Digital Infrastructure Policy and Regulation in Asia-Pacific

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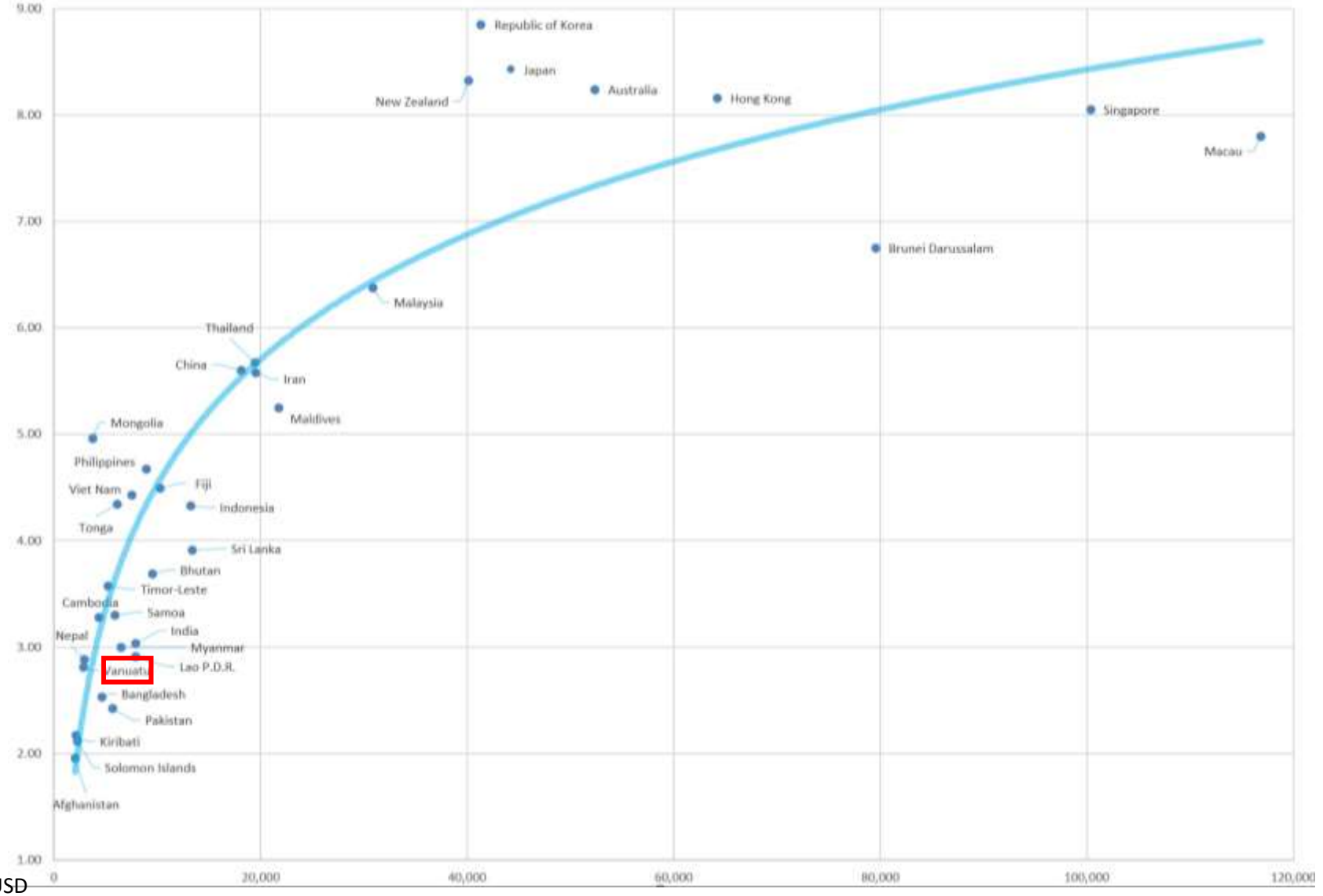
Digital Infrastructure Policy and Regulation

- Overview of Asia-Pacific region
- Asia Pacific and the Digital Economy
- What is Digital Infrastructure?
- Digital Challenges
- Digital Infrastructure: Different pathways
- 5G Deployment Challenges
- Recommended Regulatory Policies & Measures

