Background Paper 2B

Data Connectivity in the Greater Mekong Subregion

Lurong Chen

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Data Connectivity in the Greater Mekong Subregion

Lurong Chen

1. Introduction

Digitalisation will create new opportunities to unleash the potential of rapid development in the Greater Mekong Subregion (GMS) – both economically and socially. To accelerate this process, the digital-friendly ecosystem needs to facilitate digital transformation in the region. The literature has shown that digital connectivity affects a nation's overall economic performance. From the global perspective, Baldwin (2016) explained the economic logic of how digitalisation (the development of information and communication technology (ICT)) could lead to a new pattern of globalisation (the third unbundling) characterised by the new type of international division of labour, which would create new strategies for national development, as Kimura (2018) illustrated. Kimura and Chen (2018) developed the policy framework and applied it to analyse the development strategy of the Indonesian economy. Empirically, the World Bank (2009) estimated that, at the national level, on average a 10% increase of fixed broadband penetration would increase gross domestic product by 1.2%–1.4%, depending on the country's stage of development. Ng, Lye, and Lim (2013) showed that factors such as broadband penetration, the utilisation of broadband infrastructure, and applications are likely to enhance national aggregate outputs.

Although the emerging digital economy and Industry 4.0 will generate great gains to GMS development, challenges and opportunities come hand in hand. While those challenges are mainly on the supply side for most developed and fast-growing countries and regions (Schwab, 2016), regions such as the GMS also face challenges on the demand side, as consumers still need basic conditions, such as logistics, connection, and skills, to obtain access to the digital world.

There is particular concern about exacerbating inequality in the region. In the GMS, a large number of people still have low incomes, low skills, and live in remote areas with limited connection to modernisation. These people lag behind progress in technology – some of them have not yet benefited from Industry 2.0 (i.e. they have no access to electricity) or Industry 3.0 (i.e. they do not know how to use computer). Changes in Industry 4.0 are believed to be even more disruptive than ever before. 5G, the next generation of broadband connection, will power the internet of things and promote further integration of the physical and digital worlds, on which new structured global value chains will be built. The GMS will try its best to catch up with technological progress by accelerating digital transformation that needs not only efforts to improve physical, institutional, and people-to-people connectivity, but also to fill/narrow development gaps. To make digital

adoption a process that effectively narrows the gaps, appropriate policy interventions will be needed and improving inclusiveness will be a main component. However, unevenly developed infrastructure remains one of the main barriers to development of the GMS. Digital connectivity gaps exist across and within countries. This requires closer collaboration amongst all participating parties, including both the public and private sectors.

The GMS has three major economic corridors – the North–South Corridor,[21] the East–West Corridor,[22] and the Southern Corridor[23] – of which the initial priority is to improve logistical linkages and expand the road and rail network. Digital connectivity has been an important component of GMS connectivity and has improved significantly in various aspects, but it is a broad topic. In the context of supporting economic development, it will take into consideration not only data connectivity but also logistics to facilitate the free flow of goods and services, connectivity to facilitate cash flow, and seamless links between cyberspace and physical parts of the e-commerce network (Chen, 2017; 2019; 2020).

This chapter does not intend to cover all these aspects, but focuses on discussing the GMS data connectivity, which is key to any stage of digitalisation. What will make 5G a game changer is the sheer amount of data that can be collected, transferred, processed, analysed, and distributed at high speed with low latency. Improving data connectivity requires infrastructure building and facilitating the free flow of data with trust (Kimura et al., 2019; Chen, 2020).

2. Infrastructure for Data Connectivity

Data are the core of the digital economy, of which the internet is the backbone. Internet connection is the precondition for digital connectivity, and therefore the free flow of data. For instance, fibre network building can directly affect the capacity, speed, and reliability of the internet, and therefore is a crucial part of the required infrastructure.

Development gaps amongst Asia's emerging economies are widely acknowledged, especially in ICT and logistics. This is also true for the GMS, although the overall level of development in the GMS is lower than that of the Association of Southeast Asian Nations (ASEAN) as a whole, and the gaps between GMS countries/regions seem be to narrower in general.

2.1. Network Connection: Coverage and Quality

By the end of 2018, the GMS had about 150 million internet users, accounting for 45% of the regional population. Thailand (53%) had the highest internet penetration, followed by Viet Nam (50%) and Guangxi Zhuang Autonomous Region in China (46%). In the rest of the GMS, most of the population still does not have access to the internet. Most users in

[21] The North–South Economic Corridor passes through China, Myanmar, the Lao People's Democratic Republic (Lao PDR), Thailand, and Viet Nam.
[22] The East–West Economic Corridor passes through Myanmar, Thailand, the Lao PDR, and Viet Nam.
[23] The Southern Economic Corridor passes through Myanmar, Thailand, Cambodia, the Lao PDR, and Viet Nam.

the GMS access the internet via their mobile phones, thanks to technological progress in wireless connections.

