



**AN INFRASTRUCTURE-BASED
APPROACH TO ADVANCE DIGITAL
EQUITY IN SOUTH-EAST ASIA**



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AN INFRASTRUCTURE-BASED APPROACH TO ADVANCE DIGITAL EQUITY IN SOUTH-EAST ASIA

The digital divide consists of two main groups of communities

The unconnected



- Live in rural and remote areas, usually in developing countries
- Low income and less educated group

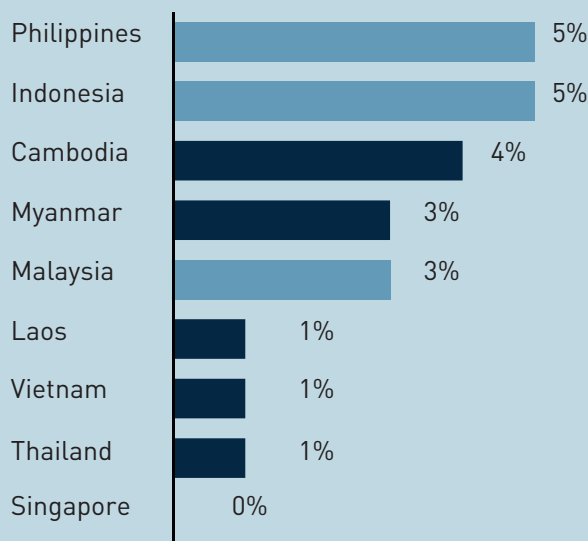
Those who lack meaningful connectivity



- Live in urban and suburban areas in both developing and developed countries
- Lack access to high-speed internet and face poor signal indoors

A small portion of rural population in our three focus SEA markets – Malaysia, Indonesia and the Philippines remain unconnected

Share of population without 4G coverage (2022)



In examining barriers to access, these markets face common issues including

- Coverage gaps perpetuated by lack of end-to-end connectivity infrastructure, particularly backhaul
- Limited consumer choice as many rural areas only have the presence of one mobile operator; economics do not permit smaller operators to deploy
- Weak coverage in essential facilities and other indoor premises

Individual markets also have their respective challenges

- Rights-of-way limitations
- High spectrum fees leading to lower network investment for rural areas
- Lack of a universal service fund



To address these barriers, nine policy themes stand out. Facilitating access to connectivity will open up vast opportunities to disadvantaged communities, enabling equitable growth

- 1 Reform the disbursement of universal service obligation/connectivity initiative funds
- 2 Conduct infrastructure mapping and improve access to information
- 3 Increase funding for backhaul infrastructure with shared access in rural areas
- 4 Create targeted programmes to improve coverage at essential facilities in rural and underserved areas
- 5 Mandate access for indoor ICT facilities to enable robust in-building coverage
- 6 Build a quality standard for mobile coverage



Themes common across markets

- 7 Ease and expedite access to rights-of-way
- 8 Rationalise spectrum fees/ offer discounts in rural regions
- 9 Leverage government financing support as a catalyst for greater private investment in rural connectivity



Country-specific

1.1 Introduction

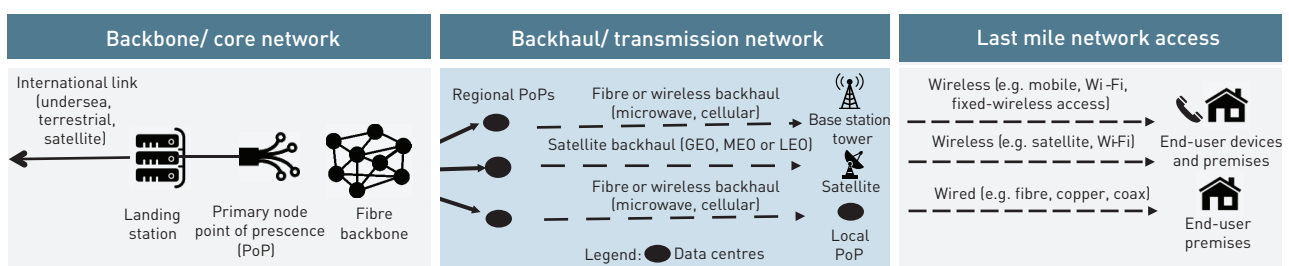
South-East Asia’s digital economy has witnessed tremendous growth in the last decade; however, a wide digital divide persists between and within countries in the region. EdgePoint Infrastructure has developed this study to examine the barriers to internet access from an infrastructure perspective and propose policy recommendations to close the digital divide in three large economies in South-East Asia – Malaysia, Indonesia and the Philippines. As impactful change can only be realised through collaboration between various stakeholders, EdgePoint Infrastructure intends for these findings to serve as a catalyst for meaningful engagement with policymakers and industry stakeholders particularly in the three focus economies. Notably, the findings presented here leverage publicly available data, as well as proprietary Edgepoint data, which may differ from market to market. Where available, we have also used benchmarking data across other South-East Asian states to provide more dimension.

