Digital Transformation in Southeast Asia during the Pandemic
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Enabling Transformation or Exacerbating Inequality?

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Abstract:

The COVID-19 pandemic has accelerated the use of digital technologies and prompted innovations like work from home, online shopping for essentials, digital collaborations, and e-governance. During the pandemic, more than two third of the population 600 million in Southeast Asia were online and Internet economy came to a trajectory that would triple in value by 2025. Information and Communication Technologies hold the potential of level the playing field by bringing education, healthcare, and marketplace to everyone's fingertips, eliminating the middleman in business, and long commutes to schools and hospitals. More than one-third of the customers explored a new online service due to this push towards digital adaption in COVID-19 pandemic.

Information and Communication Technologies are catalytic means to enable the achievement of SDGs, specifically Quality Education, Gender Equality, Industry Innovation and Infrastructure, and Partnership for the Goals for implementation. ICT infrastructure maturity has been thought to increase GDP growth significantly through Global Connectivity. However, a third of the 600 million Southeast Asian population were found to be lacking access to a functioning internet or a digital device. Stark digital divide emerged among income groups, rural and urban populations, formal and informal workers, and male and female populations.

The perils of people outside of the digital space exposed how inequality remained significant as technology progressed. The ASEAN government bodies should ensure proper implementation of the collaborative plans across member states to help ASEAN achieve sustainable progress in the whole region. ASEAN may consider establishing ICT governance committee across the region to cooperate in building a technological framework that will improve inclusivity and equality across these countries.

This paper will present theories, literature, and pre-COVID-19 practices that points towards digitalization enabling further economic and social inclusivity and contrast them with incidences, practices, and cases in Southeast Asia and beyond, where large proportions of people have been unable to participate in the newly

emerged digital ecosystem due to their class, place of habitat, gender, and income level. The objective is to understand what the digital divide could mean for sustainable development goals like reduced inequalities, decent work & economic growth, quality education, gender equality, and good health and what could be the solutions moving forward into this decade.

The paper will reflect upon actions undertaken by the ASEAN region, both individually and collaboratively, to address new momentum of digital transformation due to COVID-19. This will help compare actions taken by government and ASEAN before COVID-19 that have helped them tackle this pandemic and analyze the new cracks exposed by the pandemic. This will help in future policies and regional collaborative plans by individual governments and ASEAN. Particularly the developing economies unable to afford the rising costs of internet connectivity, urther widening the digital divide.

Introduction

The 10-country Association of Southeast Asian Nations (ASEAN) – comprising of Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam – is one of the world's fastest growing economic regions with one of the world's highest average regional GDP growth rate. The revised ASEAN average GDP growth rate stood at 4.8 percent that many developed countries struggle to reach. (Medina 2020)

The COVID-19 pandemic has thrown the whole world into chaos – including the ASEAN countries. With a virus restricting almost everyone into their houses, digital infrastructure became an immediate necessity across households and businesses to carry on their daily lives. Employees started to work from home through communicating on virtual platforms while students started attending school online. New industries like Telemedicine and E-commerce emerged overnight with remote working (work from home) expected to become a norm, even after the pandemic has passed. The region now has over 400 million internet users opening new digital opportunities but also growing concern of lack of digital inclusivity. (Medina 2020)

As IMF anticipates a strong global GDP growth in 2021, ASEAN member countries are looking forwards to digital connectivity to boost the economic recovery from COVID-19. ASEAN's foundation of their ICT infrastructure played a crucial role during the COVID-19 outbreak through digital trade among businesses, digital communications, and adoptions of robotics by manufacturing businesses, and also benefiting the healthcare industries to thrive. Many ASEAN countries are looking forwards to utilize the digital push by COVID-19 by investing in next generation technologies such as 5G network which is almost 50 times faster than the current 4G networks, Cloud computing services, Internet of Things (IoT), and even in Artificial Intelligence. Governments would collaborate with these industries to support this digital transformation.

