and then release additional sub 1 GHz spectrum which enhances the range for mobile networks.
- Lower the cost of supply by improving tower and backhaul availability in rural areas.

However, it is unlikely that they will be sufficient to achieve universal availability. Instead, alternative ways to change the economics of deployment are required. There are a number of questions to consider here in deciding policy. The traditional approach is to designate a universal service provider, impose a universal service obligation, and then fund the incremental costs of meeting the USO. This approach was appropriate when safeguarding loss-making narrowband services supplied to rural end-users by a monopoly provider facing competition for the first time. But the problem of achieving universal access to broadband is different in that:

- The objective is to stimulate investment in new supply of broadband services rather than to safeguard continued availability of an existing narrowband service.
- There is scope for competition between bidders for subsidy – both in terms of rival technologies (for example satellite versus mobile broadband) and rival suppliers (several mobile operators). This can be exploited to increase the cost efficiency of supply.

In terms of technology, there is an increasing number of alternatives. Fixed wireless access, satellite broadband and mobile operators might all want to bid to supply universal access. All have their advantages in different circumstances:

- Ka-band satellite is a good way of serving very remote locations at relatively low-cost.
- Mobile broadband based on LTE is being rolled out anyway in urban and many rural areas. At the same time release of additional sub-1 GHz spectrum will significantly increase commercial viability in rural areas.
- Fixed wireless access using high gain antennas offers significantly higher speeds and data throughput than 4G and 5G mobile services when using the same spectrum resources.

As shown below, the level of connectivity differs hugely across the region.

FIGURE B.4: BROADBAND CONNECTIVITY AND INVESTMENT LEVELS ACROSS THE 10 AMS [*-UPDATED DATA PROVIDED BY THE COUNTRY]

AMS	GDP/capita	LTE coverage	Internet usage
		Average 2017-19	2019
	US$	Pop %	Household using %
Myanmar	1,408	76%	N/A
Cambodia	1,643	73%	40%
Laos	2,535	26%	N/A
Vietnam	2,715	95%	47%
Philippines	3,485	87%	N/A
Indonesia	4,136	95%	66%
Thailand	7,808	98%	68%
Malaysia	11,415	93%	87%
Brunei	31,087	93%	67%*
Singapore	65,233	100%	98%

Singapore is a world leader in the supply of digital connectivity. Many AMS including but not limited to Lao PDR, Myanmar, Philippines and Indonesia have a significant way to go. Improving connectivity is largely a matter of enabling investment and lowering the cost of upgrading connectivity. But the level of investment is very much a function of GDP per capita as the table shows. It would be unrealistic to expect all AMS to invest in connectivity improvements at the same level. Investment is particularly challenging while COVID-19 is affecting AMS economies – both in terms of reducing income to AMS governments and reducing end users' ability to pay for services because of recession and unemployment.

FIGURE B.5: WITH REFERENCE TO AIM 2020

AIM 2020 Action Points	AIM 2020 Description	AIM 2020 Target/Project	AIM 2020 Final Review Completed Score	AIM 2020 Final Review Valuable Score
Initiative 4.1: Fostering broadband access and connectivity	Ensuring an ASEAN connectivity backbone is in place	4.1.1.1. Identify new digital divides, such as access and cost, brought about by new technologies (67%)	4.6	5.9

		4.1.1.2. Mapping of priority locations (cities, provinces) requiring broadband deployment for private sector participation; host discussion to highlight opportunities for private sector participation in broadband development and deployment (33%)	4.2	5.0
Initiative 6.1: Create a conducive environment for business	Support the development of the AEC in ICT products and services	6.1.3.1. Promote spectrum management harmonization in ASEAN (e.g. 700 MHz band, International Mobile Telecommunications (IMT) and related next versions) (50%)	5.5	5.1
		6.1.3.2. Study spectrum usage for newly emerging technologies and strengthen cross-border spectrum management and coordination (44%)	4.4	4.4

Some work was undertaken on digital divides and opportunities for private sector involvement in addressing these, but these have a relatively low completeness score suggesting there is much still to do here.

Initiatives took place around spectrum harmonisation and usage, and these have a medium-low completeness score and value score, again suggesting further work. In any case, these are on-going activities that repeat as new spectrum bands and issues arise.

B.2.3 ENABLING ACTIONS

B.2.3.1 Technology neutral actions

ENABLING ACTION 2.1: ENCOURAGE INWARD INVESTMENT IN DIGITAL AND ICT

Surveys suggest that one of the key reasons for insufficient deployment of telecommunications networks is a lack of investment. Where there is insufficient investment funding available nationally, there may be benefits in encouraging investment from other AMS and/or from elsewhere in the world. In particular, enabling and encouraging pan-ASEAN telecoms operators can allow leading operators to tap into global sources of investment, as well as benefit from economies of scale and employment of best practice techniques across the region. In light of this, ASEAN should work with sectorial bodies to promote cross-border investments.

The survey conducted during the process of developing this strategy asked respondents to identify the top three barriers to achieving the 2025 vision. The responses are shown below. As can be seen, lack of investment is among the most-selected answers.

FIGURE B.6: TOP THREE BARRIERS TO ACHIEVING ADM 2025 VISION

Investment improves infrastructure. It can deliver better speeds, higher reliability and resilience, improved security and greater coverage, often all together. Each country will need to decide where and on what the investment is best focused.

Investment can be national and international. National investment is not within the scope of this project since it is a matter for individual AMS to decide. However, acting collectively ASEAN can stimulate international investment. How important this is will vary from country to country and might need further study. There is already some intra-ASEAN investment, for example:

- Singtel invests in Singapore, Philippines, Indonesia and Thailand.
- STTelemedia invests in Singapore, Philippines and Lao PDR.
- Axiata invests in Cambodia, Malaysia and Indonesia. and its tower company subsidiary edotco Group invests in Malaysia, Myanmar, Cambodia, Lao PDR and the Philippines.
- Viettel invests in Viet Nam, Lao PDR, Myanmar and Cambodia.

In practice, this means that each ASEAN country should make clear its rules and preferences on investments in national telecoms operators and MNOs by operators from other AMS and where possible work towards a common framework for cross-border investments and mergers.

Action would need to be taken by each AMS. to make clear its preferences on merger, acquisition or investment in a telecoms company by an ASEAN entity including legal and constitutional restrictions that might apply.

MEASUREMENT: Number of countries that have enacted agreed regulation. Changes in intra-ASEAN investment over time.

IMPORTANCE: High

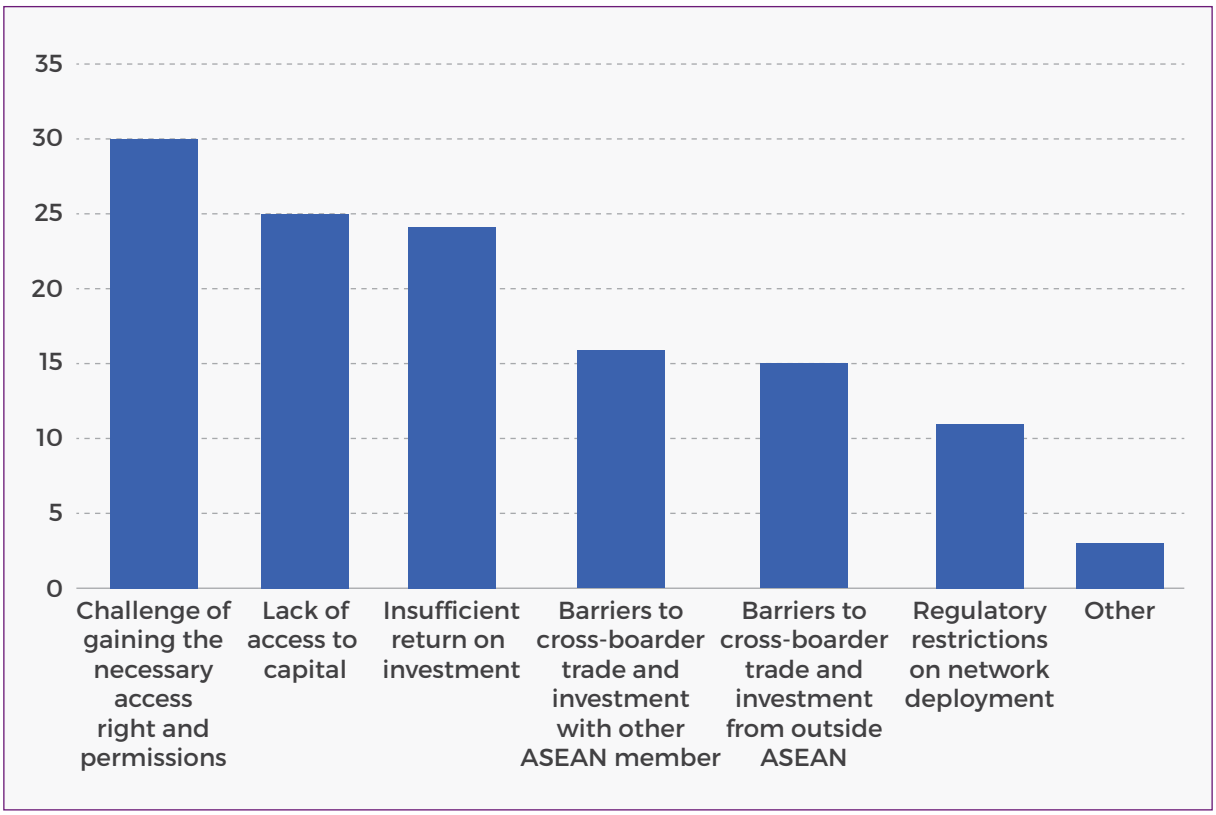
ENABLING ACTION 2.2: MOVE TOWARDS BEST PRACTICE PERMISSION AND ACCESS RIGHTS FOR LOCAL AND NATIONAL INFRASTRUCTURE INCLUDING SUBMARINE CABLE REPAIR

In order to deploy new and repair infrastructure there is often a need for rights of access. For example, for fixed network, the right to dig up roads and for wireless, access to street furniture while for mobile networks this may be planning permission for new mast sites. The same is true for submarine cable repair. Such access rights can be complex, with delays and variations across countries and across regions within a country. Difficulties in gaining rights is often mentioned as the most significant issue impeding the deployment of infrastructure. To encourage the adoption of best practices to improve rights across the region, ASEAN may consider commissioning a project to identify best practices and gain agreement to a pan-ASEAN set of processes and rights.

In order to deploy new fixed broadband connectivity there is often a need for rights of access. For FTTH this can include the right to dig up roads and access private premises. For FWA this can include rights to access street furniture such as lampposts. For mobile networks this mostly involves rights to erect masts both on open land and on buildings. It can also involve rights to lay fibre and power to the base stations.

Gaining access to appropriate permissions is widely seen as a key barrier. The survey completed as part of this study showed the following.

FIGURE B.7: RESPONSES TO SURVEY QUESTION *"IN YOUR VIEW, WHAT ARE THE KEY CHALLENGES TO THE DEPLOYMENT OF INFRASTRUCTURE IN THE ASEAN REGION? PLEASE MARK ALL WHICH APPLY."*



The issue seen as most important is "challenges of gaining the necessary access rights and permissions". Such rights can be complex, with delays until the right is granted and with various restrictions such as time-of-day when access is allowed, depth of trenches, liabilities, etc. Reducing differences in these across the ASEAN region will facilitate inward investment and enable countries to understand and adopt best practice. This could be achieved by understanding all relevant permissions in each country, comparing the regulations and agreeing on which could be considered best practice. This might require periodic review as the need for regulation changed.

The following actions would be needed:

- ASEAN to commission a project to (1) detail current planning permission processes and access rights in each ASEAN country and best practice from bodies such as ITU (2) determine best practice (3) help countries move towards best practice as best they can.

MEASUREMENT: Publication of a set of best practice regulations.

IMPORTANCE: High

ENABLING ACTION 2.3: FACILITATE ADOPTION OF REGION WIDE TELECOMMUNICATIONS REGULATION BEST PRACTICES BY MARKET PLAYERS TO PROVIDE REGULATORY CERTAINTY

Lack of common regulation can make intra-region operation complex and expensive. Developing consistent regulation across the ASEAN region would both encourage inward investment and enable countries to understand and adopt best practice. The ASEAN Telecommunication Regulators' Council (ATRC) should develop and codify best practice as a resource for national regulatory authorities. This could be achieved by understanding all regulations in each country, comparing the regulations and agreeing on which could be pan-ASEAN best practices. ASEAN should commission a project to (1) detail current telecommunications regulation in each ASEAN country (2) determine best practice (3) aim for a pan-ASEAN set of regulations

Developing consistent regulation across the ASEAN region would both encourage inward investment and enable countries to understand and adopt best practice. This could be achieved by understanding all regulations in each country, comparing the regulations and agreeing on which should be pan-ASEAN and on which could be considered best practice. This might require periodic review as digital services markets develop and regulation needs to change.

Fixed telecoms operators are regulated in many ways such as:

- Obligations for dominant operators to supply wholesale products to enable retail competition.
- Price regulation at wholesale and retail level.
- Coverage/connectivity obligations.
- Performance obligations covering reliability, time to connect a premise, speed of connection and latency.

Mobile telecoms operators are regulated in many ways such as:

- Price regulation at wholesale level.
- Coverage/connectivity obligations.
- Performance obligations covering reliability, speed of connection and latency.
- Length of licenses (especially for spectrum) and the certainty around any renewal process.
- Security and other similar obligations such as liability, especially around IoT.

The following actions would be needed:

- ASEAN to empower ATRC to (1) detail current telecoms regulation in each ASEAN country (2) determine best practice (3) gain agreement to a pan-ASEAN set of regulations.

MEASUREMENT: Publication of a set of exemplar regulations.

IMPORTANCE: Medium

ENABLING ACTION 2.4: ENSURE ADEQUATE INTERNATIONAL INTERNET CONNECTIVITY

A substantial amount of data traffic is international and hence there needs to be excellent fibre-optic connectivity. Much has been done in ASEAN to interconnect countries, but the demand for bandwidth continues to grow and it is important to continually review and upgrade international fibre links. ASEAN should establish a project to identify connectivity gaps and detail how this might evolve in future.

AMS have made considerable progress on the implementation of international connectivity, for example:

- Myanmar is now connected to SEA-ME-WE3, SEA-ME-WE-5 and AAE1. There is also considerable capacity at the land border into Thailand with now connectivity at Myawaddy, Mae Sai/ Tachileik, Phayar thone su (Three Pagoda), Mawtaung, Htee Kee, Seikhpu and Lao PDR with now connectivity at Tachileik. However, it was unable to connect to SE-ME-WE4 that has the cable landing station at Cox's Bazar in Bangladesh. Notwithstanding the conflict in the Shan State on the Myanmar border with China there is connectivity to China via Muse. International bandwidth into Myanmar has gone from 30 Gbps in 2013 to 1975 Gbps in 2020.Thailand has a big push to increase submarine cable. CAT Telecom had monopoly on international submarine capacity until recently but Thai players like Truemove have made heavy investments in new cables like SJC2. Facebook is a major investor in that cable which connects Singapore, Thailand, Cambodia and Vietnam in ASEAN.

- Until recently much of the submarine cable capacity into the Philippines was routed through the old US naval base at Subic Bay, but over the past couple of years this has been addressed by cable systems such as PLCN which involved investments from Google and Facebook.

- Indonesia has built the domestic Palapa ring connecting many islands in the archipelago but most of their capacity goes north to Singapore hence there are currently proposals to connect southwards to Darwin (into Kupang in West Timor) to provide enhanced connectivity.

- Lao PDR now has extensive land connectivity into China and across the Mekong into northern Thailand.

ASEAN countries should agree on a plan for future international fibre connections, including submarine cables, that completes the connectivity that the region needs.

The following actions would be needed:

- ASEAN to establish a project to the current position, forecast whether further connectivity is needed, and detail how this might evolve in future.

MEASUREMENT: (1) Establishment of project. (2) Implementation of recommendations.

IMPORTANCE: Medium

ENABLING ACTION 2.5: REDUCE THE CARBON FOOTPRINT OF TELECOMMUNICATIONS OPERATORS IN ASEAN

While much of climate change is related to issues much broader than telecommunications, there is one specific action ASEAN can take – to ensure operators operate their networks as energy efficiently as possible. This action puts in place a mechanism to measure and report on key metrics allowing comparison and alignment with best practice across the region.

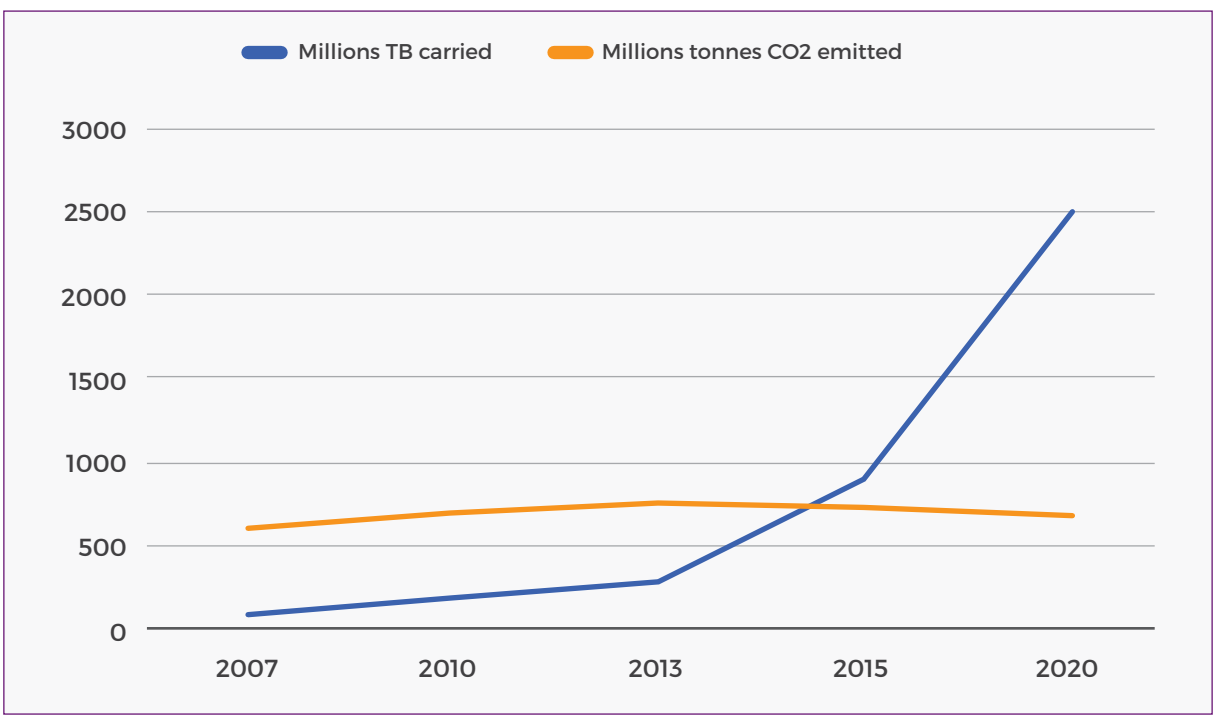
Telecoms operators can assist with reducing greenhouse gas emissions by operating their networks as energy efficient as possible. The evidence here is already encouraging. As Figure B.8 shows, the amount of data traffic generated by digital services globally has grown enormously over the past seven years while the amount of electricity consumed in carrying this growing traffic has fallen slightly since 2013 as:

a) global vendor's have made their equipment more energy-efficient;

b) global digital platforms like Google, Facebook Microsoft and Apple have made their data centres more efficient and moved from fossil fuels to renewable energy; and

c) operators have paid much more attention to running their networks in an energy efficient way.

FIGURE B.8: CARBON FOOTPRINT OF ICT GLOBALLY[17]



[17] Ericsson, 2020, A quick guide to your carbon footprint

Initiatives to accelerate effects a) and b) are largely out of the control of ASEAN. But ASEAN can take one simple enabling action on c). That is each AMS could require all their main operators to report on:

- the electricity consumed in running their networks each year;
- the proportion of this electricity which comes from renewable resources; and
- the amount of data traffic carried over their network.

This information can then be collated centrally to compare AMS, to monitor trends, and to identify where there are problems which require action.

MEASUREMENT: Delivery of key data by all operators across the ASEAN region – percentage of operators responding and number of metrics provided.

IMPORTANCE: Low

B.2.3.2 Spectrum-related actions

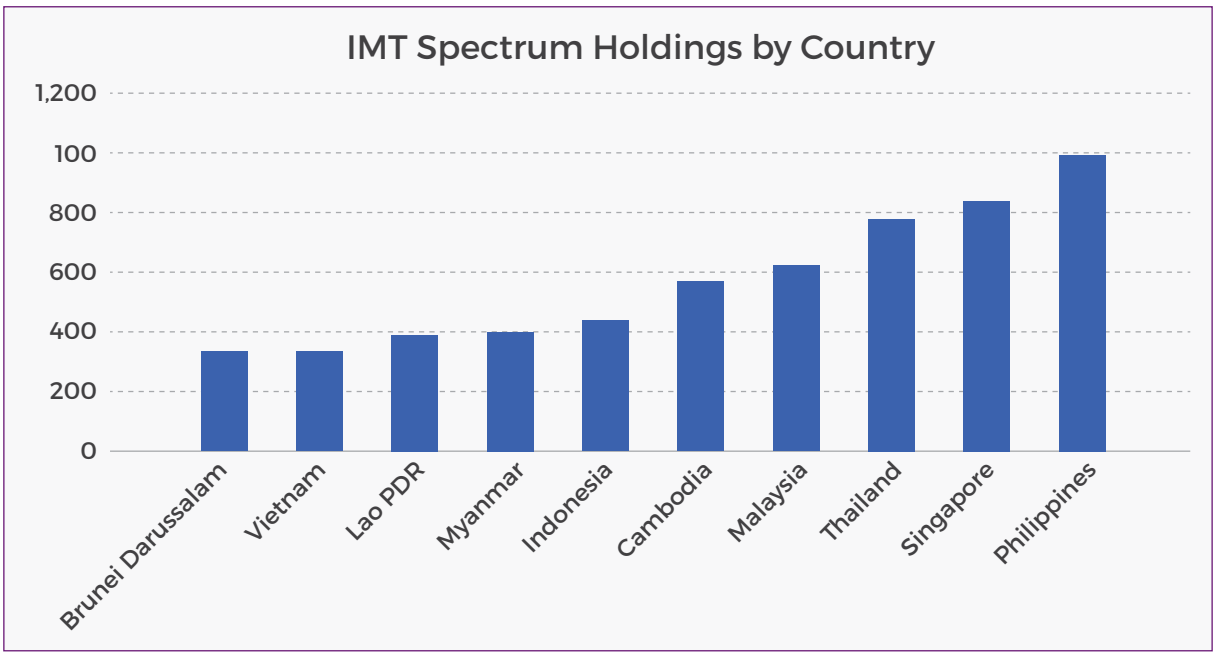
ENABLING ACTION 2.6: ENSURE INCREASED AND HARMONISED SPECTRUM ALLOCATION ACROSS THE REGION.

Having sufficient and suitable spectrum is key to many initiatives including introducing 5G, using mobile to deliver coverage and connectivity in rural areas and enabling IoT solutions. While there is much discussion and intra ASEAN initiatives, more could be done. ASEAN should build on the AIM 2020 work to deliver the harmonisation recommended, provide guidance on best practice licensing and award, and continue to assess future harmonisation needs.

Having sufficient and suitable spectrum is key to many initiatives including introducing 5G, using mobile to deliver coverage and connectivity in rural areas and enabling IoT solutions. While there is much discussion and intra-region differences, more could be done both in harmonising bands where feasible and in ensuring the adoption of best practice approaches to spectrum reallocation, spectrum award and pricing, licensing framework and conditions, per-operator spectrum holdings, etc.[18]

[18] The GSMA has developed detailed guidance and toolkits on a range of spectrum management issues. See for example https://www.gsma.com/spectrum/managing-spectrum/

FIGURE B.9: THE CURRENT ALLOCATIONS TO MOBILE OPERATORS ACROSS THE REGION.



As can be seen, there is huge variance, with nearly three times as much spectrum allocated in some countries than others.

Harmonising spectrum allocations and awards across a region has many benefits including:

- Reduction in cross-border interference.
- Facilitation of roaming from one country to another.
- Economies of scale for network equipment and terminals in the region.
- Similar business cases for operators across the region, facilitating mergers and cross-region investment.

Harmonisation already occurs through the ITU at a global level and through regional groupings, like APT and the ASEAN Telecommunication. Regulators' Council (ATRC). Hence, this task is more one of ensuring that these are working effectively and efficiently.

The following actions would be needed:

- Build on the AIM2020 work to deliver the harmonisation and best practice guidance recommended and continue to assess future harmonisation needs.

MEASUREMENT: (1) Delivery of a report on additional harmonisation (2) number of countries that have implemented the harmonised arrangements.