While in Thailand, Viet Nam, and China, the 4G network has been the mainstream that covers 90% or even more of the whole mobile network; connection in Cambodia, the Lao People's Democratic Republic (Lao PDR), and Myanmar (CLM) still relies on 3G technology. Economically, Guanxi and Yunnan are not the most advanced regions in China. Internet development in these two Chinese provinces seems to be more advanced than in CLM, but falls behind that of Thailand and Viet Nam (Table 1).

Table 1: ASEAN Access to the Internet

Country	**Internet penetration** (users as percentage of population)	**Mobile subscriber penetration** (per 100 inhabitants)	**Mobile connection** (% of population)	
			3G	**4G**
Cambodia	34.0	126.3	83.9	57.5
Lao PDR	25.5	54.1	78.0	9.0
Myanmar	30.7	89.8	90.5	75.1
Thailand	52.9	176.0	98.0	98.0
Viet Nam	49.6	125.6	95.0	95.0
Guangxi, China	46.1	89.2	72.6	64.9
Yunnan, China	39.9	96.5	75.8	69.9
China	54.3	104.6	98.0	98.0

ASEAN = Association of Southeast Asian Nations, Lao PDR = Lao People's Democratic Republic.
Source: Author. Raw data from World Bank (2019); The Statistics Bureau of Guangxi Zhuang Autonomous Region (2020), *Guangxi Statistical Yearbook 2019*. tjj.gxzf.gov.cn/tjsj (accessed 20 March 2020); and The Statistic Bureau of Yunnan Province (2020), *Yunnan Statistical Yearbook 2019* stats.yn.gov.cn/tjsj (accessed 20 March 2020).

GSMA (2019) compiled the Mobile Connectivity Index to measure and compare the development of mobile connectivity around the world. The second column of Table 2 shows GMS countries' scores on the network infrastructure index, a subset of the Mobile Connectivity Index. China has the highest score (74) amongst the six countries, but the mobile infrastructure in Guangxi and Yunnan is very likely to be lower than the average level in China and probably closer to that of Thailand or Viet Nam.

The per-user bandwidth in CLM is quite limited compared with that of Thailand or Viet Nam. The gap will be even wider if the speed of the increase in network bandwidth does not catch up with the rise in internet penetration (Table 2). There is a two-sided story here. On the one side, according to Cisco (2019), to use advanced cloud apps, the network speed of download and upload needs to be higher than 2.5 Megabits per second (Mbps) and 1.0 Mbps, respectively, and the network latency must be less than 100 milliseconds. If that is true, the whole GMS has met the minimum requirements and will be able to

benefit from the latest digital technology, such as cloud computing and big data. On the other side, since China is advancing in 5G networks, and Thailand and Viet Nam are also interested in adopting the new technology, CLM needs to catch up quicker, perhaps in a leapfrogging way, to level up the overall digital connectivity in the GMS.

Table 2: Mobile Network Infrastructure

Country	Index of network infrastructure*	Mobile connection		Bandwidth capacity	
		Average upload speed (Mbps)	Average download speed (Mbps)	Total bandwidth (Gbps)	Per internet user (Kbps)
Cambodia	53.03	8.6	7.4	102 ~ 174	19 ~ 32
Lao PDR	43.57	n.a.	n.a.	~32.2	~18.4
Myanmar	51.80	14.4	22.7	83 ~ 92	6 ~ 7
Thailand	64.30	9.9	15.4	1,764 ~ 4,364	48 ~ 120
Viet Nam	59.84	7.7	14.3	4,038 ~ 6,100	91 ~ 137
China	73.90	18.1	42.2	10,993 ~ 20,785	15 ~ 28

Gbps = Gigabits per second, Kbps = Kilobits per second, Lao PDR = Lao People's Democratic Republic, Mbps = Megabits per second, n.a. = data not available.
*The value of the index ranges from 0 to 100. The higher the value, the better infrastructure of the mobile network.
Source: Author. Based on EIU (2019), ITU (2019), World Bank (2019), and GSMA (2019).

Cambodia and Myanmar face an additional challenge from the limits to electricity access in rural areas. The rural population accounts for 80% of Cambodia's total population and 65% of that of Myanmar. In both countries, more than 60% of the rural population still does not have access to electricity. Without the necessary energy supply, it will be difficult for people to adopt ICT technology in daily life (Table 3).