1.2 Understanding how the digital divide impacts communities in South-East Asia

To address the digital divide, it is not only necessary to ensure that all communities have access to the internet. As more people connect, delivering reliable and fast connections across key geographical areas, indoors and outdoors (i.e. delivering meaningful connectivity) becomes more challenging and requires additional regulatory focus. Only then can digital inclusion be achieved.

The digital divide in South-East Asia affects two main communities, namely the unconnected and those who lack meaningful connectivity. The unconnected group comprises rural and remote populations that typically reside in developing countries in South-East Asia, especially those with sparse islands. These populations face barriers to internet access in the form of lack of 4G coverage and end-to-end connectivity infrastructure, where either multiple segments of the core network, backhaul network or access network¹ is/ are missing (see Figure 1). These populations also tend to have income below the national average and are less educated, with primary education as the highest level attained. Bringing unconnected populations online would result in them reaping the benefits of the internet for daily communication, education and entertainment.

Figure 1: Connectivity value chain [Source: EdgePoint Infrastructure, 2023]



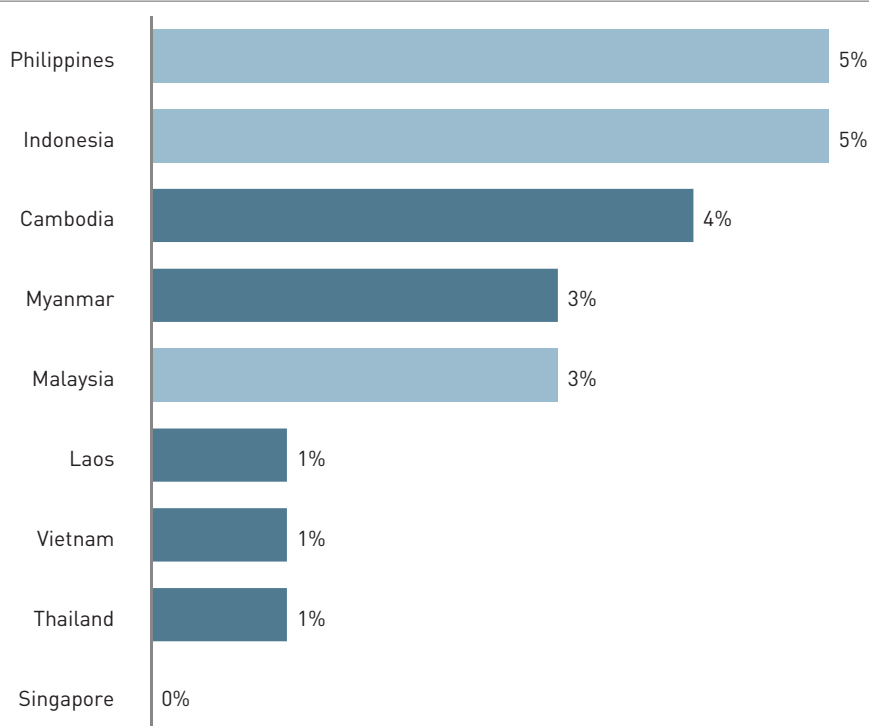
¹ Core network: central part of any network aggregating traffic from multiple backhaul and access networks. Backhaul: part of the communications network which connects the local exchange to the ISP’s core network. Access network: an electronic communications network which connects end-users to a service provider. It is sometimes referred to as the ‘local loop’ or ‘last mile’