Pre-COVID ICT Infrastructure across ASEAN

Long before the COVID-19 pandemic shook the world and pushed everyone towards a global digital transformation, Southeast Asia has been progressively improving its internet connectivity. ASEAN has the world's fastest growing internet market with about 125,000 new users starting to use the internet – even before COVID-19. The region's digital economy is expected to increase the regional GDP by USD 1 Trillion, according to the World Economic Forum. (World Economic Forum n.d.)

The region has ICT qualifier like Singapore with ICT infrastructures enabling to fully cover its population under 4G network (100% LTE Coverage), digitally connect almost all households through broadband (113% coverage & 98% household internet use). However, Singapore was only able to do it due to its high income of more than USD 65,000. It's not the case for the rest of the ASEAN countries. Almost all ASEAN countries have a good 4G connection (LTE) with at least 76% coverage (except Laos) – possibly derived through the demand of smartphones uses. Laos was the only country behind with less than 50% LTE coverage. [Refer Table 01] (ASEAN Digital Masterplan 2025 2020, 45,50)

Table 01: ICT Infrastructure & Spending against Average Country Income of ASEAN in 2019

ASEAN Countries	GDP per Capita in USD	LTE Coverage (2019) as % of population	Fixed Broadband (2019) as % of houses	Avg. Int. bandwidth in kbits/sec/pop (Avg 2017-19)	Telecoms Investment as USD/pop (2019)	Internet Usage as % of household (2019)
Myanmar	1,408	76%	1%	3	-	-
Cambodia	1,643	80%	6%	18	23	40%
Laos	2,535	43%	7%	14	15	-
Vietnam	2,715	97%	77%	66	-	47%
Philippines	3,485	94%	19%	11	14	-
Indonesia	4,136	98%	14%	22	13	66%
Thailand	7,808	98%	51%	71	27	68%
Malaysia	11,415	93%	44%	56	73	87%
Brunei	31,087	95%	69%	170	-	67%
Singapore	65,233	100%	113%	806	157	98%

Table 01: The latest ICT infrastructure, ICT spending by government and ICT consumption against the average income of the 10 ASEAN member countries in 2019 ranked in descending order of GDP per Capita. (ASEAN Digital Masterplan 2025 2020, 45, 50)

However, if we refer to other ICT infrastructure position of rest of the ASEAN countries, the numbers do not look good for everyone. Myanmar barely has broadband connections (1% broadband coverage), followed by Cambodia (6%) and Laos (7%). On the other hand, despite being a low disposable household income of just USD 2,715 – Vietnam has ensured internet access to majority of the households (77% broadband coverage) (ASEAN Digital Masterplan 2025 2020, 45,50). This could be one of the reasons why Vietnam has the best economic performance among its ASEAN members: with 2.91% GDP growth even during the pandemic – a feat that even Singapore failed to achieve (with 5.39% contraction of the GDP) [Refer to Table 04] (GDP growth rate (World Bank) 2020).

In terms of IDI, only Singapore dominated the ASEAN region with the only one to be in top 20 of the World IDI ranking from the ASEAN region, due to major investments the country has done in the ICT infrastructure [Refer to Table 01]. Although countries like Brunei (53rd), Malaysia (63rd) and Thailand (78th) barely made it to the top 100, majority of the ASEAN countries are lagging behind significantly in terms of the ICT Infrastructure they have developed to cater to the technological demand of their citizens – which has increased due to the push of the COVID-19 pandemic. However, the countries show promising improvements as Laos (139th) and Myanmar (135th) gained two of the highest IDI value jump from previous years [Refer to Table 02]. The significant growth is due to huge rooms for improvement for these two countries. Considering Brunei has the second largest income (GDP per capita), it has the potential to improve its ICT infrastructure significantly. The country has similar internet usage to Thailand and Indonesia and moderate broadband coverage (69%).