Table 3: Electricity Access

Country	Electricity access		
	Urban (% of urban population)	Rural (% of rural population)	Share of rural population (% of total population)
Cambodia	100.0	36.5	79.1
Lao PDR	97.4	80.3	60.3
Myanmar	89.5	39.8	65.4
Thailand	99.9	100.0	48.5
Viet Nam	100.0	100.0	65.8
Guangxi, China	100.0	100.0	49.8
Yunnan, China	100.0	100.0	52.2
China	100.0	100.0	43.2

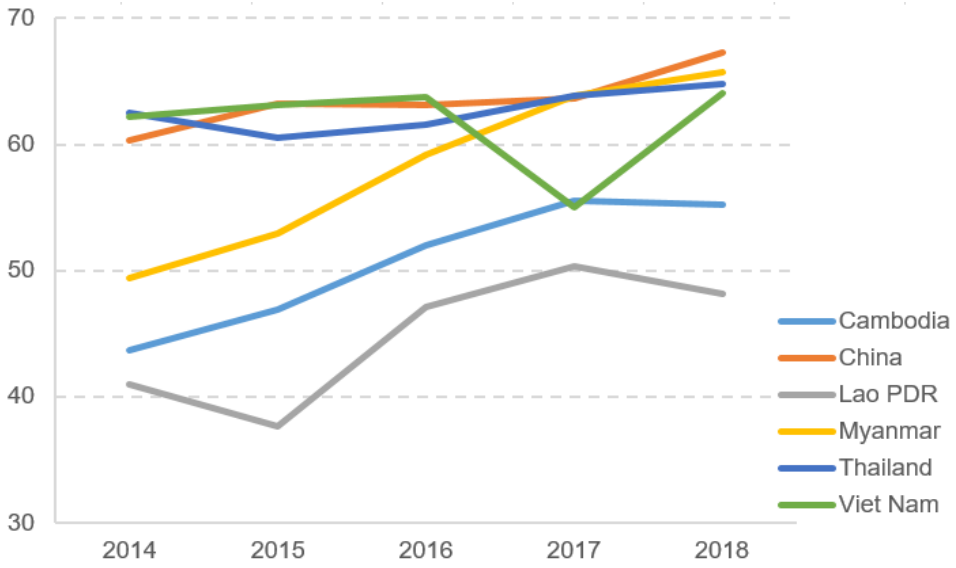
Lao PDR = Lao People's Democratic Republic.
Source: Author. Raw data from ITU (2019).

2.2. Affordability of Internet Access

The affordability of using the internet is an important factor worth considering. In the past decade, the cost of internet access, especially with mobile connection, has been driven down dramatically thanks to technological progress and market competition. This has particular implications for digital adoption in regions such as the GMS, where smartphones are the main devices that people use for internet access.

According to GSMA (2019), the affordability of mobile connection in GMS countries has improved substantially since 2014 (Figure 1). Indeed, using mobile connection to access the internet is now more affordable in Myanmar than in most other ASEAN Member States (Chen, 2020). Regionally, the gap across countries has narrowed from 2014 to 2018.