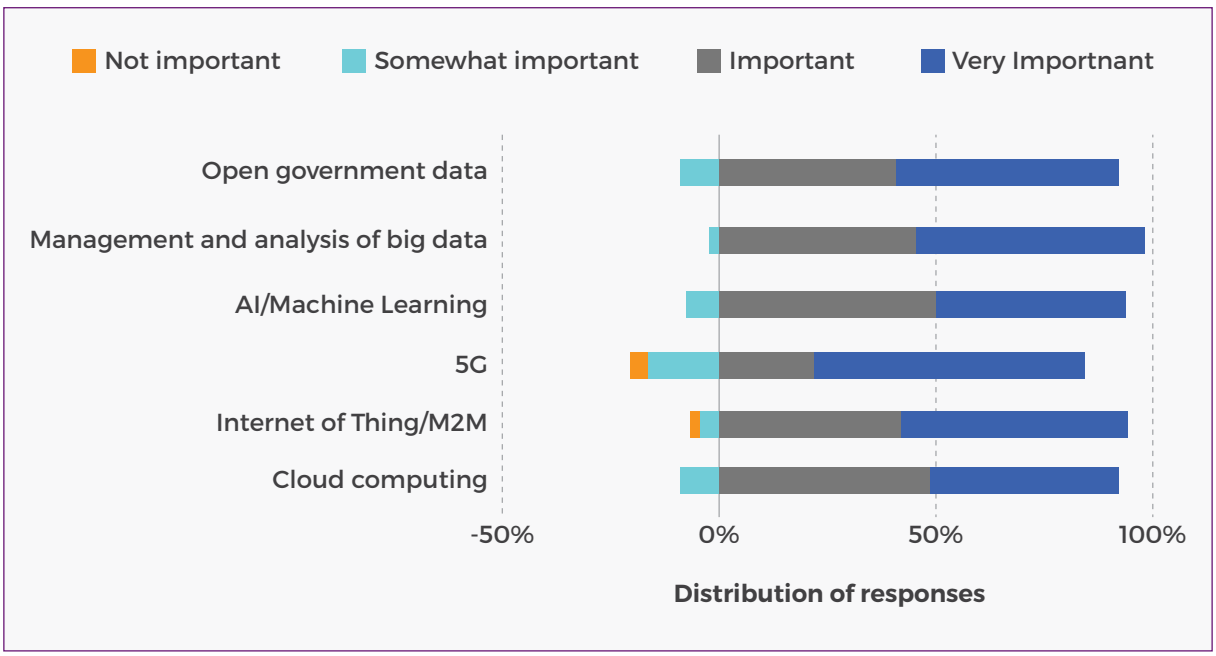
IMPORTANCE: High

B.2.3.3 Local and national/regional IoT-related actions

The Internet of Things (IoT) promises many benefits including enhanced productivity, better healthcare, reduced congestion, reduced carbon emissions, facilitation of "Industry 4.0", and much more.

The survey, shown below, shows IoT being seen across the region as almost universally important and jointly the most important technology alongside big data (which itself is typically enabled by IoT data collection).

FIGURE B.10: RESPONSES TO SURVEY QUESTION "IN YOUR VIEW, HOW IMPORTANT ARE THE FOLLOWING TECHNOLOGIES IN FACILITATING DIGITAL DEVELOPMENT IN THE ASEAN REGION?"



Despite continued enthusiasm, deployment of IoT in ASEAN remains disappointing. Partly this is due to a lack of a single clear connectivity technology, even though the regional preference is for NB-IoT. It is also due to lack of expertise to provide end-to-end solutions to businesses and lack of a clear business case for the deployment and operation of IoT solutions. A pan-ASEAN strategy could overcome many of these issues by making decisions at a scale that would allow significant investment, both providing the benefits of ubiquitous IoT connectivity and benefiting regional providers. Such a policy would have the following elements:

- Regional policy to deliver certainty on technology.
- Regional skills development in integration and end-to-end services.

Each of these is discussed below.

ENABLING ACTION 2.7: ADOPT A REGIONAL POLICY TO DELIVER BEST PRACTICE GUIDANCE ON AI GOVERNANCE AND ETHICS, IOT SPECTRUM AND TECHNOLOGY

At present, if an entity such as an airport wished to deploy an IoT solution they would have numerous choices as to the frequency bands they use and the connectivity including Wi-Fi, Sigfox, LoRa, LTE-M, NB-IoT and 5G MMC. This choice is unhelpful since it risks the airport selecting the wrong technology that subsequently becomes obsolete and it prevents strong economies of scale for the terminals. A regional agreement on best practices to encourage innovative technology for IoT connectivity, coupled with regional harmonisation on the spectrum needed could resolve this issue.

As ASEAN move towards developing its digital economy, a trusted ecosystem is key – one where businesses can benefit from digital innovations while consumers are confident to use AI. A regional guide that helps address key governance and ethical issues when deploying AI solutions could be developed to promote understanding and trust.

The following actions would be needed:

- ASEAN to establish a group to determine and agree upon the IoT wireless connectivity strategy including harmonised frequency bands and preferred technology for the region.
- Regulatory measures put in place to enable and favour this choice.

MEASUREMENT: Number of countries implementing regulatory measures. Extent of IoT deployment and revenue from IoT connectivity.

IMPORTANCE: Medium

ENABLING ACTION 2.8: DEVELOP REGIONAL MECHANISMS TO ENCOURAGE SKILLS IN INTEGRATED AND END-TO-END SERVICES

An entity such as an airport also requires a complete solution, including equipment, terminals, software, integration into their IT system and on-going management. This is often best provided by a mix of operator, system integrator, airport experts and apps providers. AMS could consider which skills and which providers are lacking across their country and region and put in place regional mechanisms to encourage their emergence, for example, through intelligent procurement of Government services and through the development of approved pan-ASEAN shortlists for particular providers.

The following actions would be needed:

- ASEAN to establish a project to determine which skills are inadequate across the region and provide an action plan to deliver.

MEASUREMENT: (1) Establishment of the project (2) Progress against the action plan.

IMPORTANCE: Medium

ENABLING ACTION 2.9: ESTABLISH A CENTRE OF EXCELLENCE FOR BEST PRACTICE RURAL CONNECTIVITY

Some AMS are still grappling with issues of limited connectivity in rural areas. There are many ways this can be improved including through fibre deployment, enhanced copper networks, Fixed Wireless Access, use of mobile coverage and satellite solutions. ASEAN could establish a centre of excellence which will allow countries and operators to understand the approaches that work best for them and benefit from expertise in their planning and deployment.

The following actions would be needed:

- Establish a centre-of-excellent for best practice rural connectivity, providing insight and knowledge on the range of technologies available such as satellite, fixed wireless and extended-range mobile and the resources to apply this knowledge to particular cases. This should consider issues such as the availability of sub 1GHz spectrum and the optimal move towards 4G/5G and decommissioning of 2G/3G.

MEASUREMENT: Centre of excellence established. Number of countries making use of the expertise to set national policy.

IMPORTANCE: High

B.2.4 MONITORING AND IMPLEMENTATION

Overall measurement

This Desired Outcome is aimed at improving the quality of fixed and mobile broadband in areas where it is already available (with a separate Desired Outcome looking at areas where it is not available). Hence, the overall measurement of success would be that the quality of fixed and mobile broadband in each country improved. This might mean higher data rates, lower latencies, increased reliability or lower congestion in peak periods. However, there are many factors that influence broadband, most outside the influence of ASEAN, so such a broad measure is unlikely to be an accurate reflection of the success of the actions proposed here.

Instead we suggest that measurement focus on:

- The amount of investment in fixed and mobile networks, ideally showing national and regional investment.
- The emergence of MVNOs.
- The harmonisation of spectrum critical for mobile broadband, primarily spectrum which can be used for 4G and 5G.

Annual reports providing key data across each of these areas would be a strong indication as to whether the Desired Outcome was being influenced.

In addition, there are detailed recommendations for measurement provided for each enabling action.

Dependencies

There are no actions that are completely dependent on others (and so cannot be started until others are completed). However, there are clearly groups of actions that, if enacted collectively are more likely to have a beneficial effect that if only a subset is adopted. These are:

Actions facilitating investment:

- EA1 – inward investment.
- EA2 – planning permission and access rights.
- EA3 – Best practice regulation.
- EA4 – sufficient international connectivity.
- EA6 – spectrum harmonisation.
- EA9 – rural connectivity.

Facilitating competition, new entrants and innovation:

- EA8 and EA8 – facilitating IoT.

Other

- EA5 – reducing carbon footprint.

Timeline for critical tasks

We have identified the following as of the highest importance:

- EA1 – inward investment.
- EA2 – planning permission and access rights.
- EA3 – Best practice regulation.
- EA4 – sufficient international connectivity.
- EA6 – spectrum harmonisation.
- EA9 – rural connectivity.

We recommend all of these are started as quickly as possible, ideally early in 2021 with the bulk of the activity completed within 12 months. After that the task may become one of monitoring and intervening as needed, for example where new spectrum bands are globally identified and need regional harmonisation.

B.3 DESIRED OUTCOME 3: THE DELIVERY OF TRUSTED DIGITAL SERVICES AND THE PREVENTION OF CONSUMER HARM

To ensure adoption of digital services, particularly in areas like health and finance, consumers need to trust these services. This is also true of new and emerging technologies. A key part of this is ensuring that cybersecurity and digital data governance best practices are adopted as widely as possible, both to mitigate the direct impact of a breach on business and consumers and to build trust.

B.3.1 INTRODUCTION

Reliable, high-quality and relevant digital services are a key indicator for success for the goals of ADM 2025. However, a key to that success is that those digital services are trusted and that they avoid an expansion of potential consumer harm. Without security, trust and protection from harm, digital services will not be used by consumers, businesses and the public sector. A failure to provide security and trust will lead to a failure to reach some of ADM 2025's most important goals.

However, providing trust in a time of digital transformation is difficult. Wide adoption of secure digital technologies needs to be in place. Public policy needs to be able to respond to a rapidly changing technological environment: adding trust but not limiting the innovation and entrepreneurship that is at the heart of economic progress in the region. This includes the implementation of cybersecurity best practices while also addressing key public policy issues related to trust.

Implementation of these best practices will largely be the responsibility of the private sector and public-private partnerships.[19] This has already been successful in the region. For instance, the ASEAN ICT 2015 Action Plan had key initiatives in this space:

- Initiative 1.1: Create a conducive environment where businesses can grow leveraging ICT;
- Initiative 1.2: Develop Public-Private Partnership (PPP) Initiatives for the ICT Industry;
- Initiative 2.3: Ensure affordable and seamless e-services, content and applications;
- Initiative 2.4: Build trust;
- Initiative 3.1: Create Innovation Centres of Excellence for Research and Development of ICT services; and
- Initiative 4.2: Provide network integrity and information security, data protection and CERT cooperation.

The AIM 2020 included a new strategic thrust for information security and assurance. This thrust focused on the increased scope of threats to cybersecurity to the economic and social well-being of the region. This approach had two main initiatives: to strengthen information security in ASEAN (creating a trusted ASEAN digital economy) and strengthening information security preparedness in ASEAN. [20]

The first of these initiatives had actions that centred on developing regional data protection principles, developing regional network security best practices, and developing regional critical information infrastructure resilience practices. The second initiative intended to strengthen cyber incident emergency response collaboration in the region.

Broadly speaking there are two separate dimensions to developing trusted digital services:

- Appropriate cybersecurity measures at a technical level, in order to limit the number and impact of cybersecurity attacks and to enable a rapid response to cybersecurity threats.
- Measures to protect users, including their personal data, from malicious actors.

These dimensions are distinct, but both are important for ensuring trust and preventing consumer harm. Below we discuss each in turn.

[19] It's worth noting that an AMS has noted that the enforcement and enablement of competition of other sectors lies outside the direct purview of the ICT sector and its regulators. However, coordination across those other competition bodies will be productive
[20] Pp.1-11 ASEAN ICT Masterplan Completion Report, 2016.

Cybersecurity

Cybersecurity threats can cause direct harm to consumers and businesses. For example, in 2016 the Mirai botnet, was used to perform a large-scale attack on domain name server (DNS) provider Dyn, which knocked dozens of sites offline for a day – including Amazon, Spotify, and Twitter. Reportedly, around 8% of Dyn's customer base stopped using its services in the wake of the attack.[21] The foregone revenue to firms faced with such attacks – just one dimension of the costs of an attack – can be significant.[22]

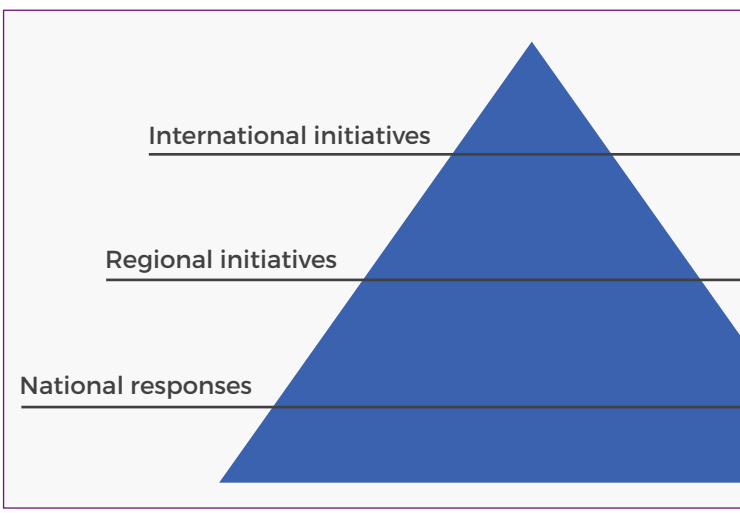
Cybersecurity attacks can also harm consumers directly. Poorly-secured domestic connected devices can be compromised, breaching the user's privacy, or even posing direct threats to their health and safety. This raises particular concerns in certain verticals such as healthcare and finance, where usage is likely to be sensitive to the level of user trust.

The region has been making significant progress on strengthening regional collaboration and coordination in cybersecurity. For instance, the ASEAN Coordinating Committee on Cybersecurity, which comprises representatives from relevant sectoral bodies to strengthen cross-sectoral coordination of cybersecurity while preserving the exclusive work domains of the sectoral bodies. For ADM 2025 work should continue on addressing resilience in these networks as well as coordination in the protection of infrastructure deemed to be critical to both individual nations and the region as a whole. Attention should be paid to those enabling actions that help build capacity building in digital skills, especially in the area of cybersecurity.

The AIM 2015 and AIM 2020 addressed cybersecurity and, regional cooperation on security, with the aim of creating an environment where digital services can flourish while allowing for consumer and stakeholder trust and confidence. However, this environment is evolving. First, the architecture of the online world is changing – and with it the mechanisms by which we ensure security. Next, the technology that brings digital services to the region is rapidly evolving as well. The new challenges for ASEAN 2025 include:

- Addressing the new architectures for transport and delivery of digital services over the Internet and the security technologies that make it safe for the region's users[23];
- Adjusting national and regional policy to rapidly changing technology;
- Strengthening cross-border cooperation on issues of trust and security; and
- Addressing dispute resolution and redress in the area of new technology.

FIGURE B.11: NEED FOR MULTI-LEVEL RESPONSE TO CYBERSECURITY AND TRUST CHALLENGES



[21] https://www.corero.com/blog/797-financial-impact-of-mirai-ddos-attack-on-dyn-revealed-in-new-data.html.
[22] https://www.akamai.com/us/en/multimedia/documents/content/ponemon-institute-the-cost-of-ddos-attacks-white-paper.pdf
[23] An AMS has noted that it is imperative and timely to seize the opportunity to increase citizen's confidence and trustworthiness towards issues on security and privacy using technologies such as e-wallets. Full encryption of financial data is a must while sending and receiving financial transactions. Government, as a digital services regulator, must compel companies to increase security of its users' data, applications and network infrastructures.

The enabling actions below attempt to address these new challenges while remaining consistent with the initiatives that emerged from the 2015 and 2020 work.

Protection against consumer harm

Harm to consumers from digital services may take a number of different forms:

- Users' privacy may be compromised by firms selling their data;
- Users' personal data may be stolen from a company following a cyberattack;
- Users may fall victim to digital fraud;
- Users may fall victim to misleading advertising or product descriptions when buying products online;[24] or
- Users may encounter inappropriate, illegal or harmful content online.

Source: Plum Consulting, 2020

The ASEAN region has progressed with developing data protection frameworks with relevant actions and targets in AIM 2020. Robust data protection frameworks increase users' trust in digital services, but only to the extent that users are aware of those frameworks and their rights. Increased transparency around how data is collected and used can also serve to improve trust.

Technological developments have implications for trust in the use of personal data, in particular AI and machine learning, Internet of Things, facial recognition and cloud computing. These technologies serve to either open up new sources of personal information or to increase the scope for data to be processed and analysed. The growing power to both collect and analyse data has the potential to lead to an erosion of trust.

One example is consumer IoT devices such as smart appliances, door locks and thermostats. Around 11bn such devices were estimated to be in operation worldwide in 2018. Such devices can collect new streams of information about a consumer's habits and preferences; in many cases consumers may be unaware such information is being collected. A key emerging issue for trust is likely to be the lack of transparency around how an AI operates.

A number of countries around the world have introduced regulation to curtail various online harms, including hate speech, online abuse and inappropriate content (deeming industry self-regulation inadequate in these respects). In ASEAN, Singapore's media regulator has required streaming platforms to classify their content and provide a notification if the content features violence, nudity or drug use.[25] OTT regulation is also an active topic amongst the ATRC. [26]

Due to different cultural norms across countries, we consider that it would not be appropriate to develop a pan-ASEAN strategy for the regulation of online harms. However, ASEAN might wish to develop some guiding principles for developing online harms frameworks to mitigate regulatory fragmentation in this area.

[23] Issues around e-commerce are discussed in DO6.
[25] https://sg.news.yahoo.com/bringing-ott-platforms-under-government-regulations-what-india-and-other-countries-are-doing-080730665.html?guccounter=1
[26] https://www.bangkokpost.com/business/1732775/ott-oversight-a-hot-topic-in-asean

B.3.2 THE CURRENT POSITION

Indicators of Advanced Digital Technology in the ASEAN Region

For trust and security, we can take other technological indicators as evidence of the state of advanced digital services in the region. As a first example of this, costs and delays associated with having to rely on international transit providers are reduced when ISPs can freely exchange local traffic in a local facility - much like using the local post to have your package delivered straight to your cousin in the next village, instead of having it shipped out of and back into the country before it reaches their doorstep. What follows is a more competitive playing field, especially for smaller ISPs, and better quality of service overall. The impact on trust and security is that IXPs are an indicator of the distribution of digital services. Figure B.12 below shows where the 10 AMS rank in terms of the availability of Internet exchange Points (IXPs) a crucial technology for contemporary delivery and exchange of data flows.

FIGURE B.12: AVAILABILITY OF IXPS IN ASEAN REGION[27]

AMS	Number of IXPs	Participants	Prefixes Exchanged	Peak Data Exchanged
Singapore	9	411	1.169M	1207G
Malaysia	6	97	1.003M	249G
Thailand	13	66	14.6K	32G
Philippines	6	1638	725K	114G
Indonesia	21	99	355K	637G
Viet Nam	3	28	No data	24.6G
Brunei Darussalam	None			
Cambodia	4	58	8K	22G
Myanmar	1	13	190k	18G
Lao PDR	1	7	No data	.01G

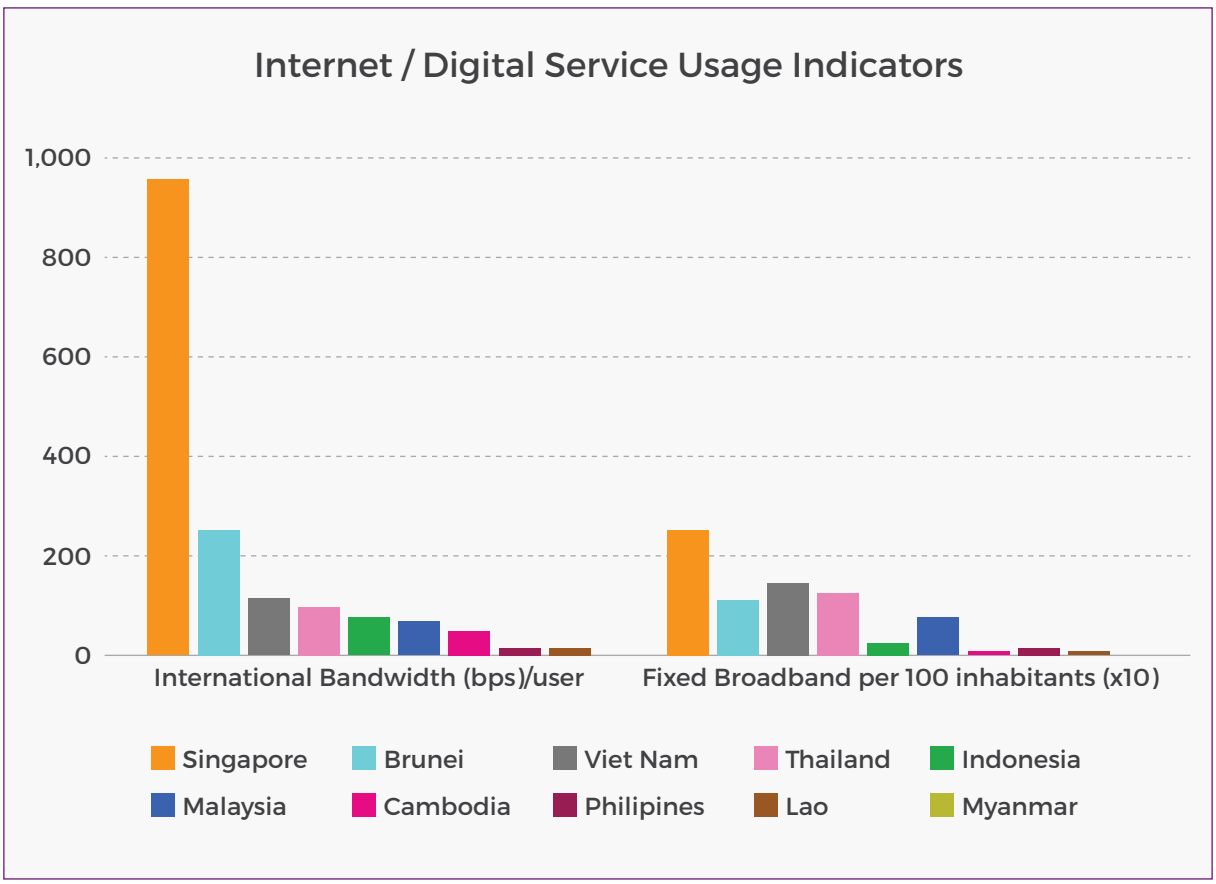
Source: Packet Clearing House Internet Exchange Directory

Another indicator is the presence of DNS Anycast servers in the region. Like the existence of IXPs, the presence of DNS anycast servers can provide a fall over mechanism to DNS services in the region, allows users to reach a topologically nearest DNS server. This reduces latency, and can provide resilience against DDoS attack. In the following AMS nations, networks are providing anycast copies of the root of the Internet's DNS system: Thailand, Cambodia, Malaysia, Singapore, Philippines and Indonesia.[28]
The presence of those anycast server is a good predictor of the richness of digital services in those countries.

[27] ITU WTID 2020 and data from the Government of Myanmar
[28] Data from APNIC, https://www.apnic.net/get-ip/faqs/rootservers/, accessed 2020/10/02

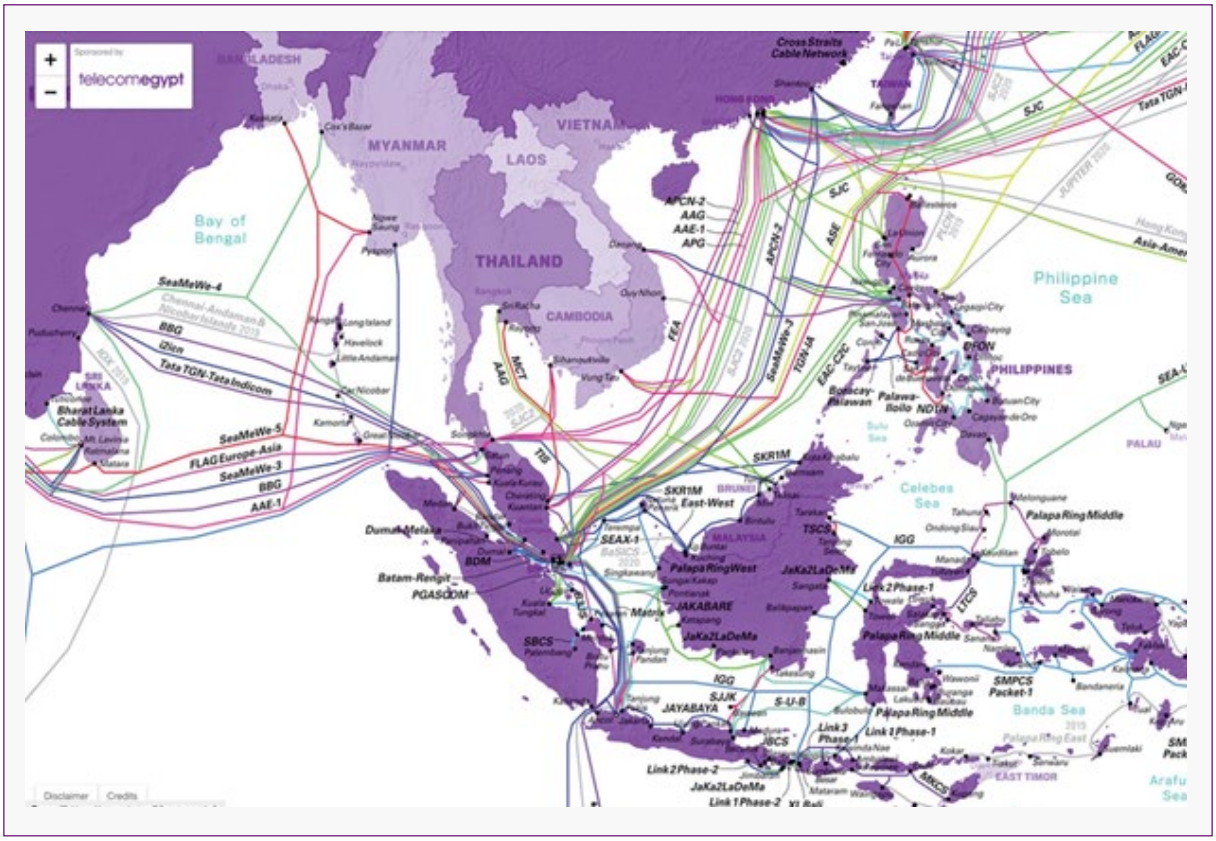
It is also useful to examine the amount of international bandwidth (in bits per second) used by both mobile and fixed Internet users to gain an appreciation for the state of digital services in each country. Figure B.13 shows the amount of international bandwidth used (in bits per second) be each user as well and the number of fixed broadband connections per 100 inhabitants in each country.