Table 02: The latest ICT Development Index (IDI) of ASEAN countries in 2017 – by ITU

ASEAN Countries	IDI Value 2017	IDI Rank 2017	IDI Value Increase from previous year	IDI Value 2016
Brunei	6.75	53	2.90%	6.56
Cambodia	3.28	128	7.89%	3.04
Indonesia	4.33	111	12.47%	3.85
Laos	2.91	139	19.75%	2.43
Malaysia	6.38	63	2.57%	6.22
Myanmar	3.00	135	15.83%	2.59

Philippines	4.67	100	3.32%	4.52
Singapore	8.05	18	2.55%	7.85
Thailand	5.67	78	6.78%	5.31
Vietnam	4.43	108	5.98%	4.18

Table 02: The ICT Development Index (IDI) scores and ranks of the 10 ASEAN member countries according to the International Telecommunication Union (ITU) - (ICT Development Index 2017 - ITU Data n.d.)*. IDI after 2017 has not been launched as of yet.*

ICT infrastructure capacity expansion is largely driven by innovation, particularly technological innovation. The Global Innovation Index (GII) in table 03 provides a clear idea on which ASEAN member countries are able to rapidly improve their ICT Infrastructure for better digital transformation. Countries like Singapore is expected to have the highest GII among the ASEAN members (ranked 8th globally) given its robust infrastructure. Malaysia (33rd) also has a decent GII score indicating country's ability to improve ICT capacity significantly driven by an ICT dependent economy with 18.5% of the country's GDP coming from the ICT sector. [Refer to Table 03] (International Trade Administration 2020).

Half of the ASEAN countries are in the income-categorized top ten list of the Global Innovation Index (Dutta, Lanvin and Wunsch-Vincent 2020). The Global Innovation Index (GII) takes the pulse of the most recent global innovation trends and ranks the innovation ecosystem performance of economies around the globe each year. Innovation plays a key role in the development of an economy's ICT development progress. (World Intellectual Property Organization (WIPO) n.d.)

Table 03: The latest Global Innovation Index (GII) of ASEAN countries in 2020

ASEAN Countries	Global Innovation Index 2020 (on a scale of 100)	GII Global Ranking
Brunei	29.82	71
Cambodia	21.46	110
Indonesia	26.49	85
Laos	20.65	113
Malaysia	42.42	33
Myanmar	24.98	129
Philippines	35.19	50
Singapore	56.61	8
Thailand	36.68	44
Vietnam	37.12	42

Table 03: The latest available Global Innovation Index (2020) and ranks of the ASEAN member countries during the COVID pandemic. (Dutta, Lanvin and Wunsch-Vincent 2020)

The Impact of COVID-19 on Digital Transformation & Inclusivity and Government preventative actions:

The pandemic shook the whole world when the virus started spreading in early 2020. Businesses and Colleges started to shut down as lockdown was announced across the world as nations tried to contain the virus. At the start of the pandemic, Southeast Asian countries has been praised for their strict policies to prevent large spreads which resulted in sharp decline in economic output. Majority of ASEAN member countries had large GDP contraction, while the rest barely survived with a small GDP growth (World Bank 2020). Southeast Asian governments took desperate measures to cushion the blow faced from the COVID-19 pandemic due to fall in consumer spending, reduced business operability, and even affected individual income of the citizens.

The Malaysian government announced wage subsidies of RM 4,000 (~ USD 950) for 9 months (KPMG 2020). The government also announced Micro Credit Scheme for small entrepreneurs and grants or loan facilities to

other businesses and declared the national recovery plan PENJANA where RM 0.08 Billion (~ USD 18.91 Million) was dedicated for Technology Innovation (KPMG 2020). Almost half of the firms in Malaysia are currently implementing digital transformation as a response to the new normal after COVID-19 impact (Forrester Research 2021). In a survey conducted by ERIA (AmCHam survey), it was also deduced that about 6% of the respondent who were foreign companies are considering shifting to Malaysia. The country was the third choice after Philippines (11%) and Indonesia (8%). Vietnam and Singapore was also the third choice with 6% respondents choosing each of these countries for relocation purposes (ERIA & AmCham Indonesia 2021). Malaysian Investment Development Authority (MIDA) even started looking into high technology areas to support in post-COVID transformation to assist businesses and industries. (Flanders Trade 2021).

Thailand has launched their development plan "Thailand 4.0" – that would target in enhancing the capabilities of the local businesses environment (particularly private sector) and enabling a transparent government. The Thai government also addressed it as a mean to provide equitable access to public services and their data for its citizens by utilizing digital technology (Bangkok Post 2021). Vietnamese businesses have undertaken actions to rapidly infuse digital advancements in offering new services to meet new demand derived by the technological push by COVID-19 (Vu Le and Nguyen 2021). Brunei launched their 2025 Digital Economy Master Plan in response to the COVID-19 influenced digital technological wave. The plan is emphasized actions taken to improve several economic activities (Bgawan 2021).