In contrast, those who lack meaningful connectivity comprise populations in urban and suburban areas in both developing and developed South-East Asian countries. Their connectivity issues manifest as patchy coverage and slow speeds in outdoor and indoor environments, affecting their user experience. Notably, access to fast and reliable connectivity in essential public areas such as schools, hospitals, government facilities, industrial parks and offices can be greatly improved. Generally, people who need to use public coverage are the lower income group of people who need such access for work purposes. Not having good public coverage limits these users, especially the lower income group, from being able to actively participate in the digital economy, which includes using the internet for work, education, financial transactions and healthcare. Mobile download speeds can also be improved for those who lack meaningful connectivity, to support ever-increasing data usage. Lack of meaningful connectivity hampers the provision of key economic activity.

1.3 Impact of mobile connectivity on the economy

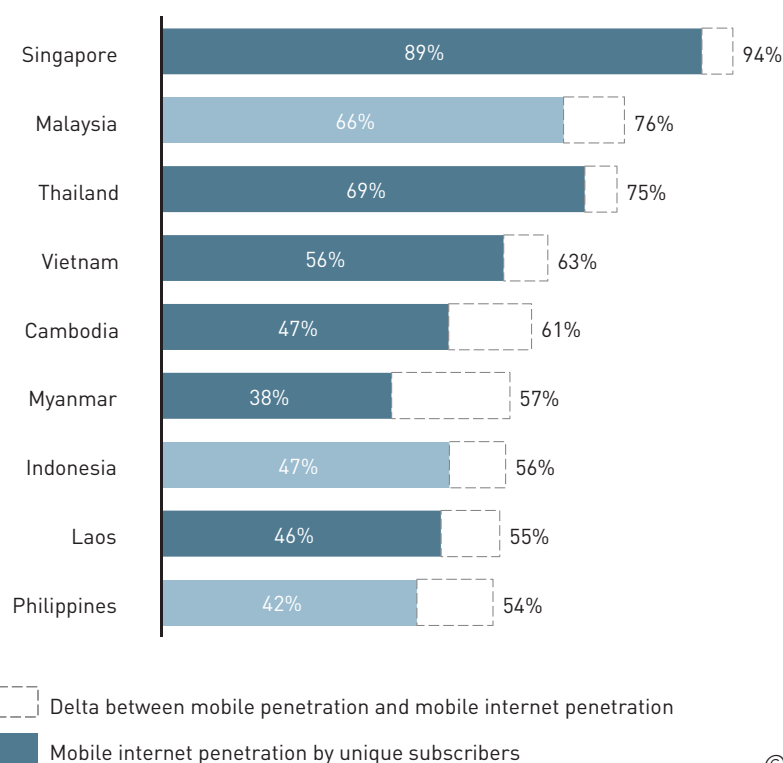
While the number of internet users in South-East Asia has grown over the years, a small portion of rural population in hard-to-access topologies do not have the 4G mobile coverage required for basic digital services (see Figure 2).

Figure 2: Share of population without 4G coverage [Source: Operator reporting, 2022]



This coverage gap has contributed to poor levels of mobile internet adoption (see Figure 3) which translates to unrealised GDP growth. The correlation between mobile connectivity and economic impact is well documented. Improved coverage will help lower the cost of supply, leading to increased internet adoption and data traffic. Higher internet take-up will in turn generate economic benefits. Studies have found that a 10% increase in mobile broadband penetration will result in a GDP increase of 0.8–2%,² roughly equivalent to a USD3–11 billion incremental GDP uplift in Malaysia and the Philippines, and a USD11–27 billion incremental GDP uplift in Indonesia (see Figure 4).