FIGURE B.13: INTERNET / DIGITAL SERVICE USAGE INDICATORS, SOURCE: WORLD TELECOMMUNICATIONS INDICATORS DATABASE 2020, ITU



One observation from this data is that while the penetration of fixed broadband does not vary excessively, the use of international bandwidth varies widely from country to country. This puts demand on undersea links and international cooperation. However, the undersea links in the ASEAN region are varied and robust as indicated in Figure B.14.

FIGURE B.14: UNDERSEA LINKS IN THE ASEAN REGION, SOURCE TELEGEOGRAPHY



It indicates that:

- Internet and Digital service usage puts demands on undersea connections, yet the fabric of submarine cables in the region is rich and diverse.
- There are inequities in the distribution of use of those submarine cables.
- While these are indicators of the general use of digital services, the indicators point both to widespread and growing use of both established and emerging digital services.
- It is possible to conclude that there are inequities in cooperation – in both technology and public policy in the presence of large disparity of IXPs and content delivery networks.
- It is likely that public policy actions to facilitate trust and security may be distributed unevenly in the region, based on studies from other regions that correlate deployment of emerging technology and public policy initiatives.

Ongoing initiatives in ASEAN

Previous ASEAN master plans have already led to initiatives in this space. For example:

- An ASEAN e-government Strategic Action Plan was developed in 2011 under AIM 2015. This included promoting the use of secure transactions within ASEAN, doing outreach to promote awareness of cyber-security, developing a framework to facilitate transparent and harmonized ICT regulations, and establishing both an ASEAN broadband corridor and an Internet Exchange Network. Specifically – with regard to security – it developed a common framework for network and information security.
- Another outcome of the 2015 work is that ASEAN has promoted network integrity and information security through a number of completed projects. One important example was the establishment of the ASEAN Network Security Action Council (ANSAC), which is a yearly meeting in which regional cooperation is discussed.
- AIM 2020 included projects on studying data privacy and protections across AMS, developing framework for personal data protection, coordinated security approaches and best practices for critical infrastructures and building the infrastructure for an ASEAN CERT. Annual drills have been conducted amongst AMS to test and strengthen cybersecurity preparedness among CERTs in the region.[29]
- A key initiative for this desired outcome is the existing work on ASEAN Framework on Digital Data Governance. The framework was endorsed at the 18th ASEAN Telecommunications and Information Technology Ministers' Meeting (TELMIN) in December 2018 in Bali, Indonesia and sets out the strategic priorities, principles and initiatives to guide AMS in their policy and regulatory approaches towards digital data governance in the digital economy.

In addition, the World Bank has studied the progress being made in the development of digital ID systems by AMS governments in a 2019 report.[30]

B.3.2 THE CURRENT POSITION

Indicators of Advanced Digital Technology in the ASEAN Region

AMS could establish a programme for the measurement and improved use of secure networking technologies. This will involve creating a reliable index and measurement regime for critical online security technologies and their deployment throughout the region. By 2023, AMS could aim to deploy routine, public and reliable measurements of key security technology indicators in ASEAN. By 2025, the metrics could guide other regional project work in the deployment of security technologies.

[29] The Cyber Security Agency of Singapore has been hosting ASEAN Computer Incident Drills (ACID) since 2006.
[30] World Bank, 2019 The Digital Economy in Southeast Asia - Strengthening the Foundations for Future Growth

As we have seen from earlier discussion, there is wide variety in the metrics for fundamental Internet technologies in the region. A framework for measurement of technologies, for example TLS 1.3, certificate authorities, DNSSEC, OAuth 2.0, deployment of CDNs and IXPs could be established. The collection of data related to the deployment of these technologies will guide further work in building out security technology capacity in the region. Further work may include, establishing a pan-ASEAN root of trust for the internet of things, establish a program for the measurement and improved use of secure networking technologies (TLS 1.3, DNSSEC, DoT, etc.), establishing a program for measured localization of content through the deployment of CCDNs and IXPs, and identification and measurement: of a reliable index for levels of use of e-government services in all AMS from 2021 onwards.

It is important to choose metrics that are widely available and that have correlation to the impact of Internet services on broader societal goals. The availability of IXPs has been shown to be an indicator of the exchange of local content without the need to have national or regional traffic "exported" over expensive links. The result is that there is a relationship between the availability of IXPs and the lowered cost of Internet access. Measuring this over time shows potential improvements in reducing the costs of access to the Internet. The number of available CDNs is also a local measure of both the performance of local services (for instance, video streaming and the availability of widely needed services). Once again measurement of the availability of CDNs allows the ability to draw conclusions about the availability and effectiveness of Internet services. Finally, DNSSEC is also easily measured and is an indicator of how well Internet infrastructure is protected from attack.

MEASUREMENT: Established metrics and measurement regime for fundamental security technologies in the region.

TARGET TYPE: Technological deployment

IMPORTANCE: High

ENABLING ACTION 3.2: BUILD TRUST THROUGH ENHANCED SECURITY FOR FINANCE, HEALTHCARE, EDUCATION AND GOVERNMENT

In the four essential industry sectors, finance, healthcare, education and government; ASEAN should build trust by developing trust and security frameworks for these industries. With the cooperation of industry stakeholders in the region, ASEAN could support the development of best practices and aim for a unified certification approach to trust and security in these industries. In some of these key verticals, additional measures will be needed to help encourage trust and manage the potential risks. Technologies that pertain to users' health should have to secure certification while in other key verticals, specially created security response teams can respond to cybersecurity incidents quickly.

These four verticals are amongst the most innovative in terms of using communication technology. Establishing trust for the verticals will include establishing frameworks for regional best practices in data protection, cybersecurity and security response for each industry. By 2023, frameworks for best practice should allow for the establishment of certification frameworks for life-critical technologies. In addition, by 2024, the frameworks can help to establish a pan-ASEAN approach to having businesses recognize cybersecurity risks as business risks. In addition, trusted digital services must also include financial literacy and awareness amongst citizens of the region. Finally, in coordination to the work on CSIRTs done as a part of ADM 2020, establish industry-specific CSIRTs for the finance, health care, education and government sectors. This should be done by eliminating any barriers related to funding or physical resources in the region.

MEASUREMENT: Publication of a framework for developing trust and security in key industries by 2022; including finance, healthcare, education and government.

TARGET TYPE: Policy/regulatory framework

IMPORTANCE: Medium

ENABLING ACTION 3.3: IDENTIFY IMPROVEMENTS IN LEGAL AND REGULATORY MEASURES ON THE MANAGEMENT OF PROTECTION OF DATA AND OTHER DATA-RELATED ACTIVITIES THAT COULD BE HARMFUL.

AMS should build on the ASEAN Framework on Personal Data Protection (2016) and ASEAN Framework on Digital Data Governance to build harmonised principles-based data protection and privacy regulations and frameworks, including on data management and cross-border data flows. This will facilitate cross-border digital trade by encouraging user trust in sharing their personal data. ASEAN should build on the Implementing Guidelines for the ASEAN Cross Border Data Flows Mechanism (2021) to develop, recognise and implement a suite of data transfer mechanisms to facilitate cross-border data flows. This would improve the region's ability to assure the eventual interoperability of standards with APEC CBPR, the European Union's GDPR amongst others. ASEAN could develop a framework for common policies for extremely large collections of data and the use of machine learning and AI on those collections.

[29] The Cyber Security Agency of Singapore has been hosting ASEAN Computer Incident Drills (ACID) since 2006.
[30] The Framework on Digital Data Governance can be seen here: https://asean.org/storage/2012/05/6B-ASEAN-Framework-on-Digital-Data-Governance_Endorsed.pdf and a ASEAN Data Management Framework is currently in draft.
[31] World Bank, 2019 The Digital Economy in Southeast Asia - Strengthening the Foundations for Future Growth

This work will build on existing ASEAN initiatives and expand upon them by:

- Establishing a cross-ASEAN position on approaches to regulating 'big tech' digital platforms including on licensing, take down procedures and reporting of 'fake news'/false content (eg COVID-19 etc), etc.
- Developing ASEAN model legislation for 'safe harbour' legislation for ASEAN Cloud data including privacy, access rules etc.
- Identifying opportunities for harmonising data protection legislation across ASEAN to facilitate cross-border data transfer (refer to DO4 for further discussion of facilitating cross-border data flows).
- Establishing a framework for a coordinated regional data protection guidelines.

MEASUREMENT: Publication of a study on regulatory approaches, best practices and model legislation for regulating big data platforms, exchange of cloud-based data, and ensuring personal data protections.

TARGET TYPE: Policy/regulatory framework

IMPORTANCE: High

ENABLING ACTION 3.4: IMPROVE COORDINATION AND COOPERATION FOR REGIONAL COMPUTER INCIDENT RESPONSE TEAMS

Expand and extend the existing coordination between individual country computer response teams and fully establish a regional CSIRT for ASEAN.

Noting the work on establishing CSIRTs for individual verticals in the region, expand the existing efforts to provide national and regional computer security incident response teams.

Based on the feasibility work done for ADM 2025, establishing a CSIRT for ASEAN could promote security best practices (in addition to its main function of responding to individual events) throughout the region. This can assist in Enabling Action 2 above where CSIRTs for appropriate verticals are established in the region to provide frameworks for best practice and trust in individual vertical sectors.

MEASUREMENT: Establishment of a pan-ASEAN CSIRT

TARGET TYPE: Technological deployment

IMPORTANCE: High

ENABLING ACTION 3.5: PROMOTE CONSUMER PROTECTION AND RIGHTS IN RELATION TO E-COMMERCE

Moving towards convergence on consumer rights and protection would help facilitate cross-border trade and reassure consumers in the region that products are safe and their rights are recognised in other member states. Building on progress to date, ASEAN may consider strengthening collaboration with relevant sectoral bodies to work out pan-ASEAN arrangements for cross-border judgement recognition and enforcement for both private and public actions to foster trade and consumer trust.

Moving towards convergence on consumer rights and protection would help facilitate cross-border trade and reassure consumers in the region that products are safe and their rights are recognised in other member states. Misleading and inaccurate advertising could also be addressed with a pan-ASEAN framework. Another option to explore is that of a trust mark for e-commerce sites that comply with the ASEAN stance on consumer rights.[31]

MEASUREMENT: Cross-ASEAN position on consumer rights in relation to e-commerce

IMPORTANCE: High

B.3.4 MONITORING AND IMPLEMENTATION

Setting targets for 2025

Establishing trust and security is done through both technological and policy mechanisms. To set targets for trust and security it is necessary to ensure that cybersecurity best practice is adopted as widely as possible, both to mitigate the direct impact of a breach on business and consumers and to build trust amongst stakeholders. It may also be appropriate to monitor the take-up of important e-services such as e-education and e-health.

To set targets for 2020, there should be clear targets for technological improvement and improved coordination on the policy and regulatory front. For each of the actions below, we indicate whether the targets for success are technological, public policy oriented, or both.

This Desired Outcome focuses on enhancing trust in digital products, services, and applications. A large body of research shows that "social capital" influences a wide range of significant economic and political phenomena. While it is hard to measure trust directly, the Desired Outcomes can be measured in other, empirical ways.

[31] In any case, it is worth noting that complete delivery of these actions will require the engagement cooperation of several ministries, most notably the ASEAN Ministers Responsible for Information (AMRI).

- EA1 should be measured throughout the planning period through quantitative measures of the key indicators for secure protocol use. We suggest that there be ongoing measurements of the percentage of ASEAN websites using TLS 1.2 or 1.3, DNS zones signed with DNSSEC, number of IXPs per country, number of CDNs per country, and number of available certificate authorities in the region.
- EA2 should be measured by progress in the development of best practices for individual vertical industries. While an overall set of best practices for enhanced security would be welcome, more focused and bespoke best practice documents for particular industries is the goal of the action.
- EA3 should be measured by the appropriate commissioning, drafting, review and publication of a study on improvements to regulatory and industry data protection consistent with the work already underway in the ASEAN Data Management Framework.
- EA4 should be measured by the successful planning for, incorporation and startup of a CSIRT for the region.

Proposed delivery timeline and dependencies

For this Desired Outcome there are no actions that are completely dependent on others. As a result, there are no actions which cannot begin immediately after agreement to the ADM 2025 plan.

We recommend this be started as quickly as possible, ideally early in 2021 with the bulk of the activity completed within 24 months. After that the task may become one of monitoring and intervening as needed for EA1.

B.4 DESIRED OUTCOME 4: A SUSTAINABLE COMPETITIVE MARKET FOR THE SUPPLY OF DIGITAL SERVICES

To help realise the vision steps should be taken to ensure that the market for digital services is designed to encourage the sound and sustainable development of digital services and to enhance competitiveness of different players in the market

B.4.1 INTRODUCTION

ADM 2025 is designed to *"make ASEAN a leading digital community and economic bloc, powered by secure and transformative digital services, technologies and ecosystems"*. To help realise this vision steps should be taken to ensure that the market for digital services is competitive and open to market entry. This section sets out proposals for enabling actions which will help achieve this desired outcome.

Around the world regulators and governments are tackling the challenge of facilitating adequate competition in the telecoms and digital sectors. Competition is vital for driving innovation

and ensuring that end-users pay a fair price for services.[32] Yet the economics of many markets in the sector mean that effective competition may be unlikely to emerge organically.

This is especially true of many digital services markets – such as digital advertising, search and social networking. These markets exhibit strong network effects, which work to the advantage of larger market players. In addition, the global scale and portfolio of services offered by platforms like Google and Facebook enable them to maintain strong positions in a number of digital markets.

Appropriate regulation can help promote effective competition and shield users from some of the adverse effects of uncompetitive markets (such as high prices). However, overly burdensome regulation can restrict investment and hinder market development. A balance must therefore be struck between intervening to promote competition and allowing markets to innovate and evolve organically.

There are a number of different areas where action could help develop the competitive environment in ASEAN:

- national telecommunications sectors;[33]
- the content services market; and
- the market for digital services.

In addition, work to align regulations and facilitate cross-border trade in digital services will also enhance the competitive environment within ASEAN.

The national telecommunications sector

An established result in the economic literature is the existence of a trade-off between ex-ante regulation and the level of investment in the telecommunications sector.[34] This represents a trade-off between static efficiency (the short-term impacts of regulation and reduced prices) and dynamic efficiency (the longer-term impacts on investment and technological development). National regulatory authorities must balance these two objectives in order that the telecommunications sector meets the needs of users, both now and in the future.

This trade-off highlights the importance of the use of established best practice regulation. Best practice regulation will typically have a number of features: it will be technologically neutral, it will focus on part (but not all) of the value chain, it will take a holistic view of sectoral markets, and it will be kept under regular review and lifted if it is no longer needed.[35] Importantly, the regulatory regime should also exhibit predictability and certainty in order to encourage investment.

National telecommunications sectors (and related regulation) are discussed in DO2 and accompanying Enabling Actions

[32] Note that this also applies to 'free' digital services, as users 'pay' for this service in terms of their personal data. In an uncompetitive market, the service might be free but users could be 'under-compensated' for their data in terms of the rights they surrender.
[33] Refer to DO1 for discussion of regulation of telecommunications infrastructure.
[34] Briglauer, W, Cambini, C. (2017). The Role of Regulation in Incentivizing Investment in New Communications Infrastructure.
[35] See ITU (2017) for discussion of these issues. https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-BB.REG_OUT01-2017-PDF-E.pdf

The content services market

The market for TV and video content services has undergone substantial changes over the past decade across the world. In particular, the growing adoption and capability of broadband services – and of connected devices like smartphones and smart TVs – has enabled new business models and facilitated market entry by online content providers, including over-the-top (OTT) video-on-demand (VOD) services and video-sharing platforms (VSPs). These services effectively compete for the same audience, and often for the same advertisers, rights holders and other businesses, as traditional free-to-air broadcasters and pay TV operators.

As a result traditional content service providers are facing challenges in adapting and competing in the digital environment. This is partly due to the costs of distribution across multiple platforms and a lack of scale relative to their online competitors. However, they are also typically subject to national broadcasting regulations and licensing requirements which may not reflect the recent changes in the market landscape. Their online counterparts typically fall outside the regulatory ambit of national regulators and are largely free to operate on a self-regulatory basis. This disparity in the regulatory burden has adverse effects on the ability of traditional operators to compete with OTT video providers.

Digital services markets

Large digital platforms have come to occupy prominent positions in many digital markets, including search, web browsers, email, social networking and online advertising. For example:

- Google has over 90 per cent share of the search market in every AMS[36].
- Google's Chrome browser has over 50 per cent market share in every AMS, and over 75 per cent in Indonesia, Malaysia, Myanmar and the Philippines[37];
- Facebook is the preeminent social network in a number of AMS[38]; and
- Lazada – owned by Alibaba Group – is the most popular e-commerce platform in a number of AMS including Thailand, Malaysia and the Philippines.[39]

This reflects a number of characteristics of digital markets that enable market entrenchment. These include:

- Network effects. Many digital services exhibit network effects (where the value of a service grows as the number of users increases). These favour larger platforms.
- Global scale. Digital services can be supplied globally and exhibit significant scale economies.
- Interlinked markets. A strong position in one market can often be leveraged into an adjacent market (for example, by offering the new service to existing users without requiring them to register or create an account).

[36] See country data at: https://gs.statcounter.com/search-engine-market-share
[37] See country data at: https://gs.statcounter.com/browser-market-share/
[38] https://aseanup.com/southeast-asia-digital-social-mobile/
[39] See country profiles on https://aseanup.com/

- The 'power of defaults'. Many consumers stick with the default services on their device (e.g. the browser).
- User data. Firms with a large user base and a range of services are in a position to capture high quality user data that their rivals cannot access. The data can be used to develop new services or to sell targeted advertising.

Many jurisdictions around the world are reflecting on how to encourage competition in digital markets: recent efforts in this area include the EU's Digital Service Act, the Furman Review in the UK, and Australia's Digital Platforms Inquiry. In the US, the Department of Justice has filed an antitrust action against Google, accusing it of suppressing competition in the internet search market.[40] In Asia, Japan has enacted laws requiring tech companies to be more transparent.[41]

Fostering cross-border data flows in ASEAN

Many governments and regulators across the globe have introduced regulations to protect their users online – for example, new and updated frameworks regulating the collection and use of online users' data. Some have also implemented policies and initiatives to regulate various facets of cyberspace, such as hate speech or online harms.

These policy approaches are typically developed at the national level, resulting in an increasingly diverse set of rules and regulations. As noted by the Internet and Jurisdiction Policy Network, *"nation states with different visions are seeking to increase their control over the internet, primarily by using national tools rather than transnational cooperation and coordination"*.[42]

This is resulting in growing regulatory and technical fragmentation of the global internet – a process dubbed "digital Balkanization" or the "splinternet"[43] – which threatens the cross-border nature of today's internet. This process is likely to have a number of implications, including increased compliance costs for online businesses, an increase in cross-border legal challenges, and a loss of cross-border benefits (such as use of data from the user base in another country).

Aiming for greater convergence in the area of online regulation among AMS could help to support ASEAN's digital economy and allow local digital start-ups easier access to local markets. Key areas of alignment could include data protection rules, data localisation and cross-border data transfer. The GSMA noted in 2019 that in ASEAN, "the requirements around the use of personal data vary greatly from country to country. Some countries already provide a range of lawful mechanisms to transfer personal data, but some do not, and others still impose localisation."[44]

[40] https://www.ft.com/content/f8b2def2-0cb0-4a2d-941d-b965f6037dbb
[41] https://english.kyodonews.net/news/2020/05/beb0d797ec39-japan-enacts-law-toughening-regulations-on-tech-giants.html
[42] Internet Jurisdiction and Policy Network (2019). Internet and Jurisdiction Global Status Report 2019. Available at: https://www.internetjurisdiction.net/uploads/pdfs/GSR2019/Internet-Jurisdiction-Global-Status-Report-2019_web.pdf
[43] Financial Times (2019). Europe should not be afraid of the 'splinternet'. Available at: https://www.ft.com/content/e8366780-9be5-11e9-9c06-a4640c9feebb
[44] GSMA (2019) https://www.gsma.com/asia-pacific/wp-content/uploads/2019/11/Operationalising-the-ASEAN-Framework-on-Digital-Data-Governance_WEB.pdf

B.4.2 THE CURRENT POSITION

Key indicators of the current position

While there are metrics that indicate the level of competition in various digital markets, few indicate the level or quality of digital regulation across countries. This reflects the fact that procompetitive regulatory action in digital markets is novel. As noted above, some jurisdictions are currently exploring options for such regulation, though it is too early to say what the outcome will be.

Ongoing initiatives in ASEAN

Although not specifically focused on digital issues, the ASEAN Competition Action Plan (ACAP) 2016-2025[45] contains five strategic goals to allow ASEAN to work towards effective and enforceable competition policies and laws:

1. Effective competition regimes established in all member states;
2. The capacities of local competition-related agencies strengthened to effectively implement national competition laws;
3. Regional co-operation arrangements on competition law and policy in place;
4. Fostering a competition-aware ASEAN region; and
5. Moving towards greater harmonisation of competition policy and law in ASEAN.

The ACAP does not specifically mention digital issues.

At the member state level, competition authorities have undertaken investigations into the digital economy. For example, Singapore's Competition and Consumer Commission (CCCS) investigated Uber's sale of its Southeast Asian operations to Grab.[46] This was followed by investigations in Indonesia, Malaysia, the Philippines and Vietnam (ultimately no authority unwound this merger).[47] AMRI (ASEAN Ministers Responsible for Information) is also active in enhancing digital broadcasting, promoting media literacy and encouraging local content production.

In regard to OTT content services, the ASEAN Telecommunication Regulators Council (ATRC) met to discuss relevant issues in 2019.[48] Earlier in the year, ASEAN Multi-Stakeholder OTT Dialogue was held in Singapore in May to discuss OTT content services. This follows a number of measures undertaken at the member state level to regulate OTT video services. For example, Singapore has issued a Code of Practice for OTT content and VOD services, while Netflix was blocked in Indonesia for four years for non-compliance with local media content regulations.[49]

[45] https://www.oecd.org/daf/competition/fostering-competition-in-asean.htm
[46] https://aasyp.org/2019/12/02/addressing-competition-issues-in-the-worlds-fastest-growing-digital-economy/
[47] https://www.reuters.com/article/us-netflix-telkom-telkom-indonesia-idUSKBN2481KY
[48] https://www.bangkokpost.com/business/1732775/ott-oversight-a-hot-topic-in-asean
[49] https://www.reuters.com/article/us-netflix-telkom-telkom-indonesia-idUSKBN2481KY

In regard to facilitating cross-border digital trade, substantial work has been undertaken to map standards and regulation across ASEAN to identify opportunities for harmonisation – for example, the review of e-Commerce legislation.[50] In 2018, the 18th TELMIN endorsed the ASEAN Framework on Digital Data Governance (DDG).[51] In late 2019 the GSMA helped launch the Regulatory Pilot Space (RPS), intended to provide firms with a test environment for cross-border data transfer, without facing sanctions or breaking privacy rules.[52] The GSMA noted that this could be a stepping stone toward a more formal mechanism for cross-border data flows in ASEAN.

B.4.3 ENABLING ACTIONS

This section lists enabling actions that might be taken by ASEAN to help member states improve the level of competition across digital markets.

ENABLING ACTION 4.1: CONTINUE TO IDENTIFY OPPORTUNITIES TO HARMONISE DIGITAL REGULATION TO FACILITATE CROSS-BORDER DATA FLOWS

ASEAN should build upon existing work by commissioning a research project to map remaining barriers to cross-border digital data flows within ASEAN.

Once the barriers are mapped and prioritise, ASEAN could identify opportunities to either align regulation (e.g. in respect of data localisation requirements) or develop mutual recognition of data protection regimes. In the meantime, regulatory sandboxes could be explored as an option to facilitate cross-border data flows (such as the RPS).

Significant work has been done on this area, including the ASEAN Framework on Digital Data Governance, which contains the ASEAN Cross-border Data Flows Mechanism. ASEAN should also seek to understand the barriers from a digital enterprise's perspective. Reducing the barriers to cross-border transfer of personal data will spur the development of competition and the evolution of digital markets.

MEASUREMENT: Study and mapping of barriers to cross-border data flows.

IMPORTANCE: High

[50] https://asean.org/storage/2019/01/UNCTAD-Review-of-e-Commerce-Legislation-Harmonisation-in-ASEAN-2013.pdf
[51] https://www.gsma.com/asia-pacific/wp-content/uploads/2019/11/Operationalising-the-ASEAN-Framework-on-Digital-Data-Governance_WEB.pdf
[52] https://www.gsma.com/asia-pacific/wp-content/uploads/2019/11/Operationalising-the-ASEAN-Framework-on-Digital-Data-Governance_WEB.pdf

ENABLING ACTION 4.2: DEEPEN COLLABORATION BETWEEN ICT AND COMPETITION REGULATORY AUTHORITIES ACROSS ASEAN ON THE ICT SECTOR AND DIGITAL ECONOMY

The digital economy creates a set of cross-cutting issues for regulators and competition authorities. These organisations should engage in deeper collaboration on digital issues and seek to promote and develop a series of principles for regulating the ICT sector and the wider digital economy.

Due to the size and scale of the larger digital platforms, any procompetitive regulatory approach is likely to be more effective if it is pursued at the ASEAN level. ASEAN members could look to agree a set of 'stances' in respect of various issues, such as licensing or the use of content from local media organisations. This might include regulatory forbearance until a stance has been agreed.

This Enabling Action would build upon existing initiatives to deepen collaboration between relevant authorities on digital issues (such as the ASEAN Experts Group on Competition).