Overview of Asia-Pacific Region

ITU and GDP/ capita in Asia-Pacific region

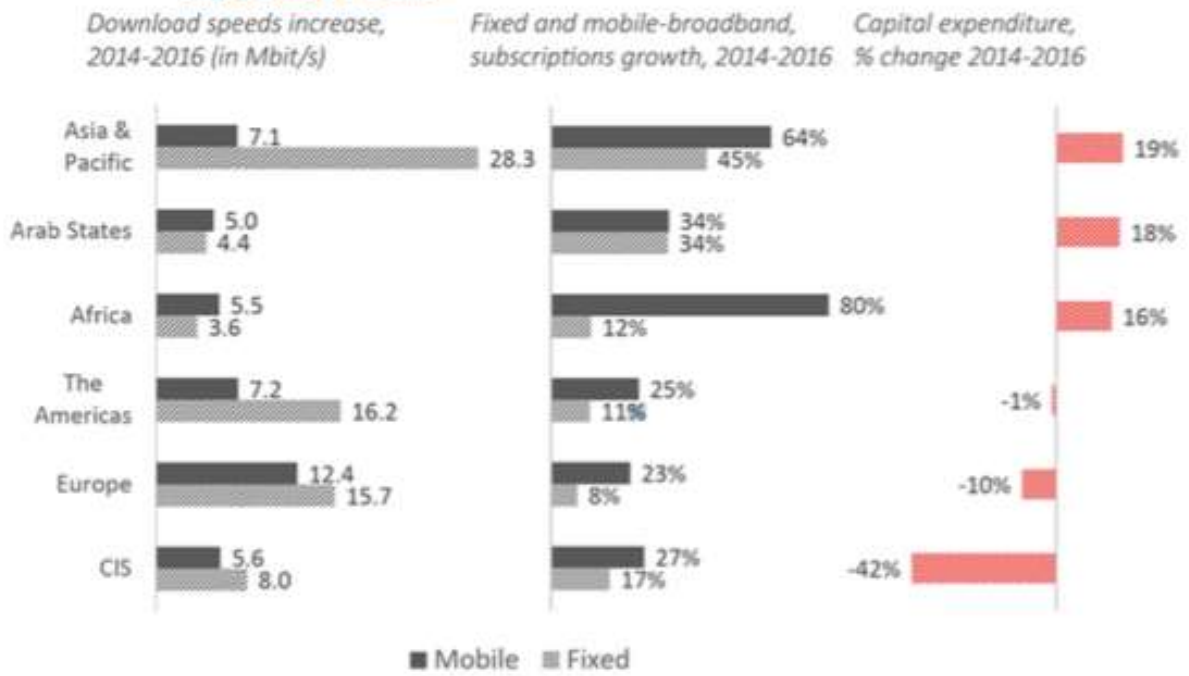


- The Asia-Pacific region is characterised by the extreme diversity of its constituent nations. It contains the world's two 'population giants', China and India, as well as the small Pacific Island countries
- The good news is that there is improving digital performance in Asia-Pacific: significant progress but still some way to go – especially in relation to fixed broadband services (including fixed wireless services).

Asia-Pacific and the Digital Economy

- Asia and Pacific grew faster than any other region in terms of mobile cellular subscriptions per 100 inhabitants.
- Asia- Pacific is a region has the highest proportion of fixed broadband with speeds greater than 10 Mb per second.
- Penetration of fixed broadband subscriptions remains relatively low in Asia-Pacific however, since 2014 it has been growing at a faster rate than the world on average.
- Relatively low absolute level of cellular subscriptions per 100 people reflects the fact that a significant proportion of the Asia-Pacific population has low to very low incomes and are not able to afford mobile phones and subscription costs.
- Asia-Pacific is performing relatively well given the relatively early stage of economic development of many of its constituents.