Figure 1: Affordability of Mobile Connection in the GMS

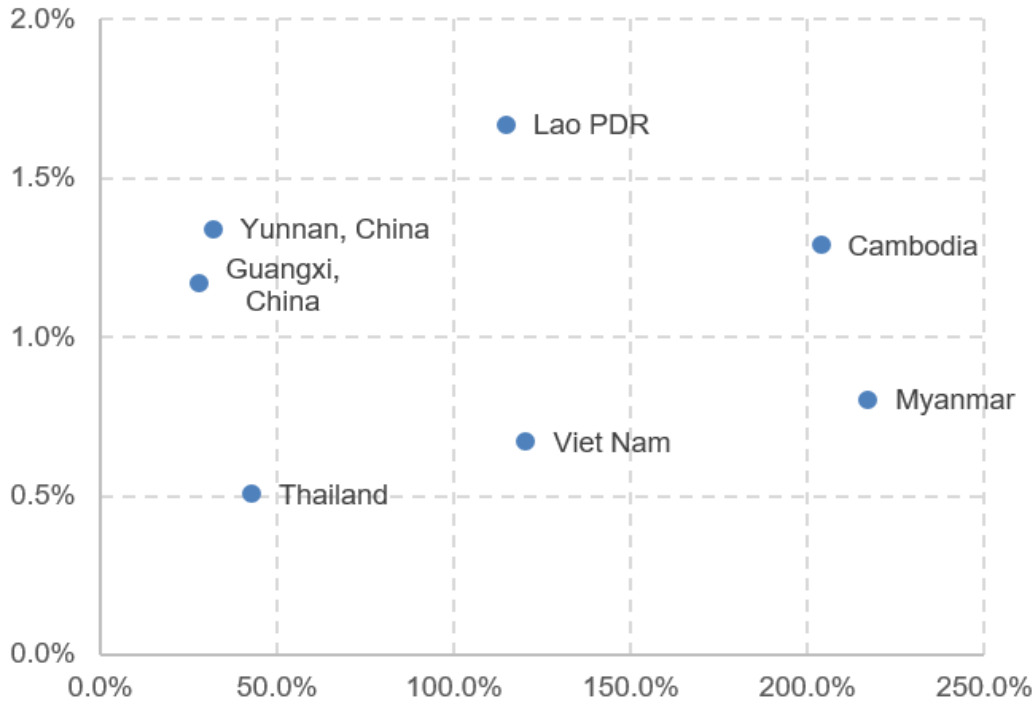


GMS = Greater Mekong Subregion, Lao PDR = Lao People's Democratic Republic.
Notes: The vertical axis shows the value of the GSMA index of affordability, which measures the availability of mobile services and devices at price points that reflect the level of income across a national population. The value ranges from 0 to 100. It is more affordable for people in countries with a higher score on the index to use mobile connection to access the internet.
Source: Author. Raw data from GSMA (2019).

The selling price of mobile phones does not vary greatly across countries. In 2017, the global average selling price of a smartphone (an internet enabled device) was about $235 (IDC, 2018). This is equivalent to about 5% of the average monthly income of consumers in Singapore, but costs people in Cambodia or Myanmar 2 months of average income.

The price of mobile data varies across different service packages and countries. The average 1 Gigabit mobile data package ranges from $0.87 in Myanmar to $9.89 in China. Figure 2 reveals more details on the relative cost of mobile data use (indicated by the vertical axis) and the relative price of an Android internet-enabled device (indicated by the horizontal axis).

Figure 2: Relative Price of Smartphones and Mobile Data



Notes: The vertical axis shows the price of a 1 Gigabit mobile data package as a share of per capita monthly income. The horizontal axis shows the price of an Android internet-enabled device related to per capita monthly income.
Source: Author. Raw data from Cable.co.uk (2020), Worldwide mobile data pricing. www.cable.co.uk (19 November 2019); IDC (2018); and World Bank (2019).

Two issues are worth noting here. First, the IDC (2018) data are based on the country's national average level, but it usually costs more to use mobile connections to access the internet in rural areas, especially remote villages, where the telecom network building normally lags behind urban areas. Second, when taking into account the wide existence of urban–rural income gaps, the affordability of internet access in the GMS could be lower than the level that Figure 2 reveals. For instance, in China's Yunnan Province, the per capita monthly income of residents in rural areas was only one-fourth of that in urban areas (National Statistics Bureau of China, 2019).

2.3. Content and Services

The richness and variety of content and services that the internet can provide will also be an important measure of digital infrastructure. Technically speaking, access to the internet is access to the online resource. From the end-user's perspective, it is not the raw data or resource, but the information after filtering and verification, that will be most useful. The more content people can access online, the more they will use the internet and the more information people will post on it.

The first three columns of Table 4 review the development of e-finance, e-health, and e-commerce content based on the Economic Intelligence Unit survey and rating (EIU, 2019). Feedback from interviewees showed little difference between countries in the field of e-finance development. The development of e-health seems to be more advanced in Myanmar, Thailand, and Viet Nam than in China and Cambodia. Most interviewees in

China and Thailand are satisfied with the richness of e-commerce content. In comparison, e-commerce in Cambodia and Myanmar seems to be at the early stage of development.[24]

Table 4: Content of the Internet, Qualitative Rating, and Score

Country	E-finance content (0–2, 2 = best)	E-health content (0–3, 3 = best)	E-commerce content (0–100, 100 = best)	E-participation index (0–1, 1 = best)
Cambodia	2	2	29	0.25
Lao PDR	n.a.	n.a.	n.a.	0.17
Myanmar	2	3	23	0.13
Thailand	2	3	68	0.65
Viet Nam	2	3	50	0.69
China	2	2	60	0.90

Lao PDR = Lao People's Democratic Republic, n.a. = not available.
Sources: EIU (2019); United Nations (2018).