MEASUREMENT: A new group or forum for ICT regulatory authorities, annual summits, an agreed set of principles for digital sector regulation

IMPORTANCE: Medium

ENABLING ACTION 4.3: MONITOR DEVELOPMENTS IN REGULATION OF DIGITAL PLATFORMS IN OTHER JURISDICTIONS

Other jurisdictions around the world are reflecting on how to encourage innovation and competition in digital markets and implementing initiatives on this. ASEAN should regularly review such efforts, and monitor the design and impact of any measures introduced. This will allow ASEAN to identify approaches that are most effective for the region and avoid those that are not.

MEASUREMENT: Annual or biannual summary report of regulatory developments in the digital sector in selected jurisdictions

IMPORTANCE: Low

B.4.4 PROPOSED MONITORING AND IMPLEMENTATION

Measurement

As discussed above, there are no readily available quantitative metrics which can be used to track progress in this area. Ultimately this is a long-term issue, requiring an evolving regulatory stance in reaction to ever-changing digital markets.

However, ASEAN should monitor the impact of the RPS and see if it generates opportunities to formalise agreement on cross-border data transfers.

A regular 'regulatory review' of developments in other jurisdictions would help keep member states appraised of the actions of regulatory authorities across the world, enabling ASEAN to track impacts and develop best practice.

Dependencies

There are no actions that are completely dependent on others. However, Enabling Action 1 is closely tied to other ASEAN initiatives to reduce barriers to cross-border digital data flows.

Timeline for critical tasks

Enabling Action 2 can be commenced immediately. This will allow traditional broadcasters and content service providers to compete on more equal footing with OTT content service providers.

Enabling Action 1 should be carried out in tandem with other efforts to implement the strategic priorities of the DDG.

Enabling Action 3 represents an ongoing task to deepen collaboration over time. As a result this work is not delivered against a particular deadline; rather it reflects an ongoing effort. Similarly Enabling Action 4 is an ongoing task that would be delivered through a regular update on digital regulation around the world.

B.5 DESIRED OUTCOME 5: INCREASE IN THE QUALITY AND USE E-GOVERNMENT SERVICES

High quality and relevant digital services are needed across ASEAN. While market players will create many of these digital services, AMS governments have an important role in making digital services relevant to all citizens and so removing one of the main barriers to digital inclusion.

B.5.1 INTRODUCTION

If the ADM 2025 vision is to be realised, high-quality and relevant digital services are needed in all AMS. This should increase the willingness to pay by end-users for digital connectivity and services and raise productivity in the delivery of goods and services. Market players will create many these services. But AMS governments have an important part to play here:

- in providing high quality e-services which will make the internal operations of government departments more efficient (G2G services);
- in developing public e-services for consumers and businesses to use (G2C and G2B services); and
- in making some of these services interoperable between AMSs to support ASEAN economic and social cohesion.

There are many barriers to achieving these objectives, the height of which varies considerably by AMS. The main barriers include:

a) lack of connectivity between local schools, local health centres and local government offices and the central servers on which datasets are assembled;

b) lack of connectivity which prevents end-users from accessing e-government services;

c) low levels of digitalisation of information and data within government departments;

d) a lack of the ICT infrastructure needed by government organisations;

e) lack of local language content for e-government services;

f) lack of digital literacy in the population and lack of digital skills within the government workforce; and

g) a population which may not trust the services provided.

The enabling actions proposed below are designed to help remove some of these barriers so that progress can be made towards achieving DO5. Barriers a), b), e), f) and g) are dealt with through enabling actions associated with other desired outcomes.

B.5.2 THE CURRENT POSITION

The quality of e-government services across the AMS

Figure B.15 below shows where the 10 AMS rank in terms of the quality and relevance of their e-government services and the progress which each has made on this measure over the past four years.

FIGURE B.15: THE QUALITY ON E-GOVERNMENT SERVICE BY AMS

AMS	Rank 2016	Rank 2020	Change in rank	Quality index 2020	GDP per head ($000)
Singapore	8	6	+2	98%	64
Malaysia	47	97	+18	86%	11.1
Thailand	67	51	+16	77%	7.8
Philippines	67	57	+10	75%	3.3
Indonesia	114	57	+57	75%	4.2

Viet Nam	43	70	-27	70%	2.7
Brunei Darussalam	114	100	+14	55%	27.9
Cambodia	179	129	+50	42%	1.6
Myanmar	170	168	+2	26%	1.2
Lao PDR	133	175	-42	21%	2.6

Source: UN database. Ranked out of 193 UN member states

It indicates that:

- most AMS are making good progress in improving the quality of their e-government services. But Vietnam and Lao PDR have fallen significantly down the world rankings in the past four years;
- the quality ranking is correlated with GDP per head with Singapore ranking in the global top 10 while Cambodia and Myanmar have low rankings; and
- there are some exceptions to this correlation. Brunei for example is a long way down the world rankings given its GDP per head.

Ongoing initiatives in ASEAN

Previous ASEAN master plans have already led to initiatives to improve e-government services. For example:

- an ASEAN e-government Strategic Action Plan was developed in 2011 under AIM 2015. This identified a list of 15 e-government services which would benefit ASEAN citizens. The study identified e-health and e-education services as especially important; and
- AIM 2020 included a project to develop best practice for e-services delivery entitled Develop Best Practices for e-Service delivery. This work developed a framework of expected minimum levels of e-services delivery by 2020, including best practices and recommendations guidelines for (a) Improvement of quality of service for common e-government applications, and (b) Cross-leveraging existing successes within AMS; taking into consideration past AIM 2015 initiatives.

In addition the World Bank has provided useful analysis on the progress being made in the development of digital ID systems by AMS governments in a 2019 report [53].

[53] World Bank, 2019 *The Digital Economy in Southeast Asia - Strengthening the Foundations for Future Growth*

B.5.3 ENABLING ACTIONS

ENABLING ACTION 5.1: ESTABLISH ASEAN WIDE INDICATORS OF THE LEVEL OF USE OF E-GOVERNMENT SERVICES IN LINE WITH ITU REQUIREMENTS

It is important to create a reliable index for levels of use of government e-services in all AMS from 2021 so as to provide a benchmark against which to monitor the success of e-government services in ASEAN. There are existing UN and ITU indicators, which can be used here.

Indicators are needed to measure both the scope/quality of G2C and G2B service provision in each AMS and the extent to which these services are used by consumers and businesses. The UN survey on e-government already provides indicators for the former. But there are currently no ASEAN-wide indicators of the latter. That is an ITU indicator which measures the level of use of e-government services. But only five of the 10 AMS report on this measure. The simplest way to achieve EA1 would be to ensure that all AMS report against this indicator from now on. EA1 will then provide a benchmark against which to measure the combined success of EA2 to 6 in promoting use of e-government services.

MEASUREMENT: Existence of a reliable index for levels of use of e-government services in all AMS from 2021 onwards.

IMPORTANCE: High

ENABLING ACTION 5.2: HELP MAKE KEY GOVERNMENT DEPARTMENTS MORE PRODUCTIVE THROUGH THEIR INTERNAL USE OF ICT AND E-SERVICES

Digitalisation can significantly improve government services and make government departments more productive. ASEAN should therefore create best practice guidance on the digital transformation of internal government functions and data handling so as to increase the productivity of government organisations - with a focus on helping developing AMS

This work will need to consider a number of questions:

- Is there a national e-government action plan?
- What are the main barriers to its implementation e.g. in terms of funds for investment in ICT and lack of workforce skills?
- Which government functions are currently provided as e-services in each AMS?
- Which paper based functions should be moved to e-services first so as to improve productivity?
- Are there existing designs for successful e-services in one AMS which can be reused in another so as to lower implementation costs?

Again there is considerable scope for the least advanced AMS to learn from the most advanced.

MEASUREMENT: Publication of best practice on the digital transformation of internal government functions and data handling to increase productivity in developing AMS.

IMPORTANCE: High

ENABLING ACTION 5.3: EXPLORE HOW TO INTRODUCE DIGITAL IDENTITIES IN EACH AMS IN A WAY WHICH SAFEGUARDS CIVIL LIBERTIES

Digital identities can make digital services easier to both use and implement. ASEAN should propose a study that will lead to published principles for introducing full functionality digital ID systems which:

- can be used for transactions as well as information in both public and private sectors; and
- will work across the ASEAN region through mechanisms such as mutual recognition.

Universal digital identities are important for effective use of digital services in general and e-government services in particular. To quote from a recent World Bank report: [54]

> *"Without the ability to reliably authenticate customers online, public and private sector service providers are either investing in their own siloed means of authentication for online services, taking identity-related risks in the services they offer online, or only providing low risk services through online channels. It is not unknown in Indonesia or Malaysia, for example, for people to have to physically visit a bank branch or government office to show their national ID cards to complete some transactions. Similarly, the lack of cross-border interoperability of existing digital ID systems makes it very difficult for e-commerce across borders to flourish".*

According to one survey fully functional digital IDs could boost GDP by between 3% and 13% by 2030.

Figure B.16 shows how far the ASEAN region has progressed towards digital IDs which can be used for transaction-based services in both the public and private sector. The figure shows that:

- nine of the 10 AMS already use ID cards and the 10th, the Philippines, enacted legislation to join the other nine in 2018; and
- only Singapore has so far enabled digital IDs which allow e-transactions for both public and private sectors.

[54] World Bank, 2019, *The Digital Economy in Southeast Asia - Strengthening the Foundations for Future* Growth

At the same time the World Bank reports that Singapore, Brunei, Thailand and the Philippines have taken action to develop digital ID systems with transaction capability which will function across borders into other AMS.

There is scope for considerable progress towards full digital ID systems across ASEAN over the next five years. This should make e-government services simpler, safer and easier to use. Given this situation there is a strong case for ADM 2025 to include an enabling action which will accelerate the introduction of full functionality digital ID systems on an ASEAN-wide basis. This work might:

- analyse the experience to date of the leading AMS in this field;
- study how best to deal with concerns about civil liberties, lost and stolen identity cards, and security of transactions;
- develop common principles for the introduction of digital ID systems which all AMS can use; and
- consider how to make these digital ID systems work across ASEAN as well as within each AMS.

FIGURE B.16: CURRENT STATUS OF DIGITAL ID SYSTEMS IN ASEAN

Country	Foundational ID system?	Digitised foundational ID system?	Digital ID (authentication for online transactions)?	Coverage (adults)	Notes
Brunei	Yes	Yes	-	Na	Digital ID system for public sector transactions is being developed. Coverage likely to be over 90%
Cambodia	Yes	Partial	-	89%	
Indonesia	Yes	Yes	-	90%	
Lao PDR	Yes	Partial	-	41%	
Malaysia	Yes	Yes	-	100%	Those Eligible and Registered
Myanmar	Yes		-	89%	
Philippines	In progress		-	Na	PhilSys, a digital ID system for public and private sector transactions, is being developed

Singapore	Yes	Yes	Yes	95%	Singapore's National Digital ID (NDI) platform (SingPass) is used for public and private sector transactions
Thailand	Yes	Yes	-	99%	A digital ID system for public and private sector transactions is being developed
Vietnam	Yes	Partial	-	94%	

MEASUREMENT: The publication of principles for introducing full functionality digital ID systems based on the experience of leading AMS in the field.

IMPORTANCE: High

ENABLING ACTION 5.4: HELP LOW INCOME AMS IMPROVE THE QUALITY OF THEIR E-GOVERNMENT E-SERVICES

Creating high quality e-government services which are valued by the population is a good way to stimulate take up of digital services in general. As such, it will be important to identify best practice in terms of which e-government services are most useful and how best to implement them in a cost-effective way.

Some developing AMS have made great progress in developing e-government services over the past four years as indicated in Figure 1. But others are falling rapidly down the UN world rankings. This indicates the need for a study which considers how best practice[55] in the development of these services can be transferred to the lagging AMS given the resources available to them. This study might also look at:

- how the least successful AMS can learn from the most successful in terms of which public e-services are most useful and how to design them;
- establishing a system for monitoring their progress;
- taking a mobile-first or mobile-centric approach to developing such services. This can help expand the reach of e-government services and lower barriers to adoption; and
- using a common national portal for access to all such services

[55] See for example https://openknowledge.worldbank.org/handle/10986/33674

The work done under AIM 2020 to develop best practice for e-services deliverables (Initiative 7.2.1) should be a useful input here.

MEASUREMENT: Publication of recommendations to improve the quality of e-government services in developing AMS.

IMPORTANCE: Medium

ENABLING ACTION 5.5: IMPROVE THE COHESION OF AMS BY MAKING KEY GOVERNMENT E-SERVICES INTEROPERABLE ACROSS THE ASEAN REGION

As the same e-government services are implemented across all 10 AMS, it will become increasingly important to Identify the most promising candidates for pan-ASEAN interoperability of e-government services and to assess the benefits and barriers to making each of them interoperable between AMS.

The work of this enabling action might, among others, evaluate the possibility of:

- electronic exchange of evidence between judicial authorities[56];
- interoperable contract registers enabling ASEAN wide e-procurement;
- interconnection of business registers;
- the creation of a common ASEAN database of job opportunities; and
- cross border e-health services.

The European Commission has done extensive work in this area[57] from which ASEAN might wish to learn. The study team will need to identify the most promising candidates for ASEAN interoperability, assess the benefits and barriers to making them interoperable and consider what kind of mechanisms might be used to introduce this interoperability – for example a process of mutual recognition. In many cases it may not be possible for all AMS to participate initially, given the relatively low current levels of provision of e-government services in some developing AMS.

MEASUREMENT: A published report which identifies priorities for interoperability between E government services and the set of AMS which will enable initial interoperability by a specified date.

IMPORTANCE: Low

[56] ASEAN secretariat, 2018, Council for ASEAN chief justices (CACJ) working group on case management and court technology

[57] See for example its eGovernment Action Plan for the period from 2016 to 2020.

B.5.4 MONITORING AND IMPLEMENTATION

Overall measurements of success

There are two clear indicators whether DO5 has been achieved:

- how the quality of e-government services which are available has improved over the five-year period. This can be measured using the UN survey on e-government; and
- how the level of use of e-government services has increased. This can be measured using the indicator established through EA1.

It is important that the ASEAN Secretariat should take baseline measures for the two indicators as soon as possible.

Dependencies

There are no strong dependencies between the EAs.

Timelines

It will be important to complete EA5.1 before the end of 2021. The remaining EAs could be started at any time over the five-year period of the masterplan. However, we recommend that the most important of the remaining EAs – EA5.2 and EA5.3 – are started early in 2021.

B.6 DESIRED OUTCOME 6: DIGITAL SERVICES TO CONNECT BUSINESS AND TO FACILITATE CROSS-BORDER TRADE

Digital services which support international trade in goods and services; both intra ASEAN and external to ASEAN is critical to the economic success of the region and is the focus of this DO. Key focus areas that are consistent with regional policies are securing the benefits of IR4.0 technologies, securing the benefits of ASEAN's trade agreements supporting e-commerce, and cross-border trade and enhancing last-mile fulfilment cooperation

B.6.1 INTRODUCTION

This paper sets out our proposals for enabling actions which will help achieve this desired outcome.

B.6.2 THE CURRENT POSITION

ASEAN is heavily dependent on international trade – both between AMS and with other countries. Figure B.17 provides a summary of relevant trade statistics which show that:

- the ASEAN region is significantly more dependent on trade than many other regions;
- trade in goods is particularly important representing 76% of total trade; and
- trade with countries outside of ASEAN represents 80% of total trade compared with 20% for intra-ASEAN trade.

FIGURE B.17: THE IMPORTANCE OF INTERNATIONAL TRADE TO ASEAN

$bn 2018	Exports	Imports	Balance of trade	Total trade	GDP	Total trade/GDP
Intra ASEAN trade	394	362	32	756	3000	25%
Outside ASEAN trade	1488	1457	31	2945	3000	98%
Total ASEAN trade				3701[58]	3000	123%
US trade	1666	2538	-872	3701	20500	18%
French trade	582	673	-91	1255[59]	2778	48%

Sources: US and French trade statistics and ASEAN Key Figures 2019

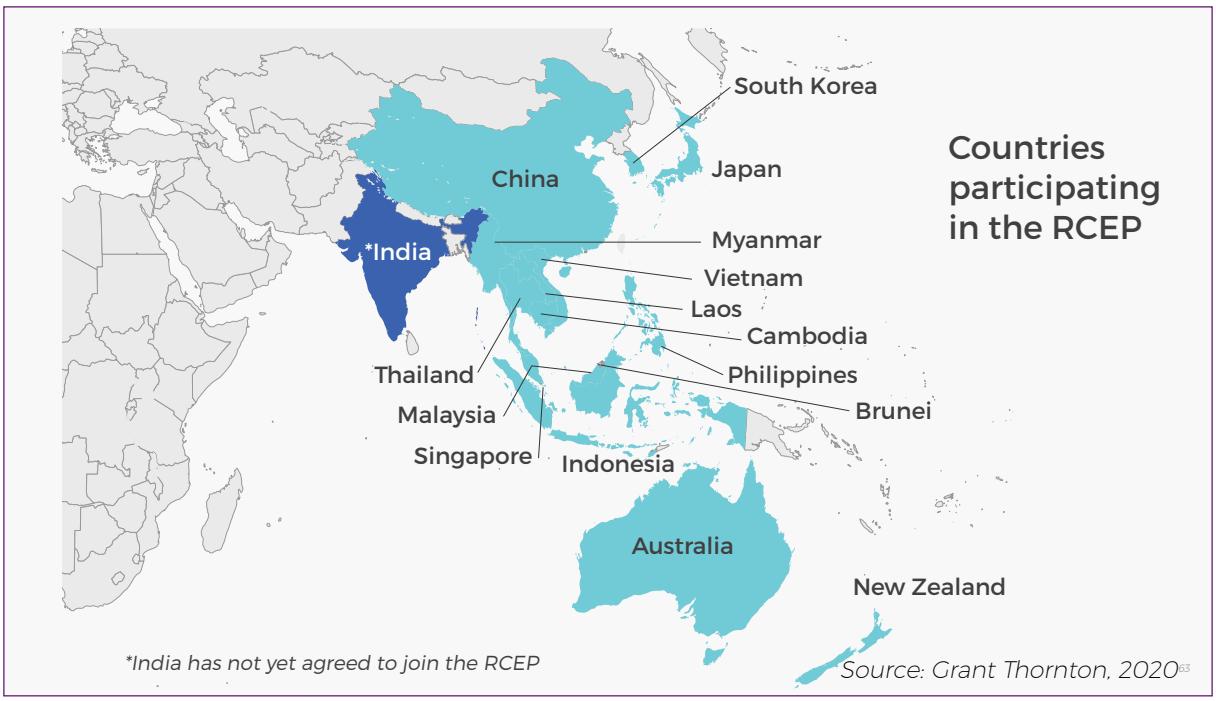
In interpreting these trade statistics it is important to note that GDP is increased by adding exports and subtracting imports.[60] So in most countries the total volume of trade makes little difference to GDP because the balance of trade is close to zero. The value of international trade is that it enables each country to focus on making the goods and services which it is best at producing (for both internal use and export) and using export revenues to purchase goods and services from other countries which are better made there and imported. Lowering barriers to trade amplify this process, leading to lower end user prices overall and increased prosperity.

Notwithstanding the great challenges of 2020, which include but are not limited to the health and economic impacts arising from the COVID-19 pandemic, continuing progress was made in relation to q new major ASEAN trade agreement namely the Regional Comprehensive Economic Partnership (RCEP). Initiated by ASEAN in 2012, RCEP is a multilateral trade agreement comprising 15 Asia and

[58] Of which 24% is trade in services
[59] Of which 44% is trade in services
[60] The full equation is GDP = private consumption + gross investment + government investment + government spending + (exports – imports).

Pacific countries: Australia, China, Japan, Korea, New Zealand and the 10 ASEAN AMS. After the text based negotiations were concluded in November 2019[61], and market access provisions were agreed in 2020 it was signed on 15 November 2020.[62] Signatories will now go through their respective ratification processes. This agreement will create a free-trade area which will give AMS access to a market with a GDP of USD$25 trillion per year – eight times the current GDP of the ASEAN economies combined.

FIGURE B.18: THE COUNTRIES PARTICIPATING IN THE RCEP



The RCEP's objective is to harmonise the existing network of 'ASEAN+1' Free Trade Agreement (FTAs) into a unified agreement, creating a single and cohesive set of trade rules for the region. In order to provide concrete market access and investment commitments, the RCEP will simplify rules and procedures for each FTA within a single arrangement and reduce existing trade inefficiencies. As highlighted by commentators, RCEP includes *".. regulatory provisions for many '21st century' trade issues, such as services, investment, e-commerce, telecommunications and intellectual property."*[64]

The RCEP will lower trade barriers and improve market access for goods and services, hopefully attracting foreign companies keen on entering into a more integrated ASEAN. This should enhance transparency in trade and investment, as well as facilitate the greater inclusion of ASEAN's small and medium-sized enterprises (SMEs) to global and regional supply chains.[65] The RCEP will be the most important regional trade agreement ever signed. While unfortunately, India has declined to participate, by population and

[61] Refer to https://asean.org/storage/2019/11/FINAL-RCEP-Joint-Leaders-Statement-for-3rd-RCEP-Summit.pdf
[62] Refer to www.dfat.gov.au/trade/agreements/not-yet-in-force/rcep/news/joint-leaders-statement-regional-comprehensive-economic-partnership-rcep. The text of the RCEP can be found at www.dfat.gov.au/trade/agreements/not-yet-in-force/rcep/rcep-text-and-associated-documents
[63] Refer to www.grantthornton.co.th/insights/articles/rcep-confirmed/
[64] Refer to www.aspistrategist.org.au/rcep-will-redraw-the-economic-and-strategic-map-of-the-indo-pacific/
[65] Refer to www.aseanbriefing.com/news/rcep-impacting-aseans-supply-chains-business-environment/

economic size it will be the largest regional bloc in existence, accounting for just under a third of world GDP. Measured in terms of world trade, its share of 29 percent is only a fraction smaller than the EU. The operationalisation of the RCEP should significantly aid in post recovery post COVID-19.

From the final text of the RCEP Agreement, it inter alia:

- Establishes high quality rules for the supply of services between the parties, including obligations to provide access to foreign service suppliers (market access), to treat local and foreign suppliers equally (national treatment) and to treat foreign suppliers at least as well as suppliers of any other non-RCEP country (most- favoured nation or MFN). Service suppliers from the RCEP countries will benefit from commitments to enhance the transparency and predictability of domestic regulation affecting trade in services, improving the business environment across the region;[66]

- In relation to telecommunications services (Chapter 8/Annex 6B) a framework of rules to govern trade in, and the access and use of, telecommunications services across the region is set out. The Annex details the commitments by RCEP to inter alia support competition in the provision of telecommunications services, support access and use, competitive safeguards, and the requirement to have an independent telecommunications regulatory body. RCEP countries have also committed to allow the portability of mobile telephone numbers (with certain AMS exemptions), have agreed to cooperate to promote reasonable international mobile roaming rates and reasonable and non-discriminatory treatment for access to the international submarine cable systems; and

- In relation to Chapter 12 on Electronic Commerce, supports ASEAN businesses transferring data across borders as part of their activities and limit the scope for governments to impose restrictions, including requirements to localise (store) data. Rules promoting the digitisation of trade documentation and the use of electronic signatures and electronic authentication will also help facilitate cross-border trade. It will support ASEAN consumers in the digital environment, with rules that help protect consumers and their personal information online, and combat 'spam'.

A key role for ADM 2025 is to set in motion the work required to develop the digital systems which are needed for ASEAN to participate efficiently in ASEAN trade agreements including the RCEP. Such development should help ASEAN significantly in its recovery from COVID-19.

Ongoing initiatives in ASEAN

Recognising the importance of trade, ASEAN has long had a free-trade area for goods and has made steady progress in developing free trade in services through the ASEAN Framework Agreement on Services (AFAS). This now includes the ASEAN Trade In Services Agreement (ATISA) which provides the guidance needed to remove regulatory barriers to international trade in services within ASEAN.
Digital services have a key role to play in making these trade agreements work efficiently and ASEAN has taken a number of steps to develop such services. This includes:

[66] Refer to www.dfat.gov.au/sites/default/files/rcep-outcomes-at-a-glance.pdf

- the ASEAN Single Window which was agreed in principle in 2005 and is now about to come into operation across all 10 AMS. The system is designed to enable the electronic exchange of trade documents such as customs declarations, animal health certificates and food safety certificates so as to provide more efficient customs clearance of goods;

- the ASEAN Framework on Digital Data Governance which was endorsed at the 18th TELMIN to create digital tools which enable, inter alia, cross-border data flows which provide legal certainty and data protection. At a high level, ASEAN anticipates enabling a selection of tools for businesses to leverage when transferring data across the region, consistent with approaches adopted by other international frameworks and countries with robust data protection regimes. The key Approaches for the ASEAN Cross Border Data Flows Mechanism, adopted at the 19th TELMIN in Vientiane, Lao PDR, in November 2019, proposes that ASEAN focus on developing these tools, one of which is ASEAN Certification for Cross Border Data Flows. ACCDF establishes a system that shall be recognised as one of a selection of valid legal bases for cross-border data transfers within ASEAN, providing businesses with legal certainty when they transfer data across ASEAN jurisdictions. This work is ongoing;

- work to again lower international mobile roaming charges within the ASEAN region. This is currently underway under Vietnam's leadership; and

- various other projects which were part of AIM 2020. Rated most valuable in the review of AIM 2020 were:

  - a study to identify how best to accelerate e-commerce in ASEAN;

  - an initiative to promote investment in the ASEAN region to global ICT suppliers; and

  - a study to assess the value of creating a telecommunications single market in ASEAN.

B.6.3 ENABLING ACTIONS

ENABLING ACTION 6.1: FACILITATE COMPLIANCE AND SECURE THE BENEFITS OF TELECOMMUNICATIONS SERVICES AND ELECTRONIC COMMERCE IN LINE WITH RELEVANT ASEAN TRADE AGREEMENTS

ASEAN's free trade agreements on telecommunications services will improve access by ASEAN firms in the telecommunications and ICT sectors. It will also substantially lower the barriers to current market players from other participating countries investing in the ASEAN region. Both will enhance and further trade digitalisation in the region and should generate substantial benefits for ASEAN.