Regional growth in mobile download speeds, mobile-broadband subscriptons and capex, 2014-2016



Source: ITU Measuring the Information Society Report 2018 – Vol 1

Digital Challenges: Asia Pacific

- **Setting of Broadband Targets**
  In 2018 the Broadband Commission launched a revised framework *2025 Targets: "Connecting the Other Half".*

Broadband Commission Targets

2025 Targets: Connecting the Other Half	
#1	All countries should have a funded national broadband plan or strategy, or include broadband in their universal access and services definition
#2	Entry-level broadband services should be made affordable in developing countries, at less than 2% of monthly gross national income per capita
#3	Broadband-Internet user penetration should reach: 75% worldwide, 65% in developing countries, and 35% in least developed countries
#4	60% of youth and adults should have achieved at least a minimum level of proficiency in sustainable digital skills
#5	40% of the world's population should be using digital financial services.
#6	Un-connectedness of Micro-, Small- and Medium-sized Enterprises should be reduced by 50%, by sector
#7	Gender equality should be achieved across all targets

Source: Broadband Commission, 2018

These targets which intended to be both aspirational and achievable should also be embraced by the Asia-Pacific region. There is considerable value especially in Asian markets with large urban areas (with generally lower costs of provisioning) to set even more challenging targets for high speed Internet access (ie gigabit access).

Digital Challenges: Asia Pacific

- **Demand for Bandwidth**
  Each time there is an improvement in the quality, capacity and availability of broadband, new opportunities emerge to make use of this improved connectivity.

  Each generation of new broadband technology enables new digitally based economic activity, enables new business models, and creates the increasing national competitiveness that drives economic growth and rising living standards.

- **Competition v Investment**
  Governments and regulators everywhere face the problem of how to create a regulatory environment that promotes profitability in telecommunications carriers.

  Both profitability and competitive tension are necessary to encourage investment; profitable operators that face no competition have little incentive to undertake investment.

- **Smart Cities v Rural Coverage**
  The equity efficiency trade-off often involves a trade-off between investment in cities and investment in regional areas.

  Cities are driving economic growth because they enable the deep specialisations which drive competitive advantage in the modern connected global economy. Smart cities use deeply embedded digital technology to achieve highly efficient operation both from an economic and an environmental perspective.

Digital Challenges: Spectrum

- Spectrum should be managed so that it creates the maximum long-term benefit to society. The factors that determine what spectrum allocation is optimal, however, are highly dynamic.

The transition from 2G/3G services to 4G/5G services requires a rethinking in relation to the optimal spectrum allocation processes for International Mobile Telecommunications (IMT) spectrum.

It is critically important that the total amount of IMT spectrum made available in a market for mobile operators is also increased (and priced reasonably) given operators need a portfolio of IMT spectrum.

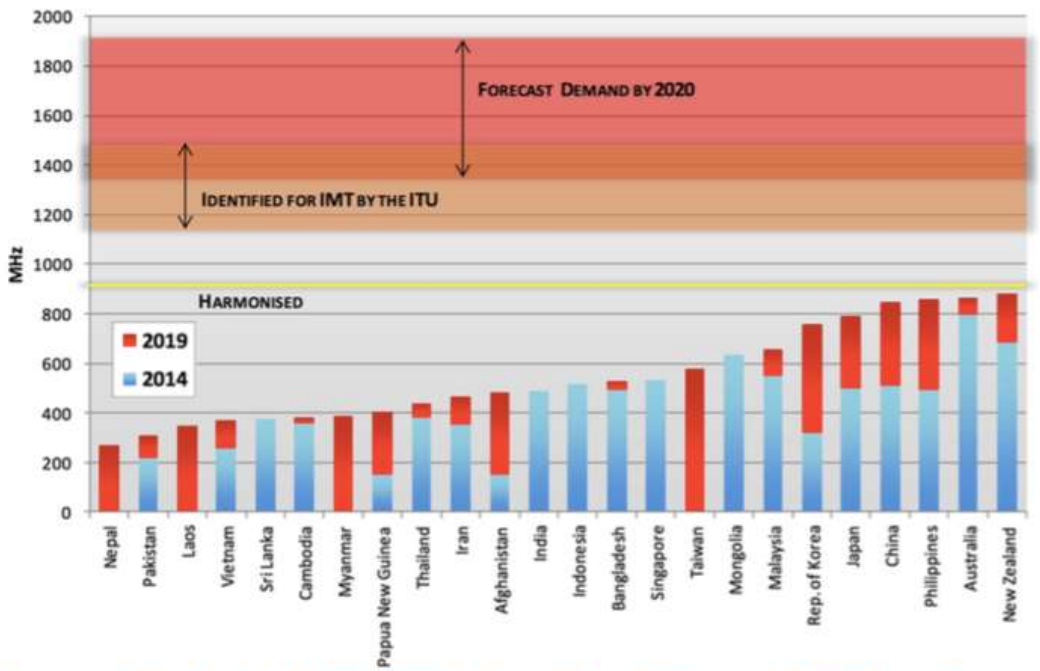
700 MHz

In many countries in Asia-Pacific, significant work remains to be done to secure the benefits of the 'digital dividend' in the 700 MHz band. The ability of mobile operators to quickly utilise 700 MHz spectrum in their service provisioning due to their modern LTE networks will have material benefits in terms of operator capex and opex.