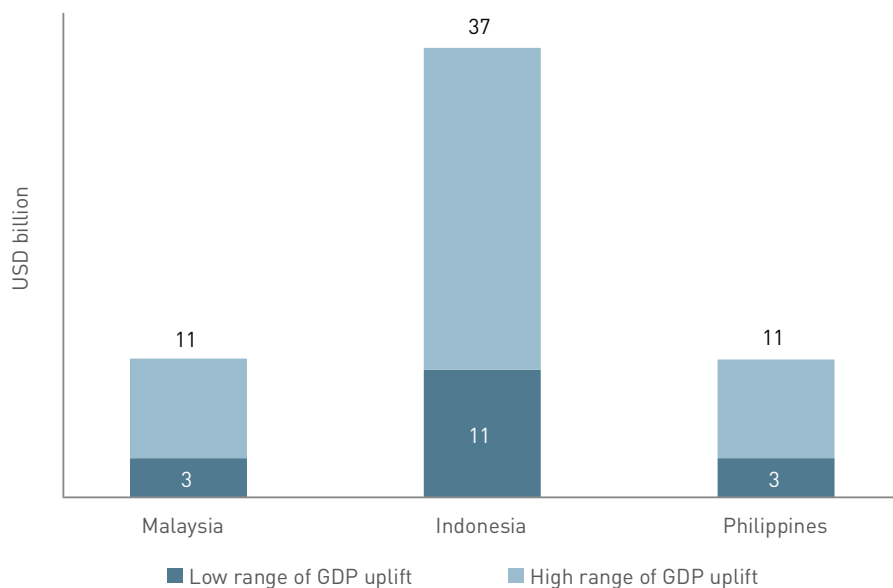
Figure 3: Mobile and mobile internet penetration by unique subscribers [Source: GSMA Intelligence, 2022]



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²GSMA Intelligence (2020), Mobile Technology: Two Decades Driving Economic Growth; Edquist, Harald, Peter Goodridge, Jonathan Haskel, Xuan Li, and Edward Lindquist (2018), "How Important Are Mobile Broadband Networks for the Global Economic Development?" Information Economics and Policy 45 (December): 16–29.; The Economic Contribution of Broadband, Digitization and ICT Regulation. Expert Reports Thematics ITU Publications (n.d.)

Figure 4: Range of incremental GDP uplift in the three focus markets, based on 2022 current GDP, with a 10% increase in internet penetration [Source: EdgePoint Infrastructure, 2023]



Increasing the level of mobile internet adoption by facilitating access to connectivity is crucial to unlocking economic development in South-East Asia and achieving equitable growth. This is especially the case for developing countries who are at a disadvantage compared to wealthier developed countries.

1.4 Nine recommended policy themes

We have identified nine policy themes that address the connectivity issues faced by the three focus markets. There are common themes that run across these markets, complemented by themes that are specific to certain markets. In combination, these policy themes will help to deliver equitable internet access in rural or access deficit areas. These are summarised in Figure 5 and discussed in more detail below.

Figure 5: Nine recommended policy themes [Source: EdgePoint Infrastructure, 2023]

1	Reform the disbursement of funds for universal access initiatives (MY, ID, PH)	Common across markets
2	Conduct infrastructure mapping and improve access to information (ID, PH)	
3	Increase funding for backhaul infrastructure with shared access in rural areas (MY, ID, PH)	
4	Create targeted programmes to improve coverage at essential facilities in rural and underserved areas (MY, ID, PH)	
5	Mandate access for indoor ICT facilities to enable robust in-building coverage (MY, ID, PH)	
6	Build a quality standard for mobile coverage (MY, ID, PH)	
7	Ease and expedite access to rights-of-way (MY)	Country-specific
8	Rationalise spectrum fees/offer discounts in rural regions (ID)	
9	Leverage government financing support as a catalyst for greater private investment in rural connectivity (PH)	

Note:  Malaysia (MY)  Indonesia (ID)  Philippines (PH)

1. Reform the disbursement of funds for universal access initiatives

All three focus markets have various government-led connectivity initiatives, e.g., universal service obligation (USO) funds or other national connectivity programmes funded by the government. However, we posit that funds can be more efficiently utilised, so that more rural communities can rapidly benefit from connectivity initiatives. Additionally, Malaysia and Indonesia would benefit from a thorough review and reform of their respective USO funding model. For a more sustainable and long-term approach to funding projects, regulators should consider changing the fund disbursement model from a capital expenditure (capex) disbursement to a monthly operational expenditure (opex) model. This would help reduce annual capital outflows from the nation's USO fund and allow a more transparent project cost.