Singapore, on the other hand, already has a sufficient digital technological structure – which is why many businesses have seen their "Digital Business Models" thrive as a result of COVID-19 push to technology. About 40% of the CEOs have admitted how this new digital transformation has helped them progress years into the future. The Singaporean Government has backed several initiatives towards the digital transformation and looks forward to be a star in terms of the digital transformation (KPMG 2020).

While digital transformation is inevitable almost in any country, the availability of these services to all of the citizens of the country is a crucial factor. With a sudden push towards such drastic technological change, businesses scrambled to survive and governments made policies to help local economic activities continue operations. While some Southeast Asian governments addressed equality of some technological facilities, it is concerning how a number of population would be digitally excluded either due to affordability or lack of ICT infrastructure to facilitate this digital transformation for everyone.

Table 04: The Internet Inclusivity Index ranks of the 10 ASEAN member countries in 2019

ASEAN Countries	Internet Inclusivity Index Rank 2019 (Pre-COVID)	Internet Inclusivity Index Rank 2021 (Post-COVID)	Position Lost
Brunei	-	-	-
Cambodia	79	83	4
Indonesia	56	66	10
Laos	-	88	-
Malaysia	37	42	5
Myanmar	74	80	6
Philippines	66	68	2
Singapore	4	12	8
Thailand	43	49	6
Vietnam	41	58	17

Table 04: The Internet Inclusivity Index ranks of the 10 ASEAN member countries in 2019 (pre-COVID) and the latest one in 2021 (post-COVID)
- (The Internet Inclusive Index 2021 2021), (The Inclusivity Internet Index 2019 2019)

Looking at the Internet Inclusivity Index, Singapore is the only performing well in the top 10, among its ASEAN neighbors (4th position in 2019). But even Singapore fell behind 8 position after the COVID impact losing its position top 10 position (12th position in 2021). It just shows how vulnerable digital inclusion is to rapid digital transformation. Each of the ASEAN countries saw worsened internet inclusivity according to the Internet Inclusivity Index with Vietnam seeing the worst impact by losing 17 positions – due to COVID-19. [Refer to Table 04] (The Inclusivity Internet Index 2019 2019) (The Internet Inclusive Index 2021 2021).

Singapore's remarkable feat in its technological development has helped it climb ranks to the global tops in terms of digital infrastructure as well as digital inclusion. But is due to Singapore's high income levels compared to its neighbors. As per Internet Inclusivity Index, Singapore is followed by Malaysia (42nd) and Thailand (49th) respectively in 2021 [Refer to Table 04]. It's no surprise that Malaysia has the 3rd highest income and Thailand is the 4th highest income among the ASEAN member countries [Refer to Table 01]. This clearly signifies how inclusivity could very well dependent on a country's individual income (GDP per capita) as government spending on ICT infrastructure is proportional to the country's income.

Table 05: A correlation study on ICT Infrastructure against per capita income, calculated from Table 01.

Correlation between LTE coverage & Income	Correlation between Broadband & Income	Correlation between Bandwidth & Income	Correlation between Telecom Investments & Income	Correlation between Internet Usage & Income
0.36	0.80	0.96	0.96	0.73

Table 05: These are the derived correlation data against per capita income for the ten member countries of ASEAN, calculated from Table 01. (ASEAN Digital Masterplan 2025 2020, 45, 50)

Table 05 represents a correlation between income and several ICT infrastructure measures of the ASEAN countries, it's quite evident how ICT infrastructural development is influenced by the country's average income. Government investments in Broadband coverage, Bandwidth strength and Telecom have high positive correlations with GDP per Capita – indicating affordability as the key reason for ICT Infrastructural progress to reach total inclusivity of the country's population into the ability to access digital technology. However, one infrastructure stood out having the lowest correlation of 0.36 compared to GDP per Capita – the LTE coverage [Refer to Table 05]. (ASEAN Digital Masterplan 2025 2020)