With this in mind EA6.1 is a study, to be completed before the end of 2021, which will:

- identify the steps needed for compliance with ASEAN trade agreements in relation to the telecommunications and ICT sectors;
- list the steps needed in each AMS to change legislation and regulation and other supporting ancillary activities at the ASEAN and AMS levels to secure the benefits of the ASEAN trade agreements in relation to the telecommunications and ICT sectors such as the ASEAN Agreement on E-commerce and ASEAN Digital Integration Framework Action Plan (DIFAP);
- set a timetable for implementing these changes and a mechanism for monitoring progress; and

Other trade agreements will also be assessed in this process.

MEASUREMENT: High degree of compliance with key telecommunications services and electronic commerce commitments in ASEAN trade Agreement by AMS by the end of 2021 or such later date as appropriate

IMPORTANCE: High

ENABLING ACTION 6.2: SUPPORT TRADE DIGITALISATION THROUGH SEAMLESS AND EFFICIENT FLOW OF ELECTRONIC TRADE DOCUMENTS (E.G. INVOICES) AND GOODS WITHIN ASEAN

Digital transformation of organisations and businesses has brought about opportunities for improving efficiency and expanding customer bases in a digital economy. It is increasingly important for ASEAN to grow deeper trust and collaboration among AMS, digitalise trade facilitation processes and enable digital transaction for our businesses to trade and transact digitally and securely, including across borders with other businesses and customers. EA6.2 proposes a study which will:

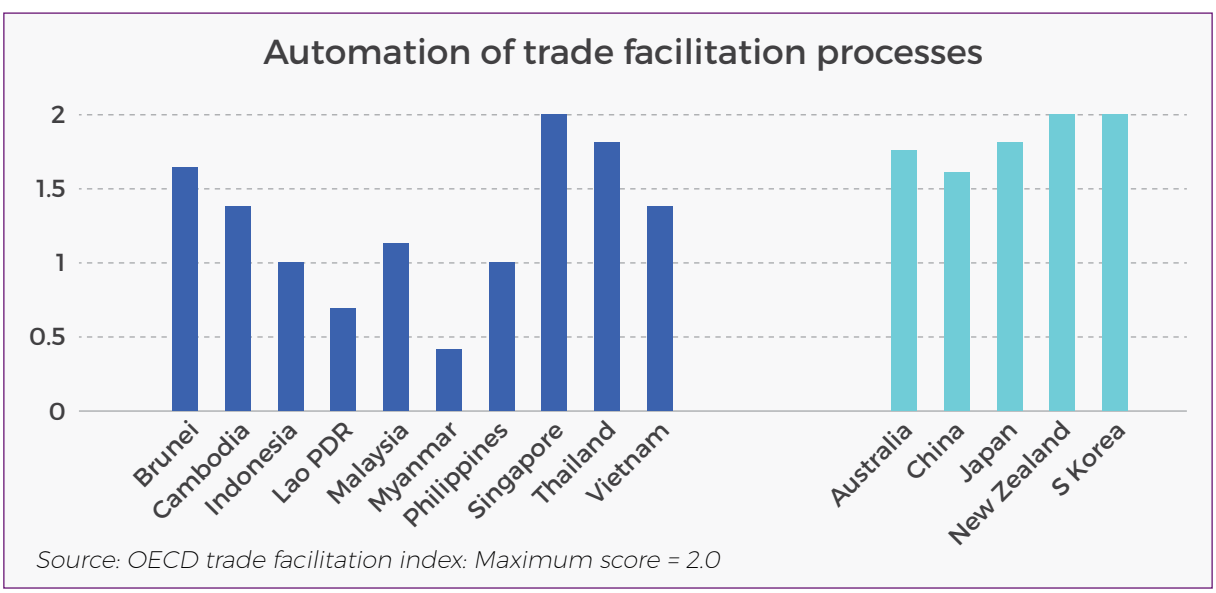
- build on the existing digitalisation of import and export procedures, such as the ASEAN Single Window;
- improve the level of automation of import and export procedures for goods in all AMS;
- track progress using the ASEAN Seamless Trade Facilitation Indicators (ASTFI) and other trade facilitation indices from exemplar third party sources to measure progress; and
- identify best practices, guidelines, policies or case studies on creating and adopting new business services that enable digital transactions and facilitate cross-border trade.

Automation of import and export procedures can have substantial benefits for AMS. For example:

- Whether exporting or importing goods, trade facilitation benefits all countries by allowing better access for businesses to production inputs from abroad and by supporting greater participation in global value chains. Countries where intermediate goods can be imported and exported in a quick and reliable manner are more attractive locations for foreign firms seeking to invest and offer consumers lower prices, higher quality products, and a greater array of goods.
- Trade facilitation helps smaller firms participate in trade. Addressing unnecessary costs related to trade procedures is essential for firms to take full advantage of new market openings. This is especially true for small and medium-sized enterprises (SMEs), for which the costs of trading can be disproportionately large.
- Trade facilitation is critical for perishable agricultural products and for high-tech manufacturing components, both of which are highly sensitive to delays.

But the level of automation of trade facilities – such as the digital exchange of trade data, automation border procedures and e-payment across borders - varies considerably across ASEAN as shown in Figure B.19. Singapore and Thailand do well on this measure. But the level of automation in many of the other AMS is significantly below that in the other ASEAN trade partner countries.

FIGURE B.19: THE LEVEL OF AUTOMATION OF TRADE FACILITATION – ASEAN VS RCEP PARTNERS



Source: OECD trade facilitation index: Maximum score = 2.0

MEASUREMENT: High degree of compliance with key RCEP telecommunications and electronic commerce commitments by AMS by the end of 2021 or the date provided in the RCEP (whichever is the later)

IMPORTANCE: High

ENABLING ACTION 6.3: ASSESS THE NET BENEFITS OF INCLUDING IR 4.0 TECHNOLOGIES IN TRADE FACILITATION PROCESSES

EA6.3 proposes a study which, in partnership with the relevant AMS ministries and proceeding in parallel with EA2, considers the feasibility, costs and benefits of using IR 4.0 technologies to automate trade processes further.

In parallel with EA2 there is merit in investigating how IR 4.0 technologies – such as AI, IoT, 5G and analysis of big data – might be used to improve the automation of trade facilitation processes in ASEAN. If such technologies can be applied successfully then this should further increase trade and stimulate foreign direct investment – especially by multinationals wanting to incorporate ASEAN firms into their production value chains.

MEASUREMENT: Outside the preparation of a study, which should act as a catalyst for the trialling and use of new technologies, an early indicator of success will be the uptake of IoT in AMS in relation to trade in goods.[67] Subsequently, the adoption of new technologies on a par (or only a slight lag) with key trade partners in Asia – namely China, Japan, and Republic of Korea will also provide the measure of success in this area.

IMPORTANCE: Medium

ENABLING ACTION 6.4: REDUCE REGIONAL BUSINESS TRAVEL COSTS BY LOWERING ROAMING RATES FOR MOBILE DATA SERVICES ACROSS ASEAN

ASEAN has tried for many years, with partial success, to establish common roaming charges across the region. Achieving this goal fully should have significant benefits in reducing business travel costs and giving a much-needed boost to the COVID-19 -stricken ASEAN tourist sector. Before making any recommendations this study would need to:

- review previous ASEAN initiatives to reduce roaming charges so as to identify the barriers to change; and
- re-examine the costs and benefits of achieving the proposed goal, perhaps using the experience of the EU in making a similar move as a guide.

MEASUREMENT: Agreement by AMS to a phased set of reductions in international mobile roaming services in ASEAN.

IMPORTANCE: Medium

[67] Note the linkage to DO1, EA10 on Build IoT connectivity through a regional policy and skills development activity coordinated via a centre-of-excellence.

ENABLING ACTION 6.3: ASSESS THE NET BENEFITS OF INCLUDING IR 4.0 TECHNOLOGIES IN TRADE FACILITATION PROCESSES

Promoting e-commerce is important in driving demand for goods and services to grow the digital economy in ASEAN. It is estimated that digital integration could uplift the region's GDP by US$1 trillion by 2025 . Thus, to further enhance the e-commerce cross-border trade among AMS, ASEAN digital sector should collaborate with other relevant sectors to

- promote e-commerce trade among AMS, enhance last-mile fulfilment cooperation, and improve competitiveness in the global economy;
- identify best policies, practices (including but not limited to e-commerce order fulfilment processes) and case studies that will benefit ASEAN businesses, especially SMEs;
- study the AMS logistics in the digital economy value chain, as well as improving postal and courier delivery standards to protect the buyers and sellers and
- form a regional virtual network of e-commerce parcel collection points with data exchange through an interoperability platform to facilitate last-mile fulfilment across borders, thereby extending the reach of local merchants selling overseas.

MEASUREMENT: Growth in e-commerce cross border trade. Increased speed of delivery metrics

IMPORTANCE: Medium

B.6.4 MONITORING AND IMPLEMENTATION

Overall measurement

This Desired Outcome is to facilitate digital services which support international trading of goods and services both intra ASEAN and external to ASEAN. Such trading is critical to the economic success of the region. But in a post COVID-19 environment assessment of trade performance in relation to goods and services will be difficult to assess given current disruptions, new rules and time to clear etc. Ultimately, the rebound in ASEAN trade in goods and services is the key metric along with successful implementation of exemplar digital services supporting such activity.

Dependencies

There are no actions that are completely dependent on others (and so cannot be started until others are completed). Enabling Action 1 and 2 are however dependent on the ratification of the RCEP Agreement by AMS and other signatories following the signing of the Agreement on 15 November 2020.

Timeline for critical tasks

We have identified the following two enabling actions as of the highest priority:

- Enabling Action 1: : Facilitating compliance and securing the benefits of telecommunications services and electronic commerce in line with relevant ASEAN trade agreements in order to enhance/further trade digitalisation in the region; and
- Enabling Action 2: Support trade digitalisation through seamless and efficient flow of electronic trade documents (e.g. invoices) and goods within ASEAN.

We recommend these enabling actions are started as quickly as possible, ideally early in 2021 with the bulk of the activity completed within 6 to 12 months.

The other enabling actions are of a medium or low priority, namely:

- Enabling Action 3: Assess the net benefits of including IR 4.0 technologies into trade facilitation processes;
- Enabling Action 4: Reduce regional business travel costs by lowering roaming rates for mobile data services in ASEAN; and
- Enabling Action 5: Promote e-commerce trade in ASEAN, enhance last-mile fulfilment cooperation, and improve competitiveness in digital economy.

Proposed delivery timeline

Enabling Action 1 and 2 to commence in early 2021 with completion before the end of 2021.

Enabling Action 3, and 5 to commence and Enabling Action 4 to continue in 2021 with completion in 2022-2024.

B.7 DESIRED OUTCOME 7: INCREASED CAPABILITY FOR BUSINESS AND PEOPLE TO PARTICIPATE IN THE DIGITAL ECONOMY

In order to drive increases in productivity by building digital capabilities, it is critical to facilitate and encourage ASEAN businesses and people to increase use of digital tools and systems. This is the primary focus of this DO – noting that digital productivity for government is covered under DO5 and digital productivity for citizens is covered under DO8.

B.7.1 INTRODUCTION

Productivity is a broad term which means, at the most general level, producing more outputs per unit of input. Conceptually speaking, 'outputs' should not be restricted to marketed outputs as measured by GDP, but rather should include a range of other more 'intangible' outputs including quality of life and environmental amenity. The outputs of the public sector and the inputs it uses should also be considered in an economy- or society-wide consideration of productivity.

From the social, economic and environmental perspectives higher productivity is a very desirable goal. Creating more of the goods, services and amenity that citizens want using fewer resources produces unambiguous benefits in all three of these domains. The economic benefits of higher productivity are highly dynamic: over time, more productive economies and more competitive, have better net export performance and improve their living standard more rapidly than less productive ones. The key here is to build stronger capabilities.

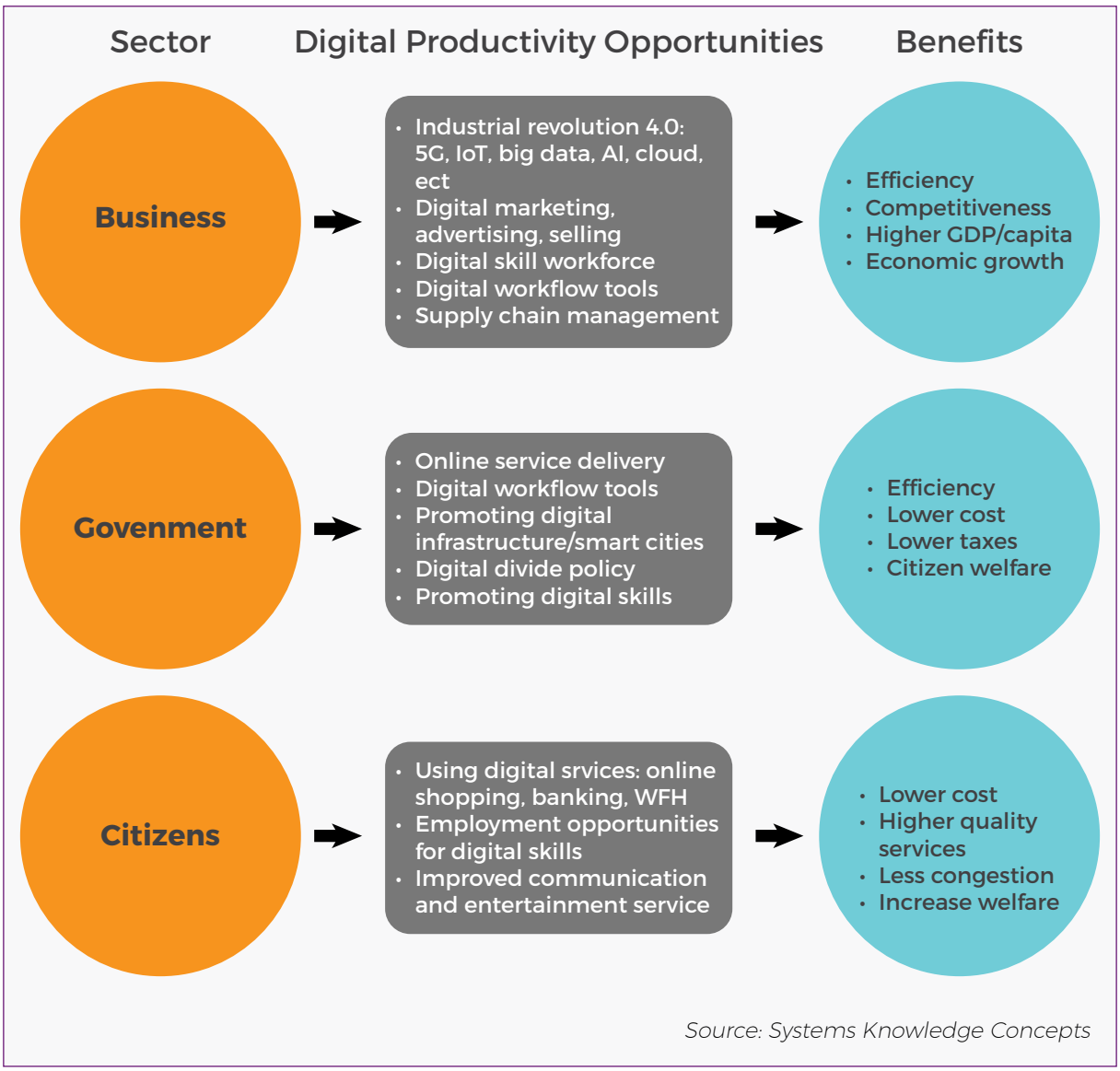
The linkages between productivity improvement and digital technologies are many and decisive. The essence of the often-used term 'digital disruption' is radical productivity improvement using digital technologies – the productivity benefits of applying digital technologies are potentially so great that existing businesses and industries struggle to keep up. While this creates a challenging environment for business, consumers benefit through better products and services and lower prices, and the national economy benefits via improved competitiveness. In the highly competitive and trade-oriented economies of ASEAN, harnessing digital technologies for ongoing productivity improvement is critical. Pursuing 'digital productivity' opportunities across all sectors of the economy should be a central focus of the ADM.

What 'digital productivity' includes

Digital technologies and services impact productivity throughout the economy: for business, for governments and for individual citizens. For business, digital technologies mean lower costs, greater efficiency and new opportunities. For Governments the opportunities include better service delivery, greater internal efficiencies and achieving more per dollar of tax revenue. For citizens and consumers, digital technologies mean improved access to digital services especially online banking and shopping, improved communications and entertainment services, employment opportunities in digital skills and overall improved welfare.

The figure below indicates a range of digital productivity opportunities for businesses, governments and citizens and the types of benefits available from achieving better use of digital technologies in these sectors.

FIGURE B.20: DIGITAL PRODUCTIVITY OPPORTUNITIES



Source: Systems Knowledge Concepts

Barriers to digital productivity

There are significant differences in the extent to which AMS have utilised digital technologies for improving productivity. The barriers to increased use include:

a. insufficient digital infrastructure and connectivity;

b. a lack of digital skills on the part of businesses, employees, governments and citizens;

c. insufficient local innovation and digital start-ups which develop new apps and services that cater to particular national or regional needs;

d. local language barriers to using digital tools and apps; and

e. insufficient application of digital tools to improve the functioning and efficiency of key ASEAN cities – greater levels of deployment of 'smart city' tools and systems.

The enabling actions described below are designed to address some these barriers (b, c, e) while some of them are addressed by actions in other DOs.

Areas of focus for DO7

Determining which aspects to focus on in the broad range of digital productivity impacts involves not only avoiding duplicating what is being dealt with in other DOs, it also requires any proposed actions be contextualised by referring to earlier work under AIM 2020 and earlier masterplans.

The focus for DO7 will be primarily on productivity for business to be achieved by facilitating and encouraging ASEAN businesses to increase use of digital tools and systems. Digital productivity for government is covered under DO5 and digital productivity for citizens is covered under DO8.

Given this focus the priority areas for DO7 are:

- improving digital skills and qualifications for the digital workplace;
- encouraging broader and more sophisticated use of digital technologies, tools and systems by ASEAN businesses at all levels; and
- development of ASEAN smart cities.

FIGURE B.21: WITH REFERENCE TO AIM 2020

AIM 2020 Action Points	AIM 2020 Description	AIM 2020 Target/ Project	AIM 2020 Final Review Completed Score	AIM 2020 Final Review Valuable Score
1.1.1 Promote Digital Trade in ASEAN	Encourage and enhance digital trade through policy innovation, awareness raising and enabling	ACTION/PROJECT 1.1.1.2. Identify best policies, industrial practices and case studies in the region that will benefit ASEAN businesses, especially SMEs	5.8	5.0

	electronic and other better modes of transactions and payments, especially for SMEs	PUBLISHED OUTPUTS https://asean.org/storage/2012/05/Study-on-MSME-Participation-in-the-Digital-Economy-in-ASEAN.pdf		
5.2.1 Continue Efforts to Align ICT Skill Standards for ASEAN	Promote an increasingly competitive ICT workforce through the establishment of standards and targeted skills upgrading to meet both current and future demand for ICT human resource	1. Explore the development of baseline ICT skills and a reference document identifying 'Basic ICT Workforce Skills' in ASEAN 2. Review and enhance the ASEAN ICT Skill Standards Definition and Certification Framework developed under the AIM 2015 (e.g. including more specified ICT skill areas where necessary)	2.6 5.6	3.2 5.6
3.1.1 Develop Best Practice Guides and Standards for Smart City Development	Promote smart city development in ASEAN by establishing policy guides through profiling examples of city planning, physical infrastructure and technology innovation	1. Share best practices on smart city planning and development in ASEAN 2. Identify suitable international and policy models and practices for smart city development, including in areas such as IoT, M2M, and sensor technologies 3. Identify, develop or adopt suitable standards for smart city developments, such as for IoT, M2M, and sensor technologies, and related policies 4. Explore the development of a measurement mechanism to track efficiencies in smart city management through ICT	4.8 2.3 1.8 1.8	3.5 4.0 5.0 3.8

3.2.1 Develop an Ecosystem Conducive to Support Start-ups and Strengthen Enterprises	Develop and promote a start-up ecosystem by connecting government, schools, and the private sector	1. Study the existing start-up ecosystem of incubators, seed funders and venture capitalists in ASEAN	4.6	6.1
		2. Develop platforms to connect start-up companies to potential private investors	3.6	5.6

Potential DO7 projects

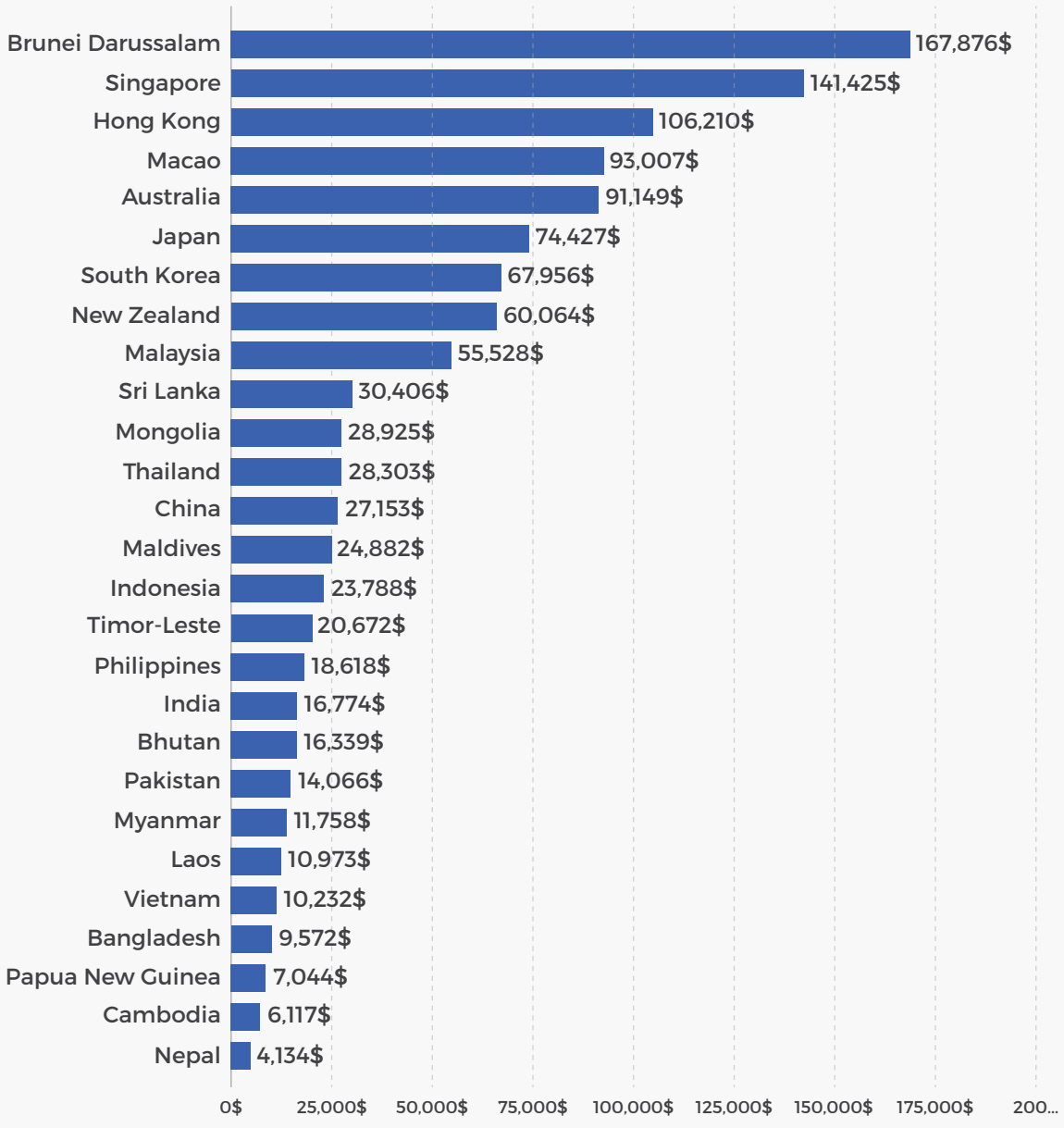
- Digital skills for the digital workplace:
  - Working with ASEAN AMS Education Ministries, establish of ASEAN Working Group on STEM education including formulation of curriculum objectives, preferred university courses (software engineering etc), gender targets etc.
  - Working with ASEAN AMS Education Ministries, adopt mutual recognition of digital technical qualifications across ASEAN including for Technical and Vocational Education and Training (TVET) (trade level digital skills eg computer repair, networking etc).
- Continue and extend the work on smart cities undertaken for AIM 2020. Working with leading national and major city governments, develop a best practice framework and key shared standards to maximize city efficiency, minimise congestion and maximise productivity.

B.7.2 THE CURRENT POSITION

Key indicators of the current position

Figure B.22 below shows labour productivity within ASEAN in the broader context of the Asia-Pacific region in 2017. The large productivity gaps across the region indicate a need for lower productivity ASEAN nations to employ not only 'digital productivity' tools but, in addition, other policy initiatives to improve broad productivity.