3.5GHz

Due to its propagation characteristics and the potential for large contiguous bandwidths, the 3.5 GHz band is an ideal frequency band for 5G as it is able to provide both capacity and coverage.

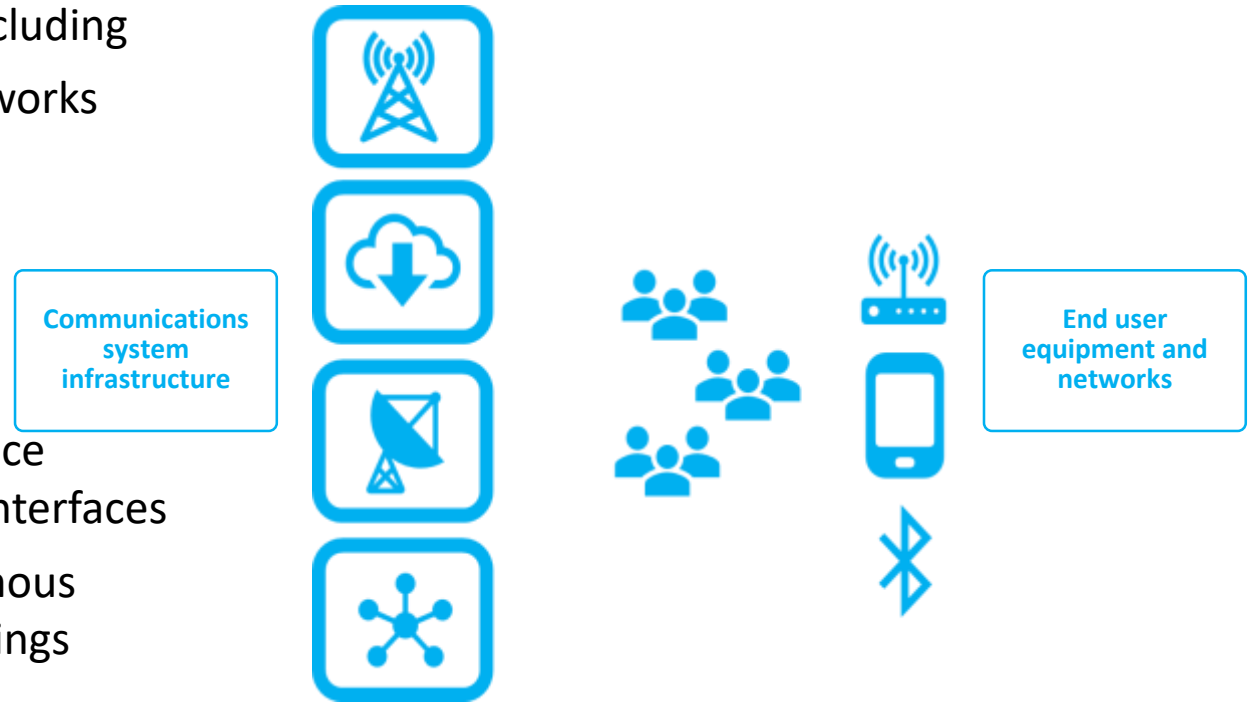
Spectrum licensed for IMT services in selected ITU Region 3 markets



Source: LSTelcom, Analysis of the World-Wide Licensing and Usage of IMT Spectrum, 5 April 2019, page 16

What is Digital Infrastructure?

- Digital infrastructure is the key to enabling the benefits of the digital economy and society. Digital infrastructure is the physical hardware and associated software that enables end-to-end information and communications system to operate, and includes:
  - Internet backbone including national and trans-oceanic fibre cables
  - Fixed broadband infrastructure such as analogue coaxial and optic fibre cable networks
  - Mobile communications infrastructure and networks including transmission towers, radio and optic fiber backhaul networks
  - Broadband communications satellites
  - Data and cloud computing facilities
  - End user equipment such as mobile devices, PCs, modems and local Wi-Fi and Bluetooth networks
  - Software platforms including computer and mobile device operating systems as well as application programming interfaces
  - Network edge devices such as sensors, robots, autonomous and semiautonomous vehicles, and other Internet of things facilitating devices and software.