LTE or the 4G network is usually consumed through smartphones is the one infrastructure which is ensuring ICT access despite of income levels of the countries. Apart from Laos, almost all countries have a significant LTE coverage (at least 76%). Southeast Asian governments that have low income level can utilize this facility to improve digital inclusion in the new era of rapid digital transformation. [Refer to Table 01] (ASEAN Digital Masterplan 2025 2020)

Regional Collaboration to develop aid Digital Transformation & Inclusion by ASEAN:

The Southeast Asian countries have developed numerous plans and undertaken multiple strategies to improve their ICT infrastructure for sustainable economic growth, increased digital inclusivity and innovative industry. The countries adopted strategies across the whole region – both individually (local actions by government) and collectively (regional collaboration with ASEAN). The region was quite active in terms of developing plans to enhance its growing digital economy even before the COVID-19 pandemic hit. While the COVID-19 pandemic is going on, ASEAN also came with plans in respond to the new virus.

After the COVID-19 pandemic hit, the Southeast Asian countries undertook adaptive plans considering the recent impact of the COVID-19 pandemic. Let's analyze if these new objectives of these revised plans (or new masterplans) have successfully addressed the new challenges to rapid digital transformation – particularly digital inclusion.

1. ASEAN Comprehensive Recovery Framework (ACRF) – post-COVID:

The ASEAN Comprehensive Recovery Framework (ACRF) is developed as a strategy to relieve the region of the ongoing COVID-19 crisis. The ACRF recovery plan focuses on five Broad Strategies: (i) improve the health system, (ii) strengthen human security, (iii) increase the scope of the ASEAN market & its economy (iv) create an inclusive digital transformation and (v) create a resilient & sustainable future. (ASEAN 2020)

The fourth strategy focused on an inclusive digital transformation would leverage the ongoing transformational momentum due to the COVID-19 pandemic and pursue for a more inclusive digital transformation to improve the digital economy through facilitating industries like e-commerce, e-governments, e-services and even ICT based educational models. The strategy would focus on key areas that needs attention in sustaining the current digital transformation momentum including data governance, cybersecurity, legal framework and institutional capacity. (ASEAN 2020)

2. ASEAN ICT Masterplan 2020 (AIM 2020) – pre-COVID:

ASEAN has announced a master plan dedicated to improve the region's ICT infrastructure and grow their digital economy – the ASEAN ICT Masterplan 2020 also called the AIM 2020. The Masterplan was developed before the COVID-19 pandemic; it articulated ASEAN's ICT development plans for the period 2016 to 2020. The plan was aimed towards 5 key outcomes, one of which was **inclusivity** and 8 strategic thrusts that would push ASEAN towards a digitally transformed economic bloc. (ASEAN 2020, 1-2)

The AIM 2020 put significant interest in integration as one of its core strategies – which loosely targets digital inclusion. The strategy is further addresses digital inclusion specifically with one of 16 key initiative of AIM – initiative 2.1: "Strengthen Digital Inclusion in Asean". (ASEAN 2020, 8-9)

AIM 2020 indirectly worked to improve the digital inclusion of the whole ASEAN region through improving availability of ICT infrastructure that would eventually cater to the consumer or to the larger households for personal purposes that ultimately became a necessity during the COVID-19 pandemic, for instance the Initiative 2.1 directed towards achieving a better "digital inclusion".

AIM 2020 implementation successfully resulted in the identification of the underserved communities in terms of ICT infrastructure integration and recommendation were also developed to improve broadband connectivity and affordability. As no activities were undertaken to directly create an impact in terms of digital inclusion, there were not much window where there could have been a significant impact on the underprivileged. The activities that were implemented resided mostly in the field of planning and development and returned an average perceived value score of 6.1 – which was generally a strong score. (ASEAN 2020, 19-20)