FIGURE B.22: LABOUR PRODUCTIVITY IN ASIA PACIFIC IN 2017, BY COUNTRY*(IN INTERNATIONAL DOLLARS)



Source: https://www.statista.com/statistics/862042/asia-pacific-labour-productivity/

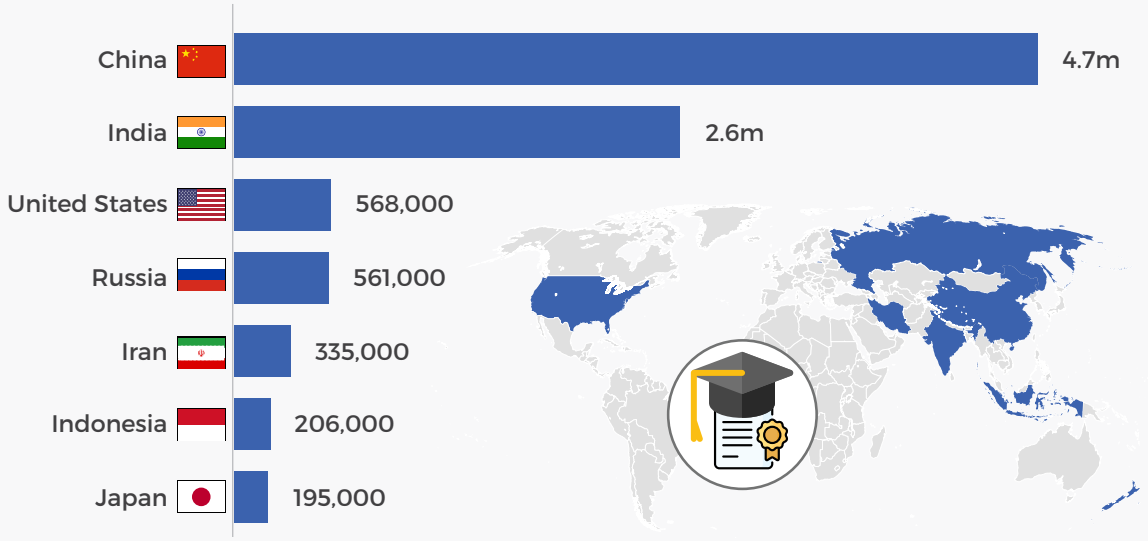
Figure B.23 shows the percentage of graduates from tertiary education graduating in STEM programs. Of note are some examples of rapid increases in the statistic between 2015 and 2018 as some countries move from a relatively low base of STEM graduates towards the higher performing AMS. Figure B.24 below provides international context regarding absolute numbers of STEM graduates globally.

FIGURE B.23: EDUCATION: PERCENTAGE OF GRADUATES FROM TERTIARY EDUCATION GRADUATING FROM STEM PROGRAMMES

Country	2015	2018	% Change
Brunei	30.49	39.21	29%
Cambodia	15.43	N/A	-
Indonesia	17.30	19.42	12%
Laos PDR	11.85	22.46	90%
Myanmar	N/A	33.67	-
Philippines	N/A	28.74 (2017)	-
Singapore	32.50 (2016)	34.93 (2017)	7%
Thailand	26.77	27.86 (2016)	4%
Vietnam	23.42	22.68	(3%)

Source: http://data.uis.unesco.org/index.aspx?queryid=163#

FIGURE B.24: COUNTRIES WITH THE MOST STEM GRADUATES



Source: https://www.forbes.com/sites/niallmccarthy/2017/02/02/the-countries-with-the-most-stem-graduates-infographic/#2ab86f35268a

Figure B.25 shows the top 50 smart cities in the world and it is notable that Singapore ranks number one in both 2020 and 2019. Although no other ASEAN city appears in the top 50 list, other Asia-Pacific cities include Taipei city at position eight, Busan at 46, and Seoul at 47.

FIGURE B.20: DIGITAL PRODUCTIVITY OPPORTUNITIES

City	Smart City Rank 2020	Change	Smart City Rating 2020	Smart City Rank 2019	Smart City Rating 2019
Singapore	1	▬ (0)	AAA	1	AAA
Helsinki	2	▲(+6)	AA	8	A
Zurich	3	▼(-1)	AA	2	AAA
Auckland	4	▲(+2)	AA	6	A
Oslo	5	▼(-2)	AA	3	AA
Copenhagen	6	▼(-1)	AA	5	AA
Geneva	7	▼(-3)	AA	4	AA
Taipei City	8	▼(-1)	A	7	A
Amsterdam	9	▲(+2)	A	11	A
New York	10	▲(+28)	A	38	BBB
Munich	11	new	A		
Washington D.C.	12	▲(+19)	A	3	BBB
Dusseldorf	13	▼(-3)	A	10	A
Brisbane	14	▲(+13)	A	27	BBB
London	15	▲(+5)	A	20	BBB
Stockholm	16	▲(+9)	A	25	BBB
Manchester	17	new	A		
Sydney	18	▼(-4)	A	14	A
Vancouver	19	▼(-6)	A	13	A
Melbourne	20	▲(+4)	A	24	BBB
Montreal	21	▼(-5)	A	16	A
Hamburg	22	new	A		
Newcastle	23	new	A		
Bilbao	24	▼(-15)	BBB	9	A
Vienna	25	▼(-8)	BBB	17	BBB

Source: https://www.imd.org/smart-city-observatory/smart-city-index/

City	Smart City Rank 2020	Change	Smart City Rating 2020	Smart City Rank 2019	Smart City Rating 2019
Los Angelas	26	▲(+9)	BBB	35	BBB
San Francisco	27	▼(-15)	BBB	12	A
The Hague	28	▲(+1)	BBB	29	BBB
Rotterdam	29	▲(+7)	BBB	36	BBB
Toronto	30	▼(-15)	BBB	15	A
Gothenburg	31	▼(-3)	BBB	28	BBB
Hong Kong	32	▲(+5)	BBB	37	BBB
Hanover	33	▼(-7)	BBB	26	BBB
Dublin	34	▼(-4)	BBB	30	BBB
Denver	35	▼(-2)	BBB	33	BBB
Boston	36	▼(-4)	BBB	32	BBB
Seattle	37	▼(-3)	BBB	34	BBB
Berlin	38	▲(+1)	BBB	39	BBB
Phoenix	39	new	BBB		
Birmingham	40	▲(+12)	BBB	52	BB
Chicago	41	▲(+12)	BBB	53	BB
Abu Dhabi	42	▲(+14)	BB	56	B
Dubai	43	▲(+2)	BB	45	BB
Prague	44	▼(-25)	BB	19	BBB
Madrid	45	▼(-24)	BB	21	BBB
Busan	46	▲(+4)	BB	50	BB
Seoul	47	– (0)	BB	47	BB
Zaragoza	48	▲(+1)	BB	49	BB
Barcelona	49	▼(-1)	BB	48	BB
Tel Aviv	50	▼(-4)	BB	46	BB

Ongoing initiatives in ASEAN

See section 1.4.

ICT skills

AMS undertaken significant work in relation to ICT skills development in relation to both AIM 2015 and AIM 2020. This work has been undertaken in three phases:

- ASEAN ICT Skill Standards Definition and Certification, September 2013: this report established definitions and certification approaches for key skill areas in ICT including: Software Development, ICT Project Management, Enterprise Architecture Design, Network and System Administration, Information System and Network Security. An additional related report, ASEAN ICT Skills Upgrading and Development Project, provides detailed skill/qualification information as well as 'training roadmaps'.

- Phase 2, completed in 2015 added Cloud Computing and Mobile Computing to the list of key ICT skills and further defined competency levels and accreditation processes to be used within ASEAN.

- Phase 3 which produced the report, Review and Enhancing ASEAN ICT Skills Standard project, extends the skill areas to include Big Data, Social Business and Internet of Things as well as:

    - study the current status of ICT skills standards used both inside and outside ASEAN;

    - update definitions of all ICT skills used by the standard since the first and second phases described above; and

    - developing an approach especially for promoting the use of ICT skills standards within ASEAN.

The work to date has established a framework for ICT Mutually Accepted Skill Standards (MASS). The MASS framework attempts to map the various ICT 'proficiency-based' skill levels defined in each ASEAN national education system to an ASEAN-wide framework that will permit greater ICT worker mobility across the region. In addition, workers also been done on an ASEAN Qualifications Reference Framework (AQRF), which is a skills classification based on 'levels of learning'. This will require will very close coordination with the ASEAN Education Ministers (ASED) and the ASEAN Labour Ministers (ALMM) Meetings and their respective officials through the AQRF.

Smart cities

At the 32nd ASEAN Summit on 28 April 2018, the ASEAN Leaders established the ASEAN Smart Cities Network (ASCN). The ASCN is a collaborative platform where cities from the ten AMS work towards the common goal of smart and sustainable urban development. 26 ASCN Pilot Cities were identified across the region (see Figure B.26).

FIGURE B.26: THE 26 PIONEER ASEAN SMART CITIES

Source: https://www.clc.gov.sg/docs/default-source/books/book-asean-smart-cities-network.pdf

The East Asia Summit Leaders' Statement on ASEAN Smart Cities (15 November 2018) recognised "the potential benefits of developing a regional smart cities ecosystem which will strengthen the region's capacity to harvest the opportunities associated with the ongoing digital and 4th industrial revolution, and achieve wide-ranging and beneficial, economic, social and environmental outcomes".

B.7.2 ENABLING ACTIONS

Potential projects are listed below each outcome.

ENABLING ACTION 7.1: CONTINUE TO SUPPORT THE ADVANCEMENT AND HARMONISATION OF ICT QUALIFICATIONS ACROSS ASEAN

Given early positive outcomes of ASEAN projects, ASEAN should continue to support the work done on ICT Mutually Accepted Skill Standards (MASS) the ASEAN Qualifications Reference Framework (AQRF) and using this work to develop and promote common curriculum standards and cross-ASEAN accreditation to encourage worker mobility . This should extend to ICT qualification definition, regional accreditation, common curriculum development across the region at all levels, and to the broader STEM categories especially those closely related to ICT occupations and qualifications.

MEASUREMENT: Progress on the MASS, AQRF etc in relation to common curriculum standards and the degree to which there is acceptance of cross-border qualifications in AMS.

IMPORTANCE: Low

ENABLING ACTION 7.2: PROMOTE DEVELOPMENT OF ADVANCED DIGITAL SKILLS, SUCH AS CODING, HACKATHONS, INNOVATIVE CHALLENGES

Advanced digital skills are much in demand by employers, include those outside of the 'traditional' ICT sector. AMS can work together to develop syllabuses for coding and programming training courses that will teach these desirable skills. Cross-ASEAN recognition of coding courses and qualifications would make studying these skills more attractive to ASEAN citizens. This should extend to hackathons, innovation challenges and other similar activities to build an ecosystem of innovative problem solvers.

Action (1) Review the ASEAN ICT Skills Standard to ensure continued relevance and ensure that emerging technologies and skillsets are reflected (2) Establish a syllabus for coding/programming training courses to be offered at coding 'bootcamps'[68] and link this to the ASEAN ICT Skills Standard.

MEASUREMENT: Syllabus for coding training courses, publication of updated ASEAN ICT Skills Standard, increase in citizens with advanced digital skills, hackathons arranged and the level of participation from across ASEAN

IMPORTANCE: Medium

[68] See https://www.itu.int/en/ITU-D/Digital-Inclusion/Youth-and-Children/Documents/CodingBootcamps_E.pdf

ENABLING ACTION 7.3: DEVELOP A FRAMEWORK THAT ENCOURAGES THE DEVELOPMENT AND GROWTH OF DIGITAL START-UPS IN ASEAN

Supporting innovation is about individuals and rewarding their insights, dedication and commitment, building on AIM2020 projects, ASEAN digital sector should develop a framework which encourages the development and growth of digital start-ups.

MEASUREMENT: Aside from the development of the Framework and its transposition in AMS law, the key metric is the growth in money being invested in ASEAN Digital start-ups.

IMPORTANCE: High

ENABLING ACTION 7.4: PROGRESS THE WORK ON SMART CITIES BEGUN IN AIM 2020

- Continue the work already begun under the ASEAN Smart Cities Network (ASCN) programme.
- In accordance with the statement by The East Asia Summit Leaders' Statement on ASEAN Smart Cities (15 November 2018):
  - promote greater city-to-city level interactions through the ASCN platform; and
  - establish and promote mutually beneficial partnerships, among ASEAN, the non-ASEAN EAS participating countries, and other multilateral institutions in mobilising resources and expertise to implement smart cities projects.
- While the AIM2020 undertook some projects in the smart city space, the COVID-19 pandemic is likely to provide greater impetus to the adoption of such systems and applications in ASEAN urban areas. Best practice guides and standards for smart city development should be developed.
- Of particular importance is to undertake studies in order to identify post COVID-19 approaches for:
  - (i) suitable international and policy models and practices for smart city development, including in areas such as IoT, machine-to-machine (M2M), and sensor technologies;[69]
  - (ii) adopt optimal standards for smart city developments, such as for IoT, M2M, and sensor technologies, and related policies;[70] and

[69] Note linkage to DO1.
[70] Ibid

(iii) the suitability of representative ASEAN cities for micromobility initiatives and the necessary telecommunications and ICT systems and support for doing so. This would extend concepts like Jakarta's Car Free Day, Ho Chi Minh's Nguyễn Huệ walking street and Hanoi's Hoàn Kiếm Lake walking streets.

MEASUREMENT: Assess the number of cities in the ASCN and their adoption of smart city technologies in their post COVID-19 city plans. Assess the AMS and AMS cities that endorse micro-mobility initiatives over ADM 2025.

IMPORTANCE: Medium

B.7.4 MONITORING AND IMPLEMENTATION

Overall measurement

This Desired Outcome is to facilitate productivity increases through the use of digital services. This is best done by assessing multifactor productivity. The optimal use of digital services can reduce both the capital and labours input required, leading to a higher total output.

Dependencies

There are no actions that are completely dependent on others (and so cannot be started until others are completed). Enabling Action 4 in relation to smart cities is however dependent on key IoT and other networks being in place and able to be used.

Timeline for critical tasks

All of the enabling actions are of low or medium Importance except Action 3 which is high. The proposed delivery timeline is:

- Enabling Action 1 and 4 to continue building on previous ASEAN work into 2021; and
- Enabling Action 2 and 3 to commence in 2021 with completion in 2022-2024 timeframe.

B.8 DESIRED OUTCOME 8: A DIGITALLY INCLUSIVE SOCIETY IN ASEAN

One aspect of realising this vision is to ensure continued adoption and use of digital services among ASEAN citizens. Digital communications technologies are widely acknowledged to be an important driver of productivity and economic growth. In order to unlock the full benefit of digital services, citizens and businesses especially MSMEs, need to adopt and use these services.

B.8.1 INTRODUCTION

ADM 2025 is designed to *"make ASEAN a leading digital community and economic bloc, powered by secure and transformative digital services, technologies and ecosystems"*. One aspect of realising this vision is to ensure continued adoption and use of digital services among ASEAN citizens. This paper sets out our proposals for enabling actions which will help achieve this desired outcome.

Digital communications technologies are widely acknowledged to be an important driver of productivity and economic growth.[71] In order to unlock the full benefit of digital services, citizens and businesses especially MSMEs need to adopt and use these services.[72] Yet in ASEAN, and in markets across the world, there remain many individuals who do not make use of digital technologies, even though such services are available to them.

Leaving aside the availability of infrastructure (covered in Objective 1), we can identify four main barriers to the adoption and use of digital services:

- **Accessibility.** Using the internet can be challenging for those with disabilities. In the UK, those with disabilities are much less likely to be internet users.[73]
- **Affordability.** The cost of getting online can present a significant barrier, and can result in those on a lower income being excluded. The cost includes both that of a digital device and an internet connection.
- **Motivation.** Some non-users do not perceive any benefits from using digital technologies. Others may be deterred by the perceived risks of being online, including online fraud and cybersecurity threats.
- **Skills**. Some non-users will lack the necessary skills to realise the benefits of digital services. Some may be deterred by the perceived complexity of the technologies and the fear of doing something wrong. Some non-users may also lack the necessary literacy skills to learn digital skills.

[71] For example the European Union (https://europa.eu/european-union/topics/digital-economy-society_en) and OECD (https://read.oecd-ilibrary.org/science-and-technology/oecd-digital-economy-outlook-2015_9789264232440-en#page1)
[72] Various studies have linked broadband penetration to economic growth. See for example Ofcom (2018). The economic impact of broadband. https://www.ofcom.org.uk/research-and-data/telecoms-research/broadband-research/economic-impact-broadband
[73] https://www.gov.uk/government/publications/government-digital-inclusion-strategy/government-digital-inclusion-strategy

Overcoming these barriers and bringing non-users online will help to grow the ASEAN economy, improve productivity and encourage social inclusion. A larger addressable market for digital services will spur the creation of more valuable services and apps tailored to local markets. And getting people online will allow governments to further digitise their services, improving the user experience and reducing costs.

B.8.2 CURRENT POSITION

The table below shows where the 10 AMS are in terms of internet use.

FIGURE B.27: INTERNET USE ACROSS ASEAN MEMBER STATES

AMS	LTE coverage	Internet Use	e-Banking	Digital skills
Metric	*% population*	*% using the internet in the past 3 months*	*% using digital platforms for financial transactions*	*Digital skills among active population (score out of 7)*
Year	*2019*	*2017*	*2017*	*2019*
Brunei	95%	95%	N/A	4.9
Cambodia	80%	34%	12%	3.6
Indonesia	98%	32%	27%	4.5
Laos	43%*	26%	8%	4.1
Malaysia	93%	80%	60%	5.4
Myanmar	76%**	31%	4%	N/A
Philippines	94%	60%	14%	5.1
Singapore	100%	84%	84%	5.6
Thailand	98%	53%	43%	4.3
Vietnam	97%	50%	16%	3.8

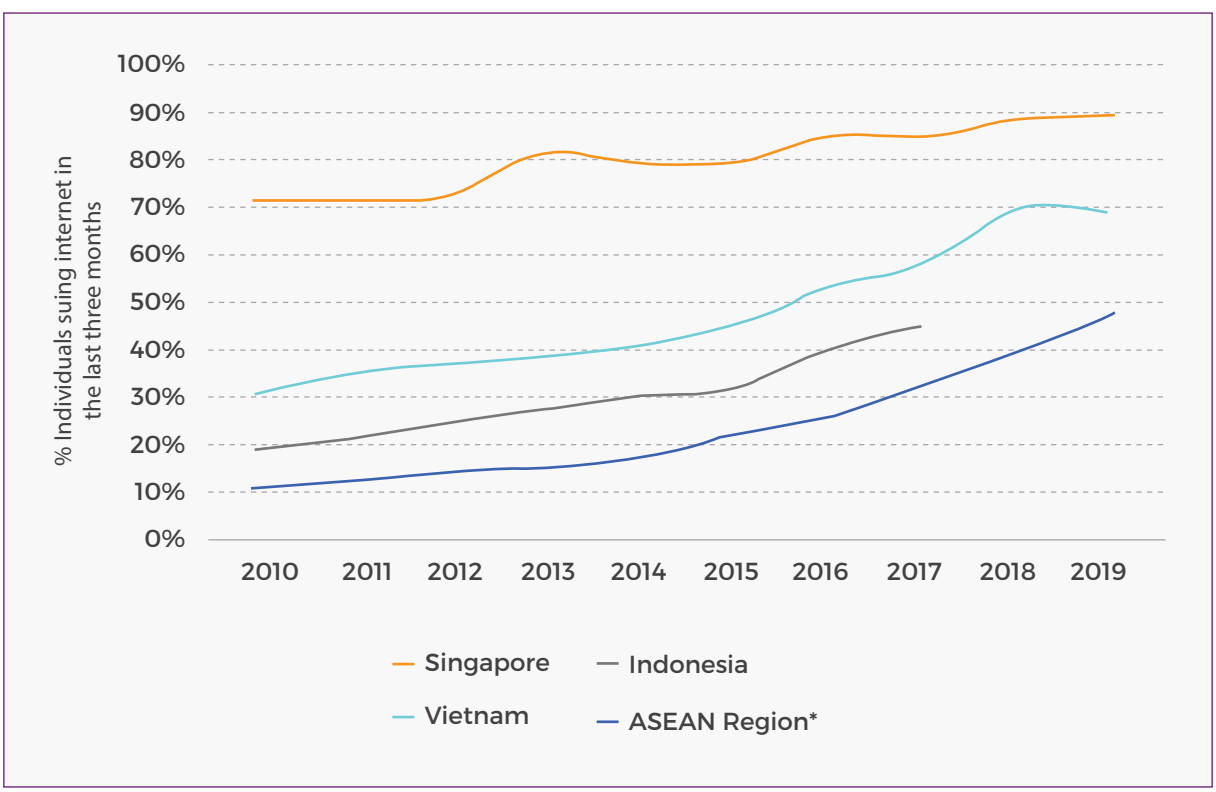
** 2018 data, ** 2020 data*

[74] 2019 data. Source: ITU
[75] 2017 data. Source: ITU
[76] 2017 data. Source: Global Financial Development Database
[77] World Economic Forum (2019). Global Competitiveness Report. The score represents a weighted response to the survey question "In your country, to what extent does the active population possess sufficient digital skills (e.g. computer skills, basic coding, digital reading)?" [1 = not all; 7 = to a great extent] by businesses operating in that country.

The available data reveal significant disparity in the use of digital services across ASEAN. In part this is likely to reflect the availability and quality of digital services and infrastructure (a topic explored in Objective 1). However, even in member states where connectivity is widely available (e.g. Singapore, Thailand) a significant proportion of the population does not use the internet on a regular basis.

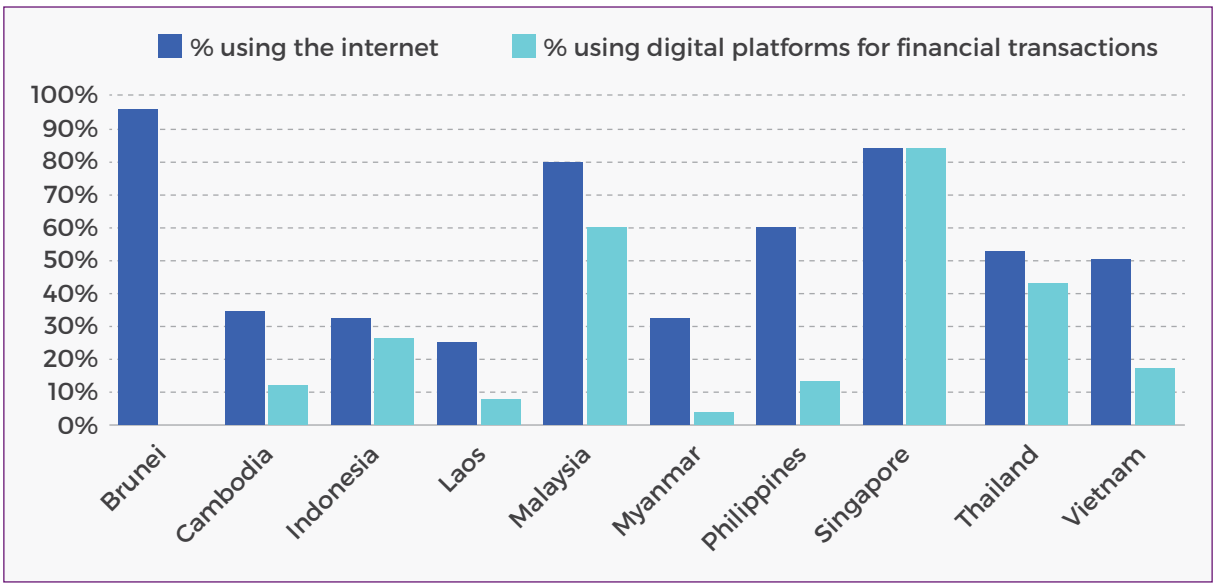
The proportion of internet users is improving over time in ASEAN, as newer generations grow up as digital natives (Figure B.28). But the experience of other markets, such as Japan and the US, indicates that time alone will not solve the problem: in these markets a persistent proportion of around 10% of individuals do not use the internet regularly.

FIGURE B.28: REGULAR INTERNET USERS IN SELECTED ASEAN STATES AND THE ASEAN REGION



It should also be noted that the use of the internet for certain specialised tasks tends to lag behind general internet use (see Figure B.29 for the example of e-Banking). The overall data on internet use may therefore conceal the under-utilisation of digital services. This may limit the potential for transformative digital growth in ASEAN economies, at a time when key verticals are becoming increasingly digitised (e.g. healthcare). One example is the use of productivity-enhancing agricultural apps by farmers in Vietnam. [78]

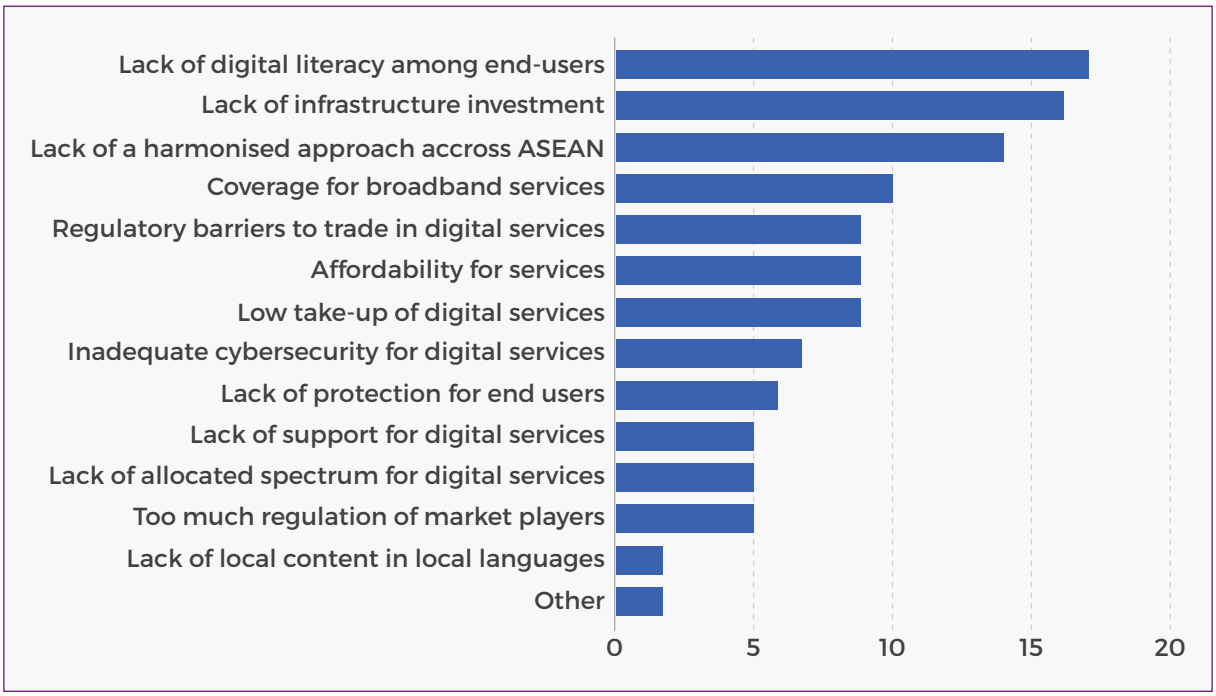
FIGURE B.29: USE OF THE INTERNET/USE OF DIGITAL PLATFORMS FOR E-BANKING IN ASEAN MEMBER STATES



[78] https://blog.google/topics/google-asia/bringing-digital-skills-training-30000-farmers-vietnam/

As part of the study, Plum conducted an online stakeholder survey. When asked to identify the top three barriers to realising the ADM 2025 vision, digital literacy among end users was among the key barriers (Figure B.30). Affordability was also identified by many as a barrier.