The last column of Table 4 – the United Nations E-Participation Index – compares the quality, relevance, and usefulness of governments' use of online services in providing information to their citizens as well as their interaction with stakeholders and involvement in decision-making processes. It shows that CLM lags behind in promoting online public services and citizen engagement, which is an important element of internet development. In general, the status of CLM's e-government is much lower than either the world average value or that of ASEAN (Chen, 2020).

2.4. Security and Reliability

Cybersecurity measures are necessary to ensure the free flow of data with trust. Possible cyberthreats include theft (of identity, personal data, or secrets); infringement of intellectual property rights; denial of service; leakage of private information; and disruption of critical infrastructure. The level of organisation and sophistication of cyberthreats has increased significantly (OECD, 2012). In terms of digital connectivity, it is important to improve security in 'cyberspace' and prevent users from incurring losses due to malicious cyberactivity.

Table 5 contains two indices: CyberGreen's index of online security and the Global Cybersecurity Index for GMS countries. CyberGreen's index focuses on the technical aspect, based on the presence of five types of open services (NTP, DNS, SSDP, SNMP, and CHARGEN)[25] in a country and their respective amplification factors. The Global Cybersecurity Index reflects a country's systematic approach to improve cybersecurity

[24] No data are available for the Lao PDR either because the country was not included in the EUI (2019) survey or due to insufficient feedback.
[25] NTP = Network Time Protocol, DNS = Domain Name System, SSDP = Simple Service Discovery Protocol, SNMP = Simple Network Management Protocol, and CHARGEN = Character Generator Protocol.

through (i) legal measures, (ii) technical measures, (iii) organisational measures, (iv) capacity building, and (v) cooperation.

Table 5: Cybersecurity – Potential Risks and Preparedness

Country	CyberGreen's index of online security			GCI		
	Score (0–1, 1 = best)	**Ranking** (Out of 244)	**Potential risk level**	**Score** (0–1, 1 = best)	**Ranking** (Out of 175)	**Level of commitment**
Cambodia	0.30	72	High	0.16	131	Low
Lao PDR	0.56	136	Moderate	0.19	120	Low
Myanmar	0.48	117	Moderate	0.17	128	Low
Thailand	0.08	20	High	0.79	35	High
Viet Nam	0.14	35	High	0.69	50	High
China	0.01	2	High	0.83	27	High

GCI = Global Cybersecurity Index, Lao PDR = Lao People's Democratic Republic.
Source: Author. Based on Estonian e-Governance Academy (2019) and CyberGreen (2020).

In the GMS, the three most advanced countries in digitalisation (China, Thailand, and Viet Nam) all face a relatively high cybersecurity risk, while the risk in the Lao PDR and Myanmar is classified as moderate. This suggests that the increasing popularisation of internet use and the rising potential of cyberthreats go hand in hand. There is a clear benchmark for the GMS countries' commitment to implement cybersecurity measures – CLM has a low level of commitment, while the others have a high level of commitment.

Cambodia is of particular concern, as it faces a high level of risk but has a low level of commitment to improve cybersecurity. From a regional perspective, Cambodia's cybersecurity needs to improve. Otherwise, potential cyberattacks could start at the weakest link and spill over to the regional digital ecosystem. Unbalanced cybersecurity development would hinder regional data flows and increase the cost and risk of doing business online. Improvements in national capacity to adopt and integrate cybersecurity will require efforts in areas such as law enforcement, education, intra-state cooperation, and public–private partnerships.

2.5. Policy Discussion

Economies of scale in ICT infrastructure are significant. The fixed cost of building, maintaining, and upgrading telecom networks is high – requiring large capital, technological, and managerial inputs. The cost of expanding existing networks is usually lower than that of constructing a new network from the ground. Once the network is established, the cost of adding new users tends to be marginal. In terms of digitalisation in the GMS, market mechanisms may not be sufficient to promote ICT infrastructure due to geographical remoteness, immature market economies, and the consequent relatively low return on investment. In this regard, subregional cooperation in joint projects and network sharing will be encouraged. For all participants, cross-border collaboration could

help avoid unnecessary overlapping in infrastructure and make it easier to reach the desired scale to ensure that projects are profitable and sustainable.

For instance, to improve the affordability of data connectivity in the GMS, intergovernmental cooperation or/and public–private partnerships in ICT infrastructure building are necessary but not sufficient. To drive down the cost of mobile data, international cooperation and policy coordination are also needed to promote fair competition amongst internet service providers.

Cooperation in e-government tends to have deep implications for GMS development as well. Basically, it is highly recommended that GMS parties place more emphasis on providing information to their citizens, interacting with stakeholders, and engaging in decision-making processes. It is worth noting that low national incomes and limited government resources or capacity need not be obstacles to e-government (Chen, 2020). Changing the mindset, of both the government and the public, is the most important task. On the one hand, better access to online public services will increase public awareness of policies and regulations and facilitate their implementation and enforcement. On the other hand, feedback via the online platform helps policymakers make decisions and take action more quickly in response to public needs.