3. ASEAN Digital Masterplan 2025 (ADM 2025) – after the COVID-19 pandemic:

ASEAN announced another master plan called the ASEAN Digital Masterplan 2025 (ADM 2025) that addresses the COVID-19 impact on digital transformation. The master plan was to improve both the digital economy and digital society within the ASEAN region. ADM 2025 dedicated primarily towards enabling the use of digital services more widely among the population of the region. ADM 2025 would also assist small and large businesses of the member states incorporate with digital technology, enhance regional trade through digital services and help recover the economy from the COVID-19 pandemic. (ASEAN Digital Masterplan 2025 2020, 4)

The 8 desired outcomes of ADM 2025 aim to improve the overall digital transformation for the economy and the people of the ASEAN member countries – especially in the post-COVID era. While the first desired outcome aims for a speedy recovery (DO1: Actions of ADM 2025 prioritized to speed ASEAN's recovery from

COVID-19), the masterplan also aimed at improving the ICT infrastructure (DO2: Increase in the quality and coverage of fixed and mobile broadband infrastructure) and also digital inclusivity (DO8: A digitally inclusive society in ASEAN). (ASEAN Digital Masterplan 2025 2020)

Under the Enabling Actions (EAS) of DO2 that focuses on ICT infrastructure, ASEAN authorities focused on encouraging more ICT investments, improve access towards better internet connectivity and ensure allocations across all regions. On the other hand EAS of DO8 focused on ensuring the citizens had the ability to use digital technology, improving affordability to access digital services and encourage adoption of digital technology. (ASEAN Digital Masterplan 2025 2020)

Conclusion – Digital Transformation or Exacerbating Inequality

There is no doubt how ASEAN countries have been steadily progressing in terms of digital technologies, through regional masterplans and even individual government's progress on ICT infrastructure. But digital inclusion has not been the primary focus of the ASEAN member countries, which is quite visible in the indices of Internet Inclusivity Index in Table 04 (an index that somewhat represent the digital inclusivity of the countries) and the level of internet usage in Table 01 (all ASEAN countries except Singapore have low internet usage, all below 70%). (ASEAN Digital Masterplan 2025 2020)

Although, ASEAN did aim to improve digital inclusivity in ASEAN ICT Masterplan 2020 (AIM 2020) – the actions lacked the gravity to make a difference. For instance, in AIM 2020's Action Point 2.1.1 – the action did try to identify the marginalized population requiring basic digital services which can later be provided to them. But in a pre-COVID world, there could have been possible hesitancy towards the use of such digital services which could have been addressed through digital practice adaptation of these marginalized populations. (ASEAN 2020). AIM 2020 rarely addressed issues that prevented citizens from accessing internet and digital services, issues that were later addressed in the ASEAN Digital Masterplan 2025 (ADM 2025) after COVID-19 pandemic exposed the weakness in digital inclusion. ASEAN countries are also put at a disadvantage in terms of their capability to improve their ICT Infrastructure to expand access to all of its citizen as it's highly dependent on a nation's ability to afford [Table 05 shows correlation between ICT infrastructure capacity and GDP per capita very high except LTE coverage, refer to Table 05].

In the post-COVID world, it's essential for the ASEAN member countries to opt for a more equitable access to the digitally transformed new normal. ADB 2025 has already identified the barriers to equitable access to digital connectivity which is availability and affordability. With successful plans to improve ICT infrastructure even in remote areas to improve availability and reduce internet prices to improve affordability, ASEAN would be able to be far more inclusive in terms of digital connectivity. With the desired outcome 08 of ADM 2025 (Digital Inclusion), the ASEAN member countries could expect a much better inclusivity which may even be reflected in the Internet Inclusivity Index [Refer to Table 04]. (ASEAN Digital Masterplan 2025 2020)

Each Southeast Asian countries' governments needs to primarily need to successfully implement the ADM 2025 across their countries for a better collaborative action on an inclusive digital transformation. Moreover, governments also need to invest significantly in improving ICT infrastructure and improve affordability of the internet connectivity even through means of subsidizing if necessary. Government should play to their strength, for instance low earning countries investing in LTE feature (4G connection on smartphones) which already has a good coverage in almost all ASEAN countries [Refer to table 01 & 05]. Investment in LTE would not only mean better coverage (instead of overlapping coverage in another sector), but also affordable access to internet as smartphones are cheaper compared to other internet-accessing electronic devices.

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