FIGURE B.30: RESPONSES TO SURVEY QUESTION: PLEASE IDENTIFY THE TOP THREE BARRIERS TO ACHIEVING THE ADM 2025 VISION



Respondents were also asked specifically about the barriers to end users learning the necessary skills to get online. This led to a diverse set of responses, but common themes included the availability and cost of training initiatives, concerns around trust and security[79], and a reluctance on the part of end users. One respondent noted that *"Some people still do not understand the benefit of using digital systems and services"*. Another respondent noted that not all apps were user-friendly.

Ongoing initiatives in ASEAN

Previous ASEAN Masterplans have also identified digital inclusion as an opportunity for further development in ASEAN. The AIM 2020 Initiative 2.1 is to Strengthen Digital Inclusion in ASEAN. This includes Action Point 2.1.1 to *Create Initiatives to Address Emerging or Growing Digital Divides* in ASEAN. Work on this action point has resulted in, among other things, the USO 2.0 Framework. In addition, Initiatives 5.1 and 5.2 focus on digital skills, with an emphasis on workplace skills.

[79] Note that measures to enhance trust in digital services are addressed in DO3.

There are also a number of continuing actions and initiatives from AIM 2015. These include actions to bridge the digital divide, to ensure children have broadband access and to (further) develop the ASEAN ICT Skills Standard. The ASEAN Working Committee has also produced, in collaboration with the World Bank, a report on the status of digital financial inclusion in the region.[80]

In terms of digital inclusion, multiple initiatives are being pursued at the member state level. These include initiatives by national governments, such as Singapore's 'Seniors Go Digital' programme,[81] as well as actions taken by businesses,[82] international charities and local organisations. In many cases, different entities will work together in partnership to deliver a project.[83]

In regard to digital financial inclusion, substantial work is being undertaken at the ASEAN level to support the expansion of digital financial services. Initiative 5 of The Master Plan on ASEAN Connectivity 2025 is to "Develop the ASEAN Digital Financial Inclusion Framework".[84] This initiative includes six Key Implementing Measures (KIMs), of which some are completed and some are ongoing. The measures aim to develop financial infrastructure, consumer protection measures and regulatory frameworks.

Other key digital 'verticals', such as telehealth services, are newer and thus less established than digital financial services. However, the COVID-19 pandemic has led to a substantial acceleration in the use of telehealth services across ASEAN, with some member states directing citizens to telehealth services and service providers.[85] Aside from digital financial services, data on the use of digital 'verticals' appears to be limited.

Finally, as discussed in Section 2.1, the COVID-19 pandemic has increased users' demand for digital services. Member states have also indicated that, in some cases, the pandemic has accelerated the digitisation of government services. It has also brought the issue of digital inclusion to the fore as digital services become increasingly important for full engagement with society.

B.8.3 ENABLING ACTIONS

This section lists enabling actions that might be taken by ASEAN to help member states improve digital inclusion in their nation. These actions were developed following analysis of the current status and survey responses, and taking into account pre-existing initiatives.

Note that the relative importance of the barriers to digital inclusion will vary significantly across member states. In consequence, measures to directly improve digital inclusion and bring citizens online will need to be tailored to the national situation, and are – in our view - best designed and applied by national governments and in-country organisations. The actions listed below are intended to help enable and facilitate initiatives undertaken in member states by national governments and organisations.

[80] http://documents1.worldbank.org/curated/en/856241551375164922/pdf/134953-WorldBankASEANDigitalFinancialInclusioninASEANpublicationJan.pdf
[81] https://www.smartcitiesworld.net/news/news/singapore-progresses-digital-inclusion-project-for-seniors-5632
[82] One example here is Telenor. https://www.telenor.com/sustainability/responsible-business/digital-inclusion/
[83] See examples from Thailand https://news.itu.int/spotlight-digital-inclusion-girls-women-rural-thailand/ and the Philippines https://www.goodthingsfoundation.org/sites/default/files/phillippines_pilot_report_v2.pdf
[84] https://asean.org/storage/2016/09/Master-Plan-on-ASEAN-Connectivity-20251.pdf
[85] https://theaseanpost.com/article/rise-telehealth-pandemic

ENABLING ACTION 8.1: ENSURE CITIZENS AND BUSINESSES HAVE THE SKILLS AND MOTIVATION TO USE DIGITAL SERVICES

An ASEAN resource centre for promoting digital inclusion could help AMS overcome skill and motivation barriers by providing easy-to-access toolkits and resources for teaching basic digital skills. These could be used by schools, community centres and charitable organisations to help users learn these skills and overcome motivational barriers.

The resource centre could also carry out research projects into digital inclusion issues specific to the ASEAN region.

MEASUREMENT: The establishment of ASEAN Digital Inclusion resource centre. Quantitative metrics include the proportion of those with basic digital skills and the proportion of internet non-users.

IMPORTANCE: High

ENABLING ACTION 8.2: REDUCE AFFORDABILITY BARRIERS TO GETTING ONLINE

While the cost of getting online (in terms of both a connection and a capable device) has fallen over time, it still remains out of reach for many citizens. Policies can help ensure that community Internet services are available in rural areas, and that those from lower incomes are also able to benefit from digital services. Another key issue is ensuring schools have Internet access for use by both pupils (digital literacy skills) and adults (affordable access).

ASEAN should therefore develop policies for establishing village Internet centres and seeking funding from global development agencies, and develop policies for getting broadband-connected computers into schools and community centres.

MEASUREMENT: Increase in internet users, increase in rural internet users, increase in connected schools.

IMPORTANCE: Medium

ENABLING ACTION 8.3: REDUCE ACCESSIBILITY BARRIERS TO GETTING ONLINE

Accessibility presents a barrier to making full use of digital services, particularly for disabled users. For some users, the typical touchscreen interface is difficult to use, and many functions and services are inaccessible.

AMS can work together to help promote the creation, deployment and adoption of accessible services, and ASEAN governments can lead by example with accessible government e-services. ASEAN can carry out research into accessibility technologies and establish a code of practice for accessible government services in AMS.

While governments cannot force privately provided services to be accessible, a publicly-available accessible code of practice will help firms understand what is needed to make their products and software accessible.

MEASUREMENT: Publication of code of practice for accessible government services, provision of accessible government services.

IMPORTANCE: Medium

ENABLING ACTION 8.4: ENCOURAGE DEEPER ADOPTION AND USE OF 'VERTICAL' DIGITAL SERVICES

ASEAN is already carrying out substantive work on digital services such as digital finance, including payments infrastructures and regulatory initiatives. The ADM 2025 can build upon this by helping to give users the necessary digital skills to take advantage of digital finance services and other emerging digital services. The digital inclusion centre should include modules for a wide range of digital services e.g. a module on digital financial inclusion, which could provide guides and resources on how to educate users on carrying out digital transactions.

The use of online banking and other more advanced digital services are key to unlocking the full benefits of the digital transformation. However, citizens may lack the necessary skills to use and benefit from such services. Citizens may also be concerned about sharing personal data (The issue of user trust and cybersecurity is discussed in DO3, however, the measures put in place to enhance trust also need to be communicated to users in order to allay their concerns about these services).

MEASUREMENT: Digital finance module, produced by the digital inclusion centre. Corresponding modules for emerging verticals (e.g. telehealth) as appropriate.

IMPORTANCE: Low

B.8.4 MONITORING AND IMPLEMENTATION

Measurement

The key metrics for this DO are the proportion of internet users, intensity of internet use, and the use of the internet to perform certain activities (e.g. financial transactions). Rural take-up should also be expected to increase as infrastructure is deployed and affordability barriers are eroded. In time, ASEAN should observe a decrease in the proportion of non-users citing affordability and accessibility barriers as the key reason for non-use.

However, these metrics are naturally trending upward over time in many member states. The key issue for measurement is examining the incremental impact of these measures. We suggest that, in addition to these metrics, ASEAN keeps track of how many times the member states draw upon the resources of the digital inclusion centre, and how many times the centre reaches out to member states.

Dependencies

Enabling Actions 1 and 3 have no dependencies on other activities.

Enabling Action 2 relies on the availability of infrastructure to be able to provide subsidised equipment and connectivity. To that extent, it is at least partially dependent on DO2. However, the relevant policies can be develop in anticipation of the roll-out of infrastructure.

Enabling Action 4 links to existing work ASEAN is carrying out in the field of digital financial inclusion. It should therefore seek to draw upon the ongoing work and research in this area (for example on measurement and case studies).

Timeline for critical tasks

The Digital Inclusion resource centre (Enabling Action 1) should be established quickly, as it will take time for it to develop resources needed to assist member states. Work can also commence on developing a code of practice for accessibility in government e-services (Enabling Action 3). The Digital Inclusion centre should be established before work on EA4 starts.

Enabling Actions 2 is likely to be ongoing tasks as infrastructure is deployed. While activity should start promptly, it need not be front-loaded as it shares dependencies with related work.

APPENDIX C
SUMMARY OF SURVEY RESPONSES

To support the study, the study team developed an online survey to be circulated to key stakeholders in the AMS. The survey was circulated to the ASEAN secretariat on the 18th September 2020. Following a request from member states for an extension, the response deadline was extended to 9th October 2020.

The survey consisted of 38 questions in total (note that as some questions were targeted at specific types of respondent, respondents would not be exposed to all 38 questions). The questions covered a variety of topics, seeking stakeholders' views on the barriers to digital development in ASEAN, the impact of COVID-19, and objectives for ADM 2025. The questions were a mixture of checkbox and free-form responses, providing stakeholders with a number of opportunities to express their views.

This note discusses the responses received and summarises the key data. Note it does not display all data received nor responses to every question.

C.1 RESPONSES RECEIVED

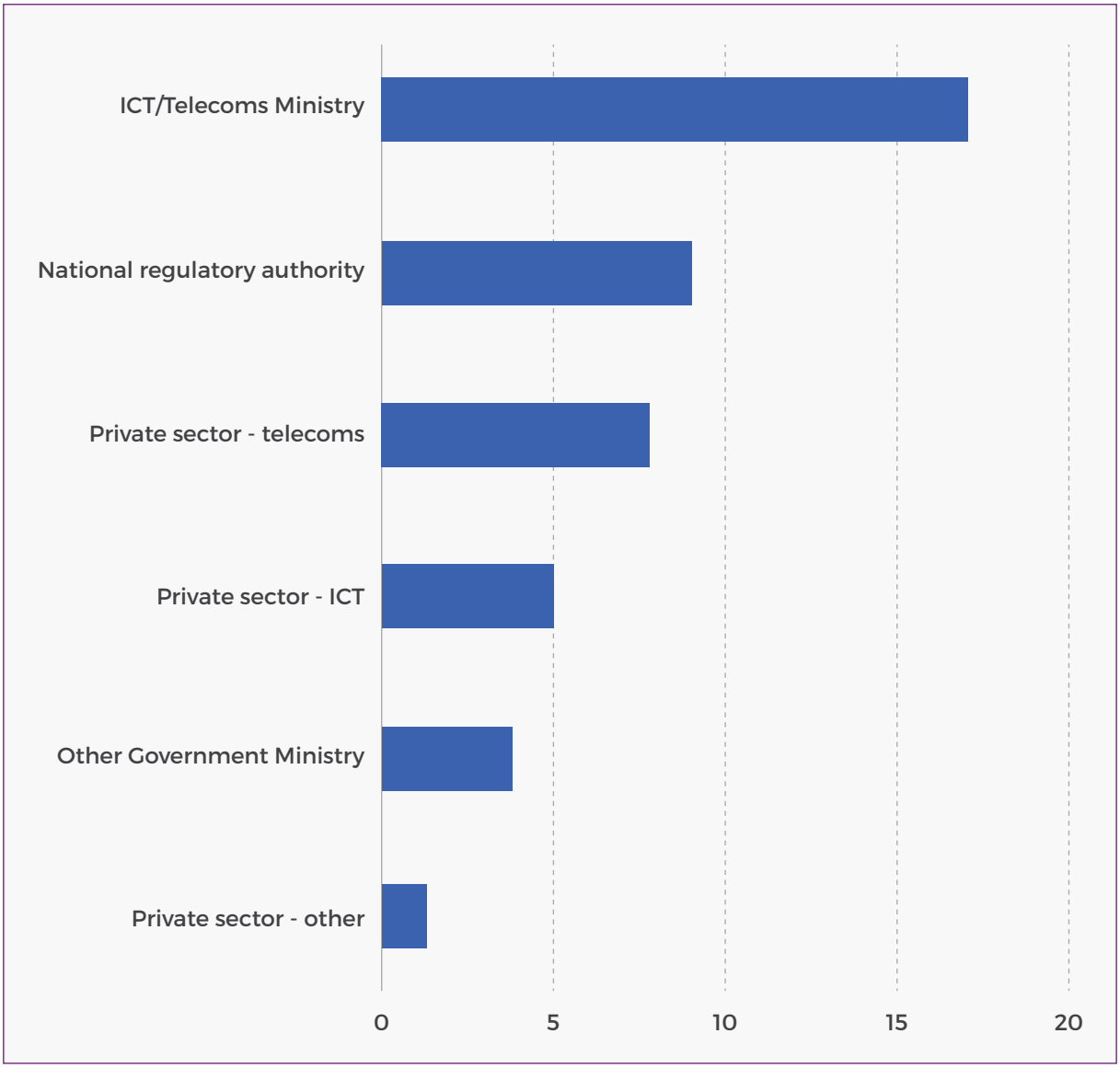
The survey received 44 responses in total. Organisations across ASEAN submitted responses to the survey (Figure C.1). However, no responses were received from organisations in Cambodia or the Philippines.

FIGURE C.1: RESPONSES RECEIVED

	Responses received
Brunei Darussalam	5
Cambodia	0
Indonesia	1
Lao PDR	6
Malaysia	7
Myanmar	1
Philippines	0
Singapore	7
Thailand	10
Viet Nam	1
Other	6

Respondents were primarily from ICT or telecommunications ministries or national regulatory authorities within member states (Figure C.2). However, responses were also received from private sector organisations.

FIGURE C.2: RESPONSES BY SELF-DESCRIBED CATEGORY

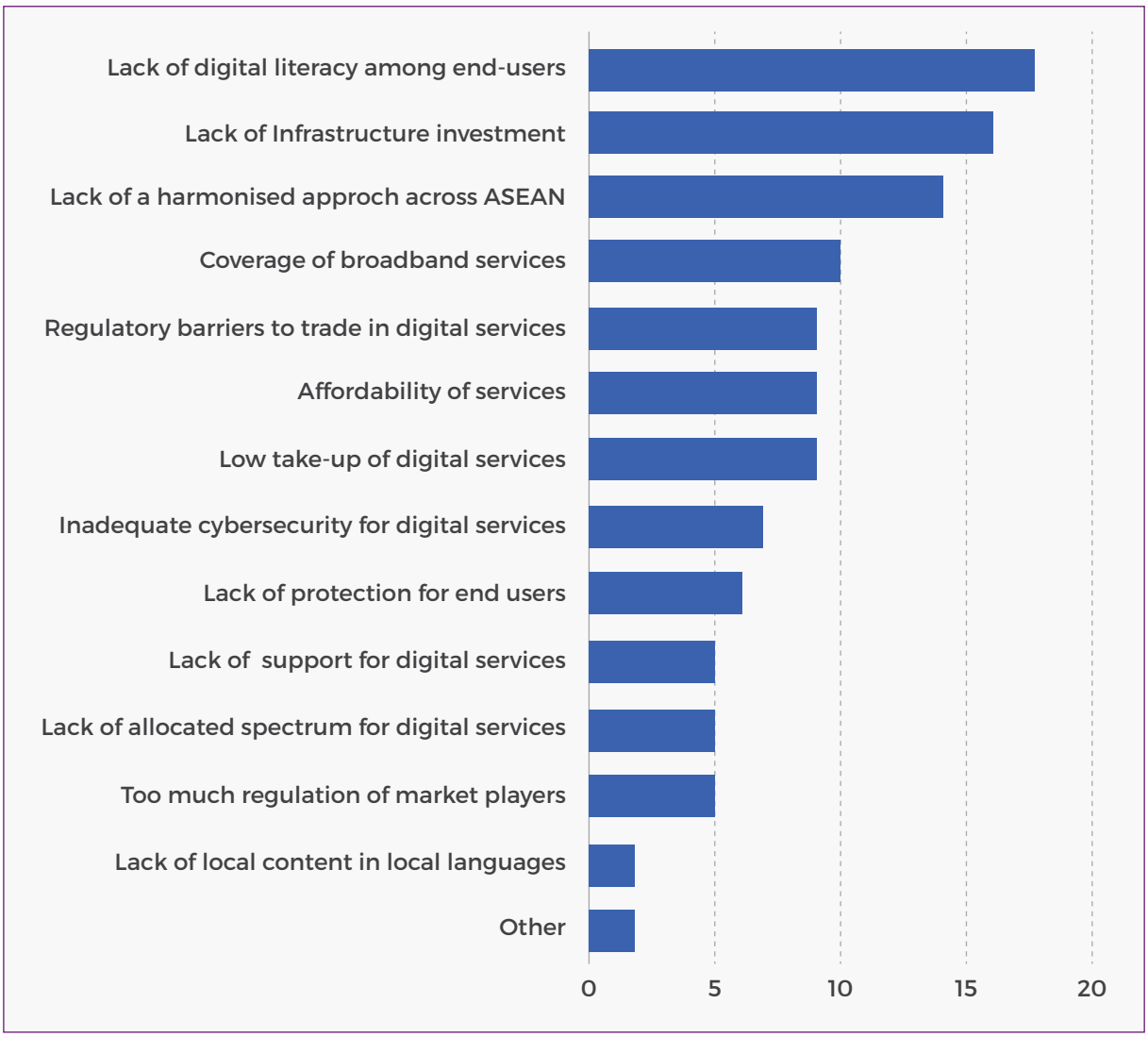


C.2 RESPONSES BY TOPIC

C.2.1 BARRIERS TO ACHIEVING THE ADM 2025 VISION

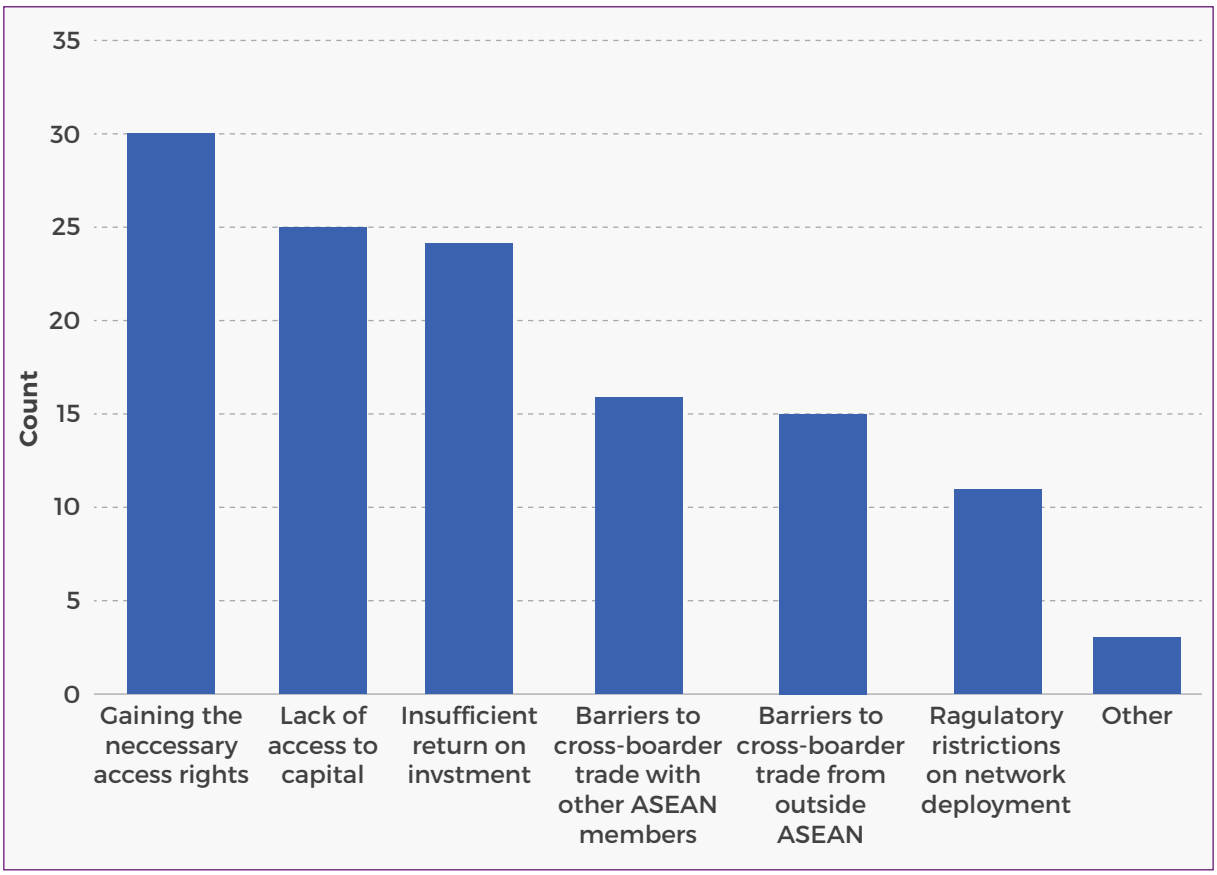
Question 6 asked respondents to identify the top three barriers to achieving the ADM 2025 vision *("ASEAN as a leading digital community and economic bloc, powered by secure and transformative digital services, technologies and ecosystem")*. From a wide range of available options there appear to be three clear standout barriers (Figure C.3).

FIGURE C.3: TOP THREE BARRIERS TO ACHIEVING ADM 2025 VISION



Respondents were asked specifically about the barriers to deployment of infrastructure in ASEAN. Many respondents indicated the challenge of gaining necessary access rights and permissions.

FIGURE C.4: *Q19 - WHAT ARE THE KEY CHALLENGES TO THE DEPLOYMENT OF INFRASTRUCTURE IN THE ASEAN REGION? PLEASE MARK ALL WHICH APPLY.*



Respondent were also asked about the challenge of operating across borders in ASEAN (Q35). Eleven respondents indicated they operate in more than one member state. All eleven indicated that different regulatory environments were a key challenge in operating across borders.

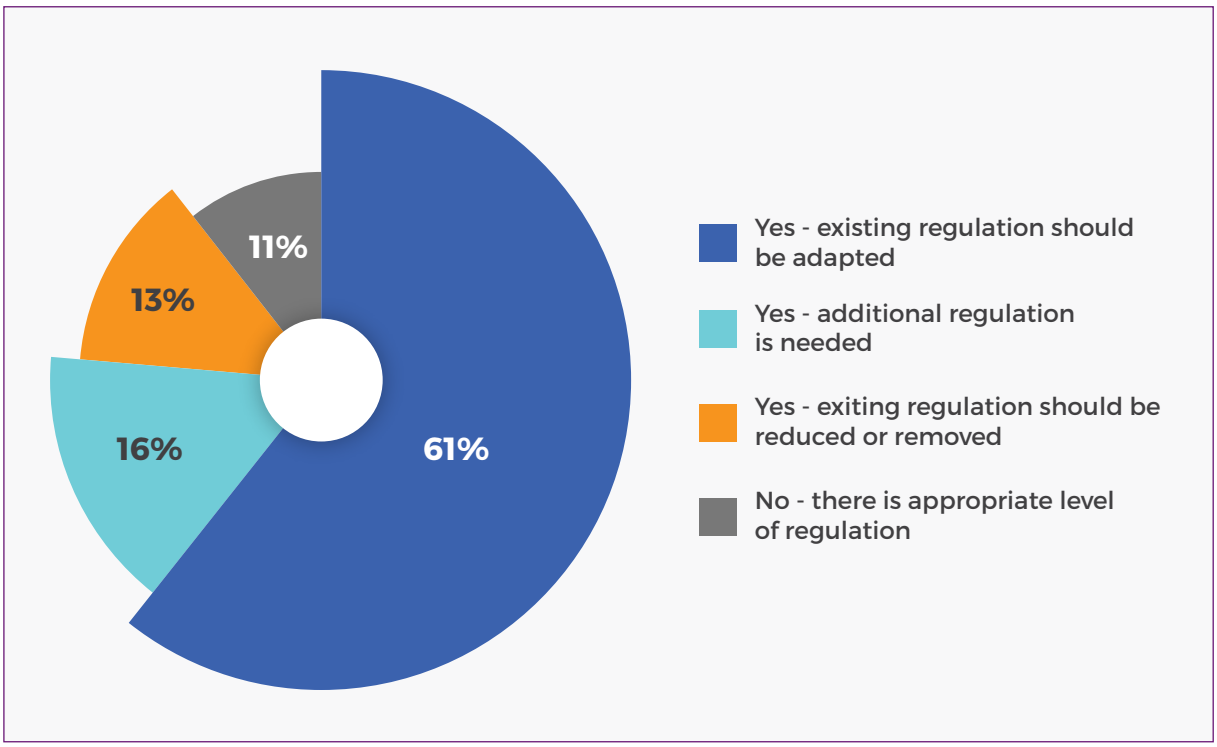
In addition, respondents were asked about the key obstacles in carrying out AIM 2020 project items (Q32). A number of respondents cited lack of funding or resources to carry out or continue the project. One suggested COVID-19 was responsible for re-prioritisation of funds away from these projects.