Two sectors – e-finance and e-healthcare – may require particular attention when considering improving the digital connectivity of the GMS since they are both very relevant to people's daily lives. Digital tools and apps in these areas provide alternatives for users, especially remote or less developed villages, to obtain access to online resources. All users tend to benefit from cross-border cooperation that increases the richness and variety of information and services. In a recent study, Walsh (2019) showed that many people in Myanmar use their mobile phones to access online healthcare information or receive telemedicine from Thai or Vietnamese doctors.

3. Free Flow of Data with Trust in the GMS

Institutional efforts to improve data connectivity are equally critical, if not more important than, digital infrastructure. One must bear in mind that cyberspace was created to be borderless. Rules and regulations in cyberspace are supposed to deal with issues related to privacy, cybersecurity, or sensitive national interests to protect and facilitate data flows on the internet instead of posing artificial obstacles to their free flow.

The establishment of international rules and regulations will enhance market drivers and strengthen such connectivity. This calls for multilayered cooperation, including public–private partnership, inter-institutional cooperation, subregional cooperation, and coordination amongst different government departments.

3.1. International Rule Setting for Data Flows

Globally, there are multiple approaches to data connectivity. Multilateralism will be the best option for rule setting given its fundamental role in global trade governance. Some

related rules are in existing World Trade Organization (WTO) agreements,[26] but a multilateral agreement on governing cross-border data flows has not yet been agreed. Asian countries are active in pushing forward WTO talks on digital trade. On the impetus of Australia, Japan, and Singapore, 70 WTO members signed the Joint Statement on Electronic Commerce at the 11th WTO Ministerial Conference in Buenos Aires in December 2017; and some 76 WTO members agreed to commence e-commerce talks on 25 January 2018.

The multilateral trade talks are progressing slowly because of significant differences amongst WTO members. For instance, while the European Union (EU) and Singapore focus on establishing an e-commerce enabling environment, others such as Japan, Brazil, and the United States want to discuss the enabling environment more extensively for various flows related to digital trade. As for the goals of the talks, some want clear rules governing the exchange of data, others think about how to facilitate data-driven growth, and still others are more focused on bolstering e-commerce.

The alternative free trade agreement (FTA) approach seems to progress at a faster pace. In addition to the ASEAN Agreement on Electronic Commerce, which contains non-binding provisions on cross-border data issues, the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), EU–Japan Economic Partnership Agreement, and the recent Singapore–EU FTA all include binding provisions on cross-border data flows. The CPTPP makes the free flow of data a default and requires member states to establish rules to protect the privacy of individuals and firms. It bans data localisation (requirements that data be produced or stored in local servers) and prohibits forced sharing of source codes. In the EU–Japan Economic Partnership Agreement, both parties agreed to recognise each other's data protection systems as 'equivalent', allowing data to flow safely between the EU and Japan. In the 2019 Singapore–EU FTA, cross-border data flow is treated as part of cross-border services. Each party has made commitments on protecting privacy and personal data, including individual records and accounts, with appropriate safeguard measures.

All three FTAs contain exceptions, which may help governments achieve legitimate domestic policy objectives, including rules to protect public morals, public order, public health, public safety, and privacy related to data processing and dissemination. However, governments can only take advantage of the exceptions if they are necessary, performed in the least trade-distorting manner possible, and do not impose restrictions on the transfer of information that are greater than what is needed to achieve that government's objectives.

3.2. Institutional Cooperation

Table 6 lists some policy plans that have been published or drafted by GMS parties. These plans have common interests and targets of digital development, such as

[26] Such as the General Agreement on Tariffs and Trade (GATT), the General Agreement on Trade in Services (GATS), the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), the Agreement on Technical Barriers to Trade, and the Information Technology Agreement (ITA and ITA2).

telecommunications infrastructure for high-speed internet, higher internet coverage, a high level of internet access and affordability, and higher human capacity. This will, to a great extent, pave the way for subregional cooperation amongst all parties involved. Moreover, the governments' establishment of special administrative units for digital development tends to increase the efficiency of cooperation in various areas related to the improvement of cross-border digital connectivity, from internet infrastructure to rule setting for regulations.