2. Conduct infrastructure mapping and improve access to information

This will help providers make strategic deployment decisions, such as the areas to prioritise first and whether it should be wholly government funded or based on a private public partnerships (PPP) model, which can have varying degrees of government support. For example, areas with a low economic case will likely require full government funding as they are not lucrative to the private sector, unlike areas with a reasonable economic case.

3. Increase funding for backhaul infrastructure with shared access in rural areas

Lack of backhaul infrastructure in rural areas has been a major contributor to coverage gaps across markets. National connectivity initiatives have typically focused on provisioning a specific part of the connectivity value chain (i.e. last-mile fibre). Hence, countries or specific regions are often lacking in end-to-end infrastructure that tends to involve backhaul. While regulators should consider providing funding for backhaul, analysis should also be conducted on a case-by-case basis to determine the most optimal backhaul approach. The increase in government funding for backbone and backhaul transmission networks could also be complemented by shared access by operators in rural and remote areas (e.g. multi-operator core networks (MOCN) set up or radio access network (RAN) sharing). Infrastructure sharing would reduce deployment and operational costs for MNOs, allow them to expand to rural areas, and enhance competitiveness. For areas that are best connected by microwave, we posit that regulators should consider funding a common shared microwave backhaul network in these rural areas.

4. Create targeted programmes to improve coverage at essential facilities in rural and underserved areas

Essential areas like hospitals, transport hubs, schools and markets tend to lack decent coverage which hampers the provision of key economic activity. Regulators should consider extending coverage to all essential public areas with higher footfalls, as it will benefit disadvantaged users who do not have internet access/ only have limited internet access in their own homes, thereby creating equity.

5. Mandate access for indoor ICT facilities to enable robust in-building coverage

Government bodies can create legislation that would allow telecoms licensees to install the necessary equipment to enable robust in-building coverage. This may include space requirements and allowing access to the building at no cost. Indoor facilities are important areas of economic activity, and improving in-building coverage will allow more users to participate in the digital economy for work, financial transactions and healthcare.

6. Build a quality standard for mobile coverage

Leading developed markets in the world such as the United States and the United Kingdom have set varying degrees of quality standards which serve as commitments for MNOs to deploy infrastructure to meet their targets. Malaysia has also enacted similar measures under its Jendela programme. Given the proven effectiveness of Malaysia's quality-of-service (QoS) targets, similar standards (e.g., 35Mbit/s downlink and 3Mbit/s uplink) should be adopted in Indonesia and the Philippines. QoS standards would bring awareness to MNOs of the service levels they should achieve, thereby stimulating the roll-out of infrastructure in underserved areas. Besides nationwide or outdoor QoS standards, all three focus markets should also set QoS standards applicable to indoor premises, so that indoor coverage can be improved.

We also recommend country-specific policies for each of our focus markets:

7. Malaysia: Ease and expedite access to rights-of-way

This involves facilitating access to and streamlining deployment processes for national infrastructure deployment.

8. Indonesia: Rationalise spectrum fees/offer discounts in rural regions

Spectrum prices in Indonesia have been significantly higher than global benchmarks. Hefty spectrum fees have been associated with lower network investment for rural areas, deterioration in network speeds and higher prices being passed down to end consumers. Therefore, the Indonesian regulator should consider alternative spectrum pricing methodologies to increase the affordability of spectrum for MNOs in rural areas.

9. The Philippines: Leverage government financing support as a catalyst for greater private investment in rural connectivity

As the Philippines has no USO fund and roll out of select connectivity initiatives has been slow, a private partner, including development banks could aid in the project process, such as providing low interest funding for companies participating in rural infrastructure's build and design. To incentivise the private sector to invest, demand guarantees could accompany the agreement as well.

1.5 Conclusion

The infrastructure-based policy recommendations put forth in this paper provide a start for focus markets to deliver equitable digital opportunities. By adopting a holistic approach that combines more targeted infrastructure-deployment initiatives, greater efficiencies in the utilisation of government funds and capitalisation on private investment, government bodies and industry players can collaboratively make significant strides towards a more inclusive digital landscape. Efforts to implement policy changes should be initiated sooner rather than later. Empowering underserved populations with digital connectivity and raising the quality of mobile internet services in a country can ignite local entrepreneurship, attract investment, create jobs and contribute to overall regional development and competitiveness.



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