Others also indicated that cooperation was a problem – either between different agencies tasked with delivering the projects, or across ASEAN as a whole. One response noted that the different stages of digital development across ASEAN made it hard to agree on priority initiatives. On the other hand, a number of respondents indicated no barriers to carrying out AIM 2020 project items.

C.2.2 REGULATION IN ASEAN

Respondents generally agreed (89%) that national regulations needed to change to help facilitate the digital agenda in ASEAN. The majority were of the view that this could be achieved by adapting current regulation rather than creating new regulation.

FIGURE C.5: *RESPONSES TO Q7 - DO NATIONAL REGULATIONS NEED TO CHANGE TO HELP FACILITATE THE DIGITAL AGENDA IN ASEAN?*



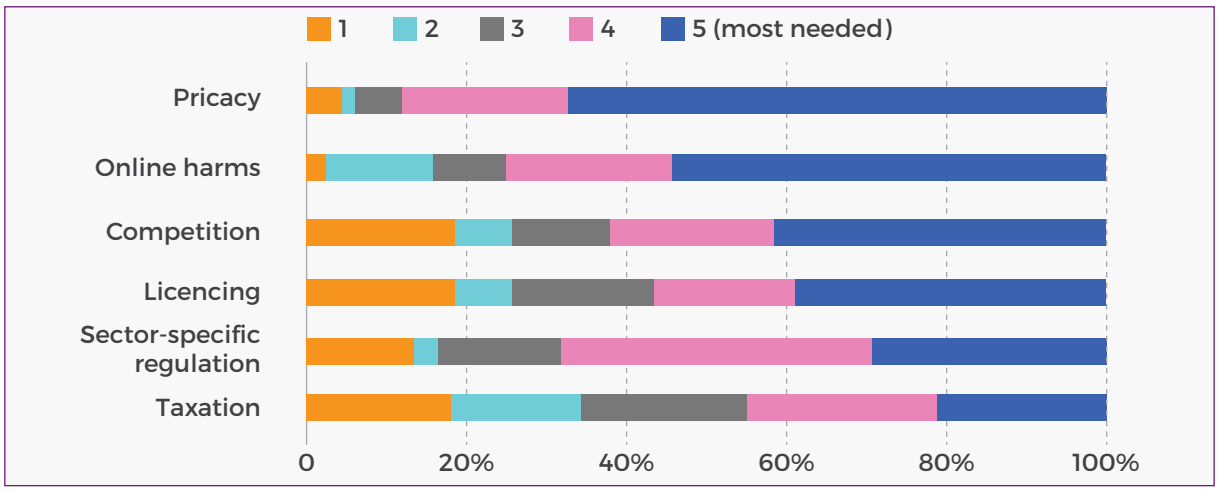
If respondents expressed the view that regulations should change, they were asked a follow-up question inviting them to clarify which regulations in particular should be changed. While a number of different responses were received, there were three recurring themes:

- Regulations which are not harmonised and consistent across ASEAN (in particular, regulations around cross-border digital data flows);
- Regulation which does not keep pace with technological change; and
- Regulations which inhibit the fast rollout of new infrastructure, including right-of-way access and municipal planning regulations.

Despite not considering that additional regulation was needed, most respondents (78%) considered that online services should be regulated where they are not currently. This could be interpreted as a need to 'equalise' regulation across online services and other services (for example, in the case in broadcasting and OTT video services).

When asked to further clarify where additional regulation was most needed, many respondents indicated privacy as a particular area of concern (Figure C.6). Over two-thirds of respondents marked privacy as an area where regulation was most needed. Online harms (including inappropriate or harmful online content, online abuse and cyberbullying) was also ranked highly.

FIGURE C.6: *Q23 - IF YOU THINK SOME ONLINE SERVICES NEED ADDITIONAL REGULATION, PLEASE RANK THE FOLLOWING ACTIVITIES IN ORDER OF GREATEST NEED OF REGULATION (5=MOST NEEDED)*

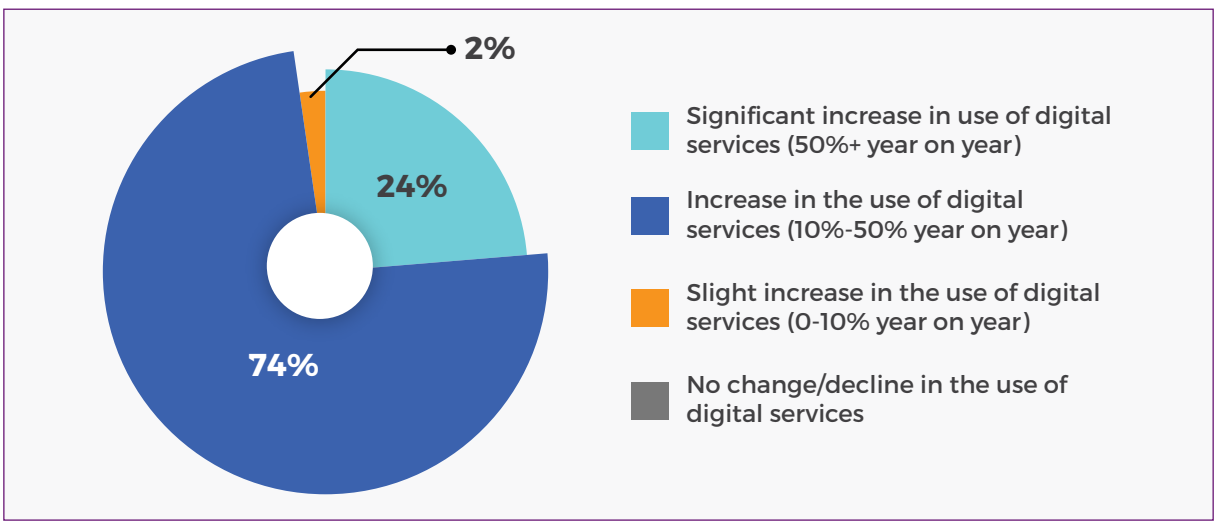


62% of respondents considered that responsibility for regulating online services should sit with national regulatory authorities. However, some respondents noted that this did depend on the specific area of regulation in question.

C.2.3 IMPACT OF COVID-19

All respondents agreed that the COVID-19 pandemic had resulted in an increased demand for digital services. A quarter of respondents indicated a significant (over 50% increase) in use of digital services (Figure C.7). 76% of respondents also stated that they had in place new initiatives or policies related to COVID-19.

FIGURE C.7: *Q10 - WHAT HAS BEEN THE MAIN IMPACT OF COVID-19 PANDEMIC (AND ASSOCIATED RESTRICTIONS) ON THE USE OF DIGITAL SERVICES?*



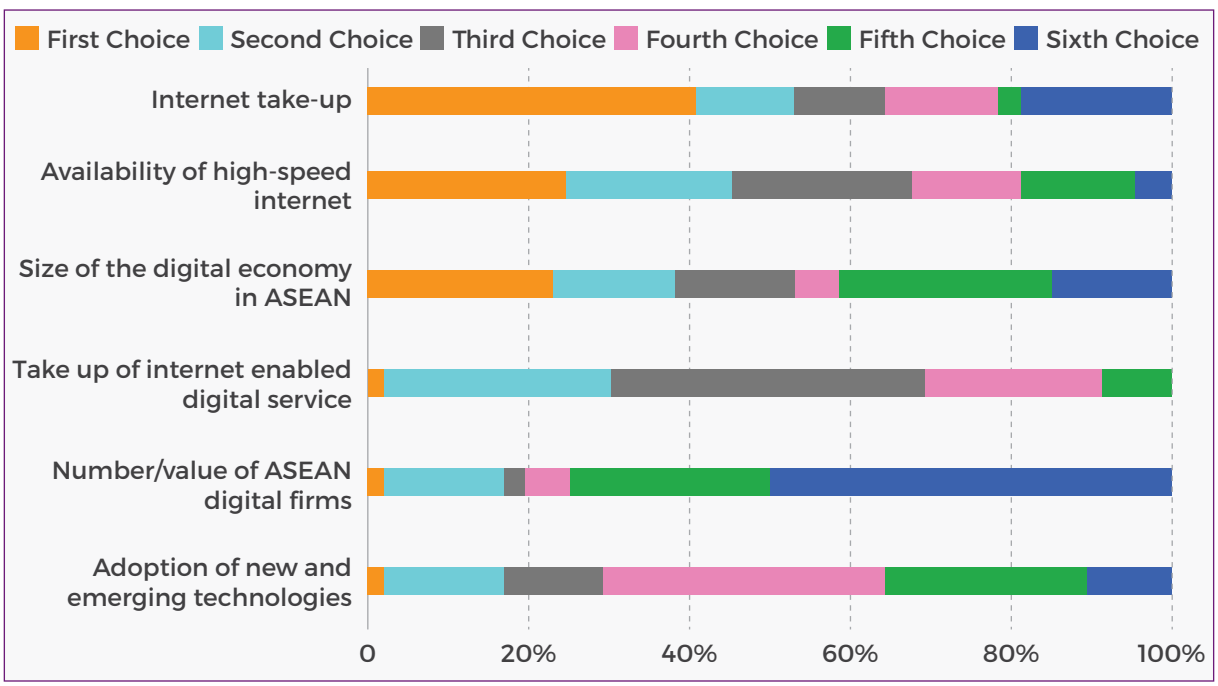
Respondents offered a variety of views about the longer-term impact of the pandemic. Some considered that there would be a shift back to pre-pandemic behaviour; others that the pandemic had introduced a "new normal" of digital activity. A number of respondents stressed the importance of the digital sector and digital technologies in driving the economic recovery after the pandemic. Some considered that the pandemic had made it increasingly important to ensure adequate digital access and digital skills for citizens.

C.2.4 MEASURING THE SUCCESS OF ADM 2025

Respondents were also asked about the most important areas where an ASEAN-wide approach was needed (Q16). Respondents gave a wide variety of responses. However, there were some recurring themes, including: cross-border data flows, cybersecurity, spectrum harmonisation, harmonised rules and standards (particularly in relation to data), and connectivity. Some respondents named key technologies in their responses – in particular, IoT, 5G, and cloud computing.

Q17 asked respondents to rank metrics for measuring the success for ADM 2025. Respondents tended to view both internet take-up and supply of high-speed internet as important metrics.

FIGURE C.8: *Q17 - WHAT ARE THE MOST APPROPRIATE METRICS AND MEASURES FOR ASSESSING THE SUCCESS OF ADM 2025? PLEASE RANK IN ORDER.*

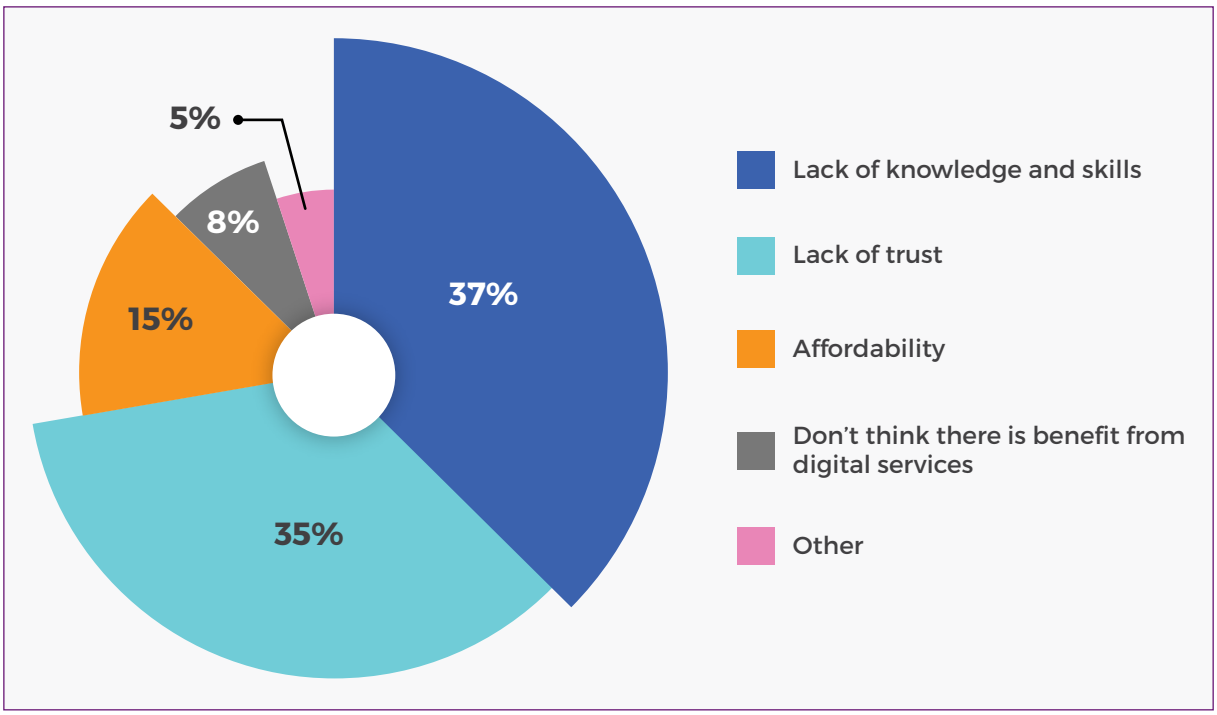


Respondents were asked about how ASEAN could encourage the growth of the digital economy (Q18). Again, while there were various responses, a key recurring theme was regulatory harmonisation and removal of barriers to cross-border trade and market entry. In regard to this some respondents indicated that ASEAN could create practical guidelines or develop regulatory frameworks in order to enable this harmonisation. Some respondents considered that ASEAN could help facilitate the growth of local digital businesses by levelling the regulatory playing field, supporting local content and services and creating innovation 'sandboxes'.

C.2.5 DIGITAL INCLUSION

Respondents were asked about the key reasons citizens choose not to use digital services (assuming services are available to them). Respondents identified a lack of skills (37%) and a lack of trust/security concerns (35%) as the key reasons.

FIGURE C.9: *Q27 - LEAVING ASIDE ACCESSIBILITY, WHAT DO YOU THINK IS THE KEY REASON PEOPLE CHOOSE NOT USE DIGITAL SERVICES?*



Respondents were asked about the key barrier to citizens gaining the necessary skills to use digital services. Some suggested that there was no single barrier. Others cited a lack of enthusiasm for learning new skills/an inability to see the benefits of digital services. Others considered that language, the user interface of apps and lack of available training were key barriers.

APPENDIX D
ONGOING EFFORTS THAT WILL CONTINUE FROM AIM 2020

D.1 INTRODUCTION

A number of projects from the AIM 2020 have been incorporated into Desired Outcomes and Enabling Actions of the ADM 2025. This Appendix captures the significant initiatives and actions that are still actively relevant in the ADM 2025 but which are ongoing from the AIM 2020. They have been listed within their Desired Outcomes and Enabling Actions in ADM 2025 as applicable.

D.2 KEY ONGOING PROJECTS FROM AIM 2020

The key ongoing projects from AIM 2020 in order of ADM 2025 Desired Outcomes (with their related AIM2020 Strategic Thrust) are detailed in the following table:

FIGURE D.1: KEY ONGOING PROJECTS FROM AIM 2020

ADM 2025 Desired Outcomes	ADM 2025 Enabling Actions	AIM 2020 Strategic Thrust
Desired Outcome 3: The delivery of trusted digital services and the prevention of consumer harm	Enabling Action 3.3: Identify improvements in legal and regulatory measures on the management of protection of data and other data-related activities that could be harmful.	8.1.1 Develop Regional Data Protection Principles Including 1. Commission A Study That Compares Personal Data Protection Frameworks Across AMS. The Study Will Identify Current Practices, Develop Case Studies, And Disaggregate Issues Across Different Levels – Local, National, Cross-Border And ASEAN 2. Develop An ASEAN Guideline Or Framework For Personal Data Protection[86]
Desired Outcome 4: A sustainable competitive market in the supply of digital services	Enabling Action 4.1: Continue to identify opportunities to harmonise digital regulation to facilitate cross-border data flows	

[86] This AIM2020 Strategic Thrust has been augmented by various Masterplan on ASEAN Connectivity 2025 (September 2016), ASEAN Framework on Personal Data Protection (TELMIN November 2016), ASEAN Framework on Digital Data Governance (18th TELMIN), and Key Approaches for the ASEAN Cross Border Data Flows Mechanism, 19th TELMIN. The ASEAN Certification for Cross-Border Data Flows ("ACCDF") is pending as at August 2020.

ADM 2025 Desired Outcomes	ADM 2025 Enabling Actions	AIM 2020 Strategic Thrust
Desired Outcome 4. A sustainable competition in the supply of digital services	Enabling Action 4.3: Deepen collaboration between ICT and competition regulatory authorities across ASEAN on the digital economy Enabling Action 4.4: Monitor developments in regulation of digital platforms in other jurisdictions	1.1.2 Develop a Consultative Approach towards Over-the-Top (OTT) Service Providers
Desired Outcome 6. Digital services to connect business and to facilitate cross-border trade	Enabling Action 6.4: Reduce regional business travel costs, by lowering roaming rates for mobile data services across ASEAN	6.1.2 Promote the Lowering of Voice, SMS, and/or Data Roaming Charges in ASEAN
Desired Outcome 7. Increased capability for business and people to participate in the digital economy	Enabling Action 7.1: Continue to support the advancement and harmonisation of ICT qualifications across ASEAN	5.2.1 Continue Efforts to Align ICT Skill Standards for ASEAN
	Enabling Action 7.4: Progress the work on smart cities begun in AIM 2020	3.1.1 Develop Best Practice Guides and Standards for Smart City Development
Desired Outcome 8: Removing barriers to the use of digital services	Enabling Action 8.1: Ensure citizens and businesses have the skills and motivation to use digital services Enabling Action 8.2: Reduce affordability barriers to getting online Enabling Action 8.3: Reduce accessibility barriers to getting online	2.1.1 Create Initiatives to Address Emerging or Growing Digital Divides in ASEAN

APPENDIX E
SUMMARY AND IMPLEMENTATION PLAN

FIGURE E.1: DESIRED OUTCOMES (DOS) AND ENABLING ACTIONS (EAS) – IMPORTANCE AND DEPENDENCIES

DO/EA	Description	Importance	Dependencies
DO1	Actions of ADM 2025 prioritised to speed ASEAN's recovery from COVID-19		None
1.1	Make the economic case for prioritising ADM 2025 actions	H	None
1.2	Assess the economic case for facilitating use of digital services that would help recovery from the COVID-19 Pandemic	M	None
DO2	Increase in the quality and coverage of fixed and mobile broadband infrastructure		
2.1	Encourage inward investment in digital and ICT	H	None
2.2	Move towards best practice permission and access rights for local and national infrastructure including submarine cable repair	H	None
2.3	Facilitate adoption of region wide telecoms regulation best practices by market players to provide regulatory certainty	M	Links to 2.2
2.4	Ensure adequate international Internet connectivity	M	None
2.5	Reduce the carbon footprint of telecommunications operators in ASEAN	M	None
2.6	Ensure increased and harmonised spectrum allocation across region in a way that meets key needs and objectives.	H	None
2.7	Adopt a regional policy best practice guidance on AI governance and ethics, IoT spectrum and technology	M	Links with 2.8, both done together
2.8	Develop regional mechanisms to encourage skills in integrated and end-to-end services	M	Links with 2.7, both done together
2.9	Establish a centre-of-excellence for best practice rural connectivity	H	None
DO3	The delivery of trusted digital services and the prevention of consumer harm		
3.1	Enable trust through greater and broader use of online security technologies	H	None

DO/EA	Description	Importance	Dependencies
3.2	Build trust through enhanced security for finance, health care, education and government	M	Links with 3.1
3.3	Identify improvements in legal and regulatory measures on the management of protection of data and other data-related activities that could be harmful.	H	None
3.4	Improve coordination and cooperation for regional computer incident response teams	H	None
3.5	Promote consumer protection and rights in relation to e-commerce	H	
DO4	A sustainable competitive market for the supply of digital services		
4.1	Continue to identify opportunities to harmonise digital regulation to facilitate cross-border data flows	H	None
4.2	Deepen collaboration between ICT and competition regulatory authorities across ASEAN on the ICT sector and digital economy	M	None
4.3	Monitor developments in regulation of digital platforms in other jurisdictions	L	None
DO5	Increase in the supply of public e-services (health, education, government etc)		
5.1	Establish ASEAN wide reporting on the level of use of e-government services in line with ITU requirements	H	Urgent
5.2	Help make key government departments more productive through their internal use of e-services and ICT	H	None
5.3	Explore how to introduce digital identities in each AMS in a way which safeguards civil liberties	H	None
5.4	Help developing AMS improve the quality of their e-government e-services	M	Needs 5.2
5.5	Improve the cohesion of AMS by making key government e-services interoperable across the ASEAN region	L	Needs 5.2, and 5.4
DO6	Digital services to connect business and to facilitate cross-border trade		
6.1	Facilitate compliance and securing the benefits of telecommunications services and electronic commerce in line with relevant ASEAN trade agreements	H	None
6.2	Support trade digitalisation through seamless and efficient flow of electronic trade documents (e.g. invoices) and goods within ASEAN	H	None
6.3	Assess the net benefits of including IR 4.0 technologies into trade facilitation processes	M	None
6.4	Reduce regional business travel costs by lowering roaming rates for mobile data services across ASEAN	M	None

DO/EA	Description	Importance	Dependencies
6.5	Promote e-commerce trade in ASEAN, enhance last-mile fulfilment cooperation, and improve competitiveness in the digital economy	M	None
DO7	Increased capability for business and people to participate in the digital economy		
7.1	Continue to support the advancement and harmonisation of ICT qualifications across ASEAN	L	None
7.2	Promote development of advanced digital skills, such as coding, hackathons, innovative challenges	M	Benefits from 7.1
7.3	Develop a framework that encourages the development and growth of digital start-ups in ASEAN	H	None
7.4	Progress the work on smart cities begun in AIM 2020	M	Needs 2.8 and 2.9 to be fully effective
DO8	Removing barriers to the use of digital services		
8.1	Ensure citizens and businesses have the skills and motivation to use digital services	H	None
8.2	Reduce affordability barriers to getting online	M	Needs 2.1 and 2.2
8.3	Reduce accessibility barriers to getting online	M	None
8.4	Encourage deeper use of 'vertical' digital services	L	Links to 5.1 and 5.2

Given the capacity of ASEAN to launch and manage multiple simultaneous projects we recommend an initial focus on those which are high priority. The table below extracts only those scoring "high".

FIGURE E.2: THE TIMING OF HIGH IMPORTANCE ENABLING ACTIONS (EAS)

DO/EA	Description	Importance	Dependencies	Timing (Short / Medium / Long term)
1.1	Make the economic case for prioritising ADM 2025	H	None	S
2.1	Encourage inward investment in digital and ICT	H	None	S
2.2	Move towards best practice permission and access rights for local and national infrastructure including submarine cable repair	H	None	S
2.6	Ensure increased and harmonised spectrum allocation across region	H	None	S

DO/EA	Description	Importance	Dependencies	Timing (Short / Medium / Long term)
2.9	Establish a centre-of-excellence for best practice rural connectivity.	H	None	M
3.1	Enable trust through greater and broader use of online security technologies	H	None	M
3.3	Identify improvements in legal and regulatory measures on the management of protection of data and other data-related activities that could be harmful.	H	None	M
3.4	Improve coordination and cooperation for regional computer incident response teams	H	None	S
3.5	Promote consumer protection and rights in relation to e-commerce	H	None	M
4.1	Continue to identify opportunities to harmonise digital regulation to facilitate cross-border data flows	H	None	L
5.1	Establish ASEAN wide reporting on the level of use of e-government services in line with ITU requirements	H	None	S
5.2	Help make key government departments more productive through their internal use of public e-services and ICT	H	Links to 5.1	M
5.3	Explore how to introduce digital identities in each AMS in a way which safeguards civil liberties	H	None	M
6.1	Facilitate compliance and securing the benefits of telecommunications services and electronic commerce in line with relevant ASEAN trade agreements	H	None	S
6.2	Support trade digitalisation through seamless and efficient flow of electronic trade documents (e.g. invoices) and goods within ASEAN	H	None	M
7.3	Develop a framework that encourages the development and growth of digital start-ups in ASEAN	H	None	M
8.1	Ensure citizens and businesses have the skills and motivation to use digital services	H	None	M

There are 17 high priority actions. In most cases there are no dependencies that require other EAs to be completed or underway, other than between EAs 5.1 and 5.2. Being high priority, of course, all are somewhat urgent but in the table there is some differentiation between those that need to start in the short term (within a year) and those in the medium term (in 2-3 years). None can be delayed to the longer term (4-5 years).

Figure 4.1 shows a possible implementation plan for these actions.

The Association of Southeast Asian Nations (ASEAN) was established on 8 August 1967. The Member States of the Association are Brunei Darussalam, Cambodia, Indonesia, Lao P.D.R., Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam. The ASEAN Secretariat is based in Jakarta, Indonesia.

General information on ASEAN is available online at http://www.asean.org

JalanSisingamangaraja
No.70A, South Jakarta, Jakarta, Indonesia 12110

POCSsocmed@asean.org

+62-21-726-2991

www.asean.org

@aseansecretariat

@asean

@TheAseanSecretariat