Table 6: Digital Development Plans

Country	Authority	Policy plan
Cambodia	• Ministry of Posts and Telecommunications • Telecommunication Regulator of Cambodia	• Policy for the Development of Telecommunication/ICT, 2020
Lao PDR	• Ministry of Post and Telecommunications • Lao Telecommunication Regulatory Authority	• 2nd Five-Year Development Plan of Posts and Telecommunications Sector, 2016–2020 • ICT Vision 2030
Myanmar	• Ministry of Transport and Communications • Myanmar Communications Regulatory Commission	• Telecommunications master plan (draft) • Universal Service Strategy for Myanmar, 2018–2022 (draft) • Myanmar e-Governance Master Plan, 2016–2020
Thailand	• Ministry of Digital Economy and Society • National Broadcasting and Telecommunications Commission	• 12th National Economic and Social Development Plan, 2017–2021 • Thailand Digital Economy and Society Development Plan • National Broadband Policy
Viet Nam	• Ministry of Information and Communications • Authority of Telecommunications	• National Telecommunications Development Plan • Master Plan of Broadband Infrastructure Development to 2020
Guangxi, China	• Government of Guangxi Zhuang Autonomous Region • Leading group of Digital Guangxi	• Guangxi Digital Development Plan, 2018–2025
Yunnan, China	• Government of Yunnan Province • Development and Reform Committee of Yunnan Province	• Digital Yunan, 2019–2021

ICT = information and communication technology, Lao PDR = Lao People's Democratic Republic.
Source: Author.

Regionally, ASEAN has made substantial progress and reached several milestones in rule setting for digital connectivity since 2000. In addition to the establishment of the E-ASEAN Framework Agreement in 2000 and the ASEAN Economic Community Blueprint 2025,

which highlighted the role of ICT development in ASEAN's economic and social transformation, recent progress includes the ASEAN Digital Integration Framework and the ASEAN Agreement on E-commerce in 2018 as well as the ratification of the ASEAN Digital Integration Framework Action Plan, 2019–2025.[27]

3.3. Policy Discussion

The real effect of all this digital-promoting policy and cooperation, either globally or regionally, depends on how well these agreements and action plans are implemented. When considering the governance of cross-border data flows, especially that of personal data, there is no common position. Even within ASEAN, Member States hold different attitudes and progress at a different pace in domestic rule setting – Indonesia, Malaysia, the Philippines, and Singapore have recently passed new laws; Thailand is considering such rules; and Brunei Darussalam and CLM have no personal data protection laws and regulations.

While countries such as Singapore are strongly against data localisation measures, many others, such as Indonesia, Malaysia, and Viet Nam, have adopted or are considering laws requiring that data generated locally on their citizens and residents be kept within their geographical boundaries and remain subject to domestic law. For instance, the cybersecurity law that entered into effect in Viet Nam in early 2019 allows the government to regulate the data processing methods of technology companies that operate in the country and restrict the internet connections of users who post 'prohibited' content online. Improving regional digital connectivity requires countries to change their mindsets and adopt more open policies on data.

In principle, improving digital connectivity requires substantial efforts regarding (i) rules and regulations to support digital connectivity, (ii) policy action plans to allow new technologies and business models to increase inclusiveness, and (iii) the harmonisation of countries' national strategies and the masterplan of regional cooperation and development.

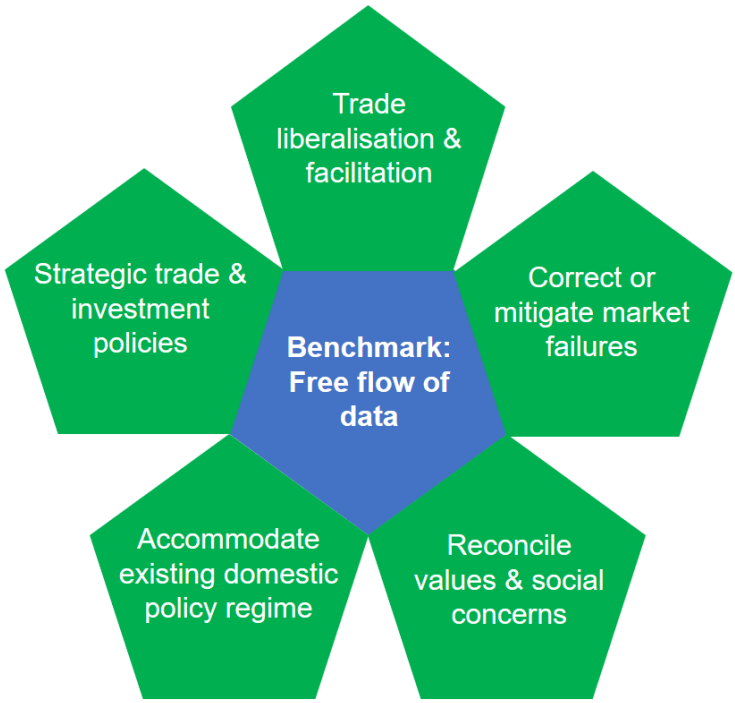
GMS parties will consider collaborating closely in related areas and if possible, provide prototype experience for regional cooperation in ASEAN and East Asia. For policy supporting data connectivity, Kimura et al. (2019) suggested free flow of data supported by a series of policies to accelerate digital transformation in a policy brief for G20 leaders. The proposed policy framework will be a useful reference for further institutional efforts on promoting digital connectivity in the GMS.