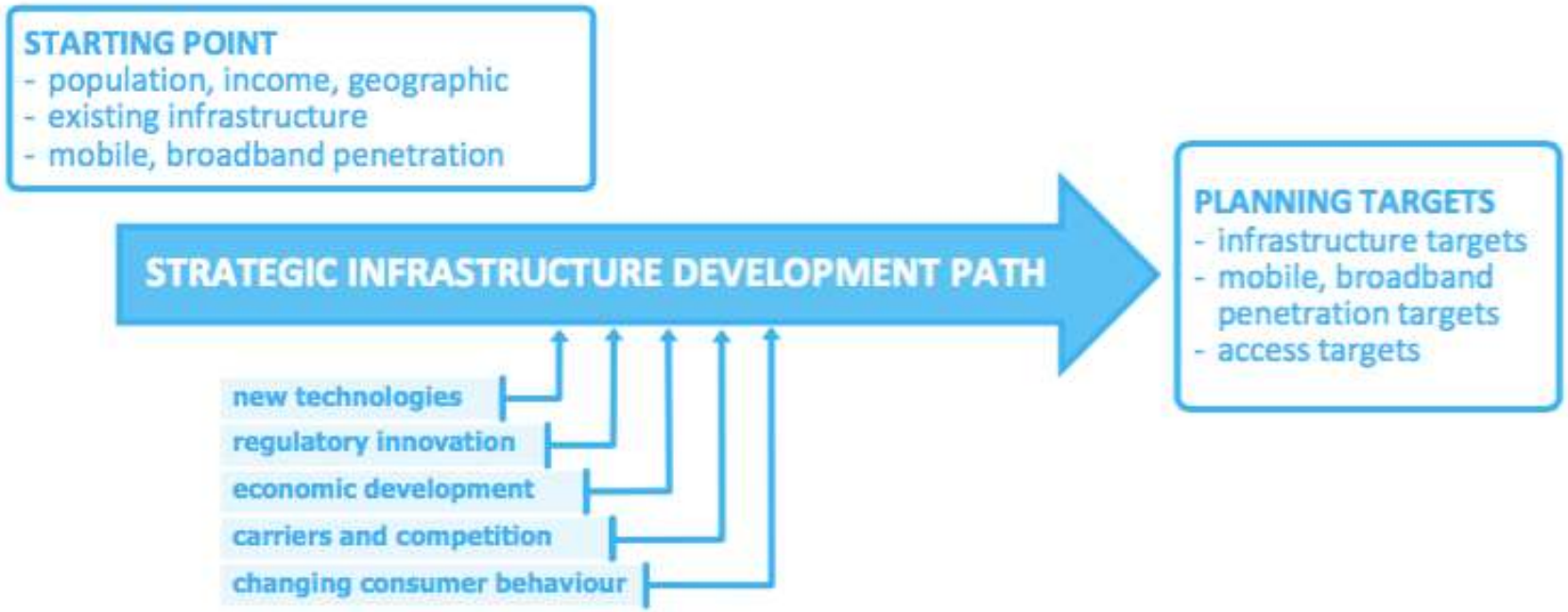


Digital Infrastructure: Strategy

What is required is a dynamic infrastructure deployment strategy that takes into account:

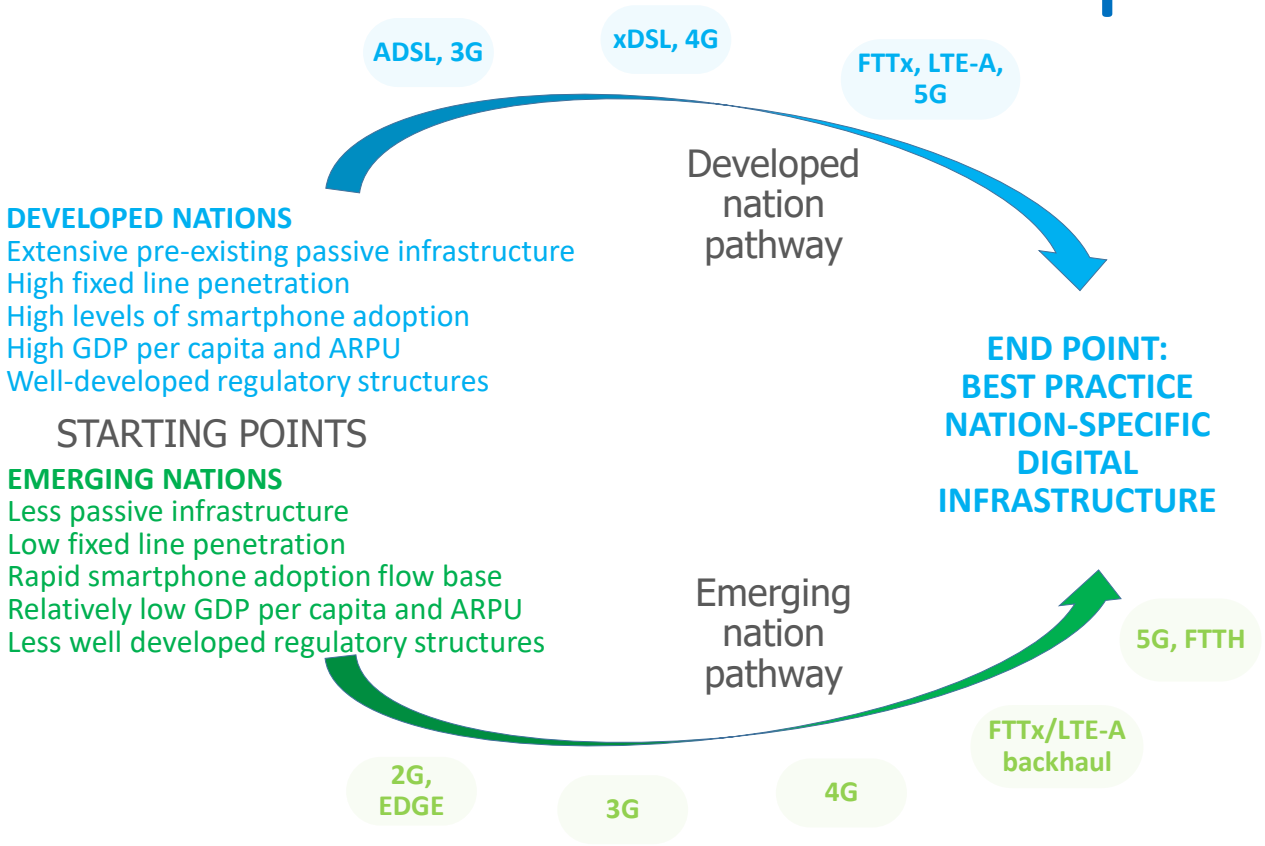
- each country's history and current circumstances
- average levels of per capita income and likely levels of average revenue per user
- current and possible future regulatory settings
- population, country size including geographic characteristics
- the state of communications technology and its expected development pathway.

Factors influencing the optimal strategic infrastructure development path



Source: Windsor Place Consulting, 2019

Digital Infrastructure: Different pathways



- A critical point to emphasise is that emerging nations are making major investments and infrastructure in an entirely different historical and technological context from the developed nations
- **Reliable fast broadband** will be a key enabler of Asia-Pacific high-growth cities and this will **require large investments in fibre** for backhaul, and national distance carriage, and to the home/enterprises and making available affordable IMT Spectrum

Digital Infrastructure: Development challenges

- **Reducing the cost of Network Infrastructure**
  - For many countries in the Asia-Pacific region, priorities for broadband infrastructure development lie predominantly in fixed and wireless network infrastructure in rural areas.
  - But, there remains a need to encourage infrastructure deployment in urban areas.

- **Deployment of network infrastructure involves:**
  - Erection of towers and poles to accommodate telecommunications equipment such as base stations and repeaters
  - Suspension of fibre optic cable on poles
  - Digging trenches and direct burying of fibre optic cable or constructing ducts for the laying of cable
  - installation of telecommunications equipment and cables within commercial and residential buildings.

- **Permissions**
  - Prior to the above activities taking place, permission must be obtained from public and private land owners as applicable to **access land for the erection of towers and poles**
  - **"Rights of way"** must also be obtained to allow fibre optic cable to be suspended or laid underground through public & private land.
  - **Permission** must also be obtained **from building owners** for the installation of telecommunications equipment and cables

- In addition to a cumbersome approval process, infrastructure deployment is also hampered by other factors including:
  - existing fibre infrastructure being **damaged by subsequent construction works** which are not aware of the existing infrastructure;
  - an **absence of in-building standards** for telecommunications equipment

- To address these evident infrastructure concerns, **new types of approval processes** can be implemented and **infrastructure sharing** should be encouraged.

5G deployment challenge in Asia-Pacific (1)

Summary	Suggestions customized for Asia-Pacific from 2018 ITU Report "Setting the Scene for 5G: Opportunitie s& Challenges"
Investment case	Policymakers may consider undertaking their own independent economic case assessment of the commercial viability of deploying 5G networks while in the interim facilitating 4G network deployment and where appropriate 2G/3G switchoff
Harmonize spectrum	Regulators should allocate/assign globally harmonized 5G spectrum including 3.5 GHz, mmWave, 2.6 TDD GHz, 2.3 GHz, 700 and 600 MHz
Spectrum roadmap	Regulators should adopt a spectrum roadmap and a predictable roadmap renewal process
Spectrum sharing	Regulators may consider allowing sharing to maximize efficient use of available sharing spectrum, particularly to benefit rural areas
Spectrum pricing	Regulators may consider selecting spectrum award procedures that favour investment (As opposed to auction returns)
Sub-1 GHz spectrum	Policymakers should consider supporting the use of affordable wireless coverage (eg through the 700 & 600 MHz bands) to reduce the digital divide
Fibre investment incentives	Policymakers, where the market has failed, may consider stimulating fibre investment and passive assets through PPPs, investment funds and the offering of grant funding, etc.
Fibre tax	Policymakers may consider removing any tax burdens associated with deploying fibre networks to reduce the associated costs
Copper to fibre	Policymakers may consider adopting policies/financial incentives to to encourage migration from copper to fibre & stimulate deployment of fibre
Wireless backhaul	Wireless Operators may consider a portfolio of wireless technologies for 5G backhaul backhaul in addition to fibre, including point-to-multipoint (PMP), microwave and mmWave radio relays, satellites etc
Access/sharing of passive infrastructure	Policymakers may consider allowing access to government-owned infrastructure such as utility poles, traffic lights and lampposts to give wireless operators the appropriate rights to deploy electronic small cell apparatus to street furniture. And Regulators may consider continuing to elaborate existing duct access regimes to encompass 5G networks allowing affordable fibre deployments
Access costs	Policymakers/Regulators may consider ensuring reasonable fees are charged to operators to deploy small-cell radio equipment
Asset database	Policymakers may consider holding a central database identifying key contacts, showing assets such as utility ducts, fibre networks, CCTV posts, lampposts, etc. This will help operators cost and plan their infrastructure deployment more accurately
Wayleaves (ROW)	Policymakers may agree upon standardized wayleave agreements to (rights of way) reduce cost and time to deploy fibre & wireless
5G test beds	Policymakers to encourage 5G pilots and test beds to test 5G technologies, & use cases, and to stimulate market engagement

https://www.itu.int/pub/D-PREF-BB.5G_01-2018

5G deployment challenge - infra example (2)

- The transition to 5G networks requires a fundamental change in radio access network design and a significant growth in the number of sites, as shown below. This example covers the local government areas (LGAs) around Sydney having a combined landmass of 295 square kms.

- Legacy and current radio design (3G and 4G) provide services primarily through a layer of macro and micro towers on buildings. These sites, primarily utilising low and mid band spectrum, provide mobile wireless services. Under this model of radio design, the landmass of the LGAs are covered by around 400 sites.

- In contrast, a 5G radio design is based primarily on small cells that can be placed onto existing fixtures such as light posts, street signs, and utility poles. The features of 5G such as low latency and very high throughput require a dense radio network, utilising low to high bandwidth spectrum.

- Deploying 5G networks in the 3.5 GHz band, with mmWave will require many more sites than current networks. A MNO operator would need to deploy up to 1,500 small cells to cover an area of less than 300 square kms. This is a fundamental re-design of current radio networks, and raises issues about sites, land access, backhaul fibre, costs of access etc.

Source: Singtel Optus, 2019

Recommended Regulatory Policies and Measures

The forthcoming ***ITU Digital Infrastructure Policy and Regulation in Asia-Pacific paper*** explores:

(1) Approaches to enable the readiness of digital infrastructure