As Figure 3 illustrates, the Kimura et al. (2019) framework places free flow of data as a logical benchmark and classifies supporting policies into five categories. The first category contains policies related to trade liberalisation and facilitation. International trade and production sharing will play an important role in GMS development, which requires continuous effort on tariff elimination, the removal of nontariff measures, service

[27] The ASEAN Digital Integration Framework Action Plan emphasised (i) trade facilitation, (ii) data protection for digital trade, (iii) digital payments, (iv) the digital workforce, and (v) digital entrepreneurship.

liberalisation, and trade facilitation. For each GMS party, step one of fast growth is to become more deeply involved in the economic corridor(s) and to 'link up' with underlying production value chains by adopting instruments that promote digital trade, such as duty-free electronic transmissions, e-signatures and e-authentication, and de minimis tariff exemptions.

Figure 3: Policy Framework for Free Flow of Data with Trust



Source: Author. Based on Kimura et al. (2019).

The second concern is about the potential market failure. In the data-driven economy, potential market failure may come from network externalities, economies of scale, information asymmetry, or any combination of these conditions. Policy efforts on competition policy, consumer protection, and intellectual property rights protection will be needed to cope with the market distortion.

Broadly, digital transformation occurs not only in the economic domain, but also in the socio-cultural dimension. This requires the establishment and implementation of international norms on the free flow of data to reconcile values and social concerns regarding economic efficiency, especially from the aspect of data privacy protection and cybersecurity.

The fourth category consists of international–domestic policy synchronisation in accommodating data flows and data-related affairs to support the incorporation of new technologies, such as artificial intelligence and financial technology (fintech), in the economy and society. In particular, related decisions in the context of GMS cooperation

will accommodate all parties' domestic regimes and seek a balance between market efficiency and fairness from a (sub-)regional perspective.

Finally, the digital economy tends to provide a novel angle for inclusive growth. The GMS, at least part of the region, will be able to create opportunities to leapfrog to a new paradigm of globalisation (the third unbundling) with proper strategic trade and investment policies to nurture their own industries in new data-related business. In this process, some measures may look similar to those of infant industry protection and require consensus or/and mutual understanding amongst all parties involved.

4. Concluding Remarks

Digitalisation will have important implications for the future development of the GMS. Digitalisation has the potential to create the opportunity for fast growth; and certain conditions will be needed to unlock such potential. Regarding GMS development, improving digital connectivity is a fundamental task, of which data connectivity will be a priority. In particular, policymakers shall pay particular attention to bridging the possible digital divide associated with the existence of development gaps in the region. In addition to digital infrastructure building, another policy focus is to facilitate data flows and unleash the power of data. Subregional cooperation and collaboration need to be enhanced in three dimensions.

First, subregional cooperation in ICT infrastructure building and related logistic construction. Digital connectivity is a broad concept. In general, improving digital connectivity requires substantial efforts on improving connectivity infrastructure in both the physical world and cyberspace, rule setting to support a development-friendly ecosystem for digitalisation, and combining countries' national strategies and regional collaboration in eliminating institutional barriers.

Second, public–private partnerships in capacity building and mitigating market inefficiency. Due to the GMS's overall stage of development and the existence of development gaps, capacity building to support latecomers' catching-up process is highly recommended. For data connectivity and digital infrastructure, obstacles may come from capacity and resource limits, either capital or technology or both. The public sector may still need to take the lead to initiate and drive the increased supply of public goods in both quantity and quality. Private sector involvement will be equally important to make the development sustainable.

Third, information sharing in support of production sharing and economic cooperation. Data and information available on the internet shall be the new resource of development. It will be a new element of GMS cooperation to enhance data connectivity and share online resources, of which a critical step is realising free flow of data with trust. An integrated digital ecosystem will have deep implications for GMS development through its efforts on facilitating trade and investment and accelerating the adoption of new technologies, new digital tools, and new business models in the region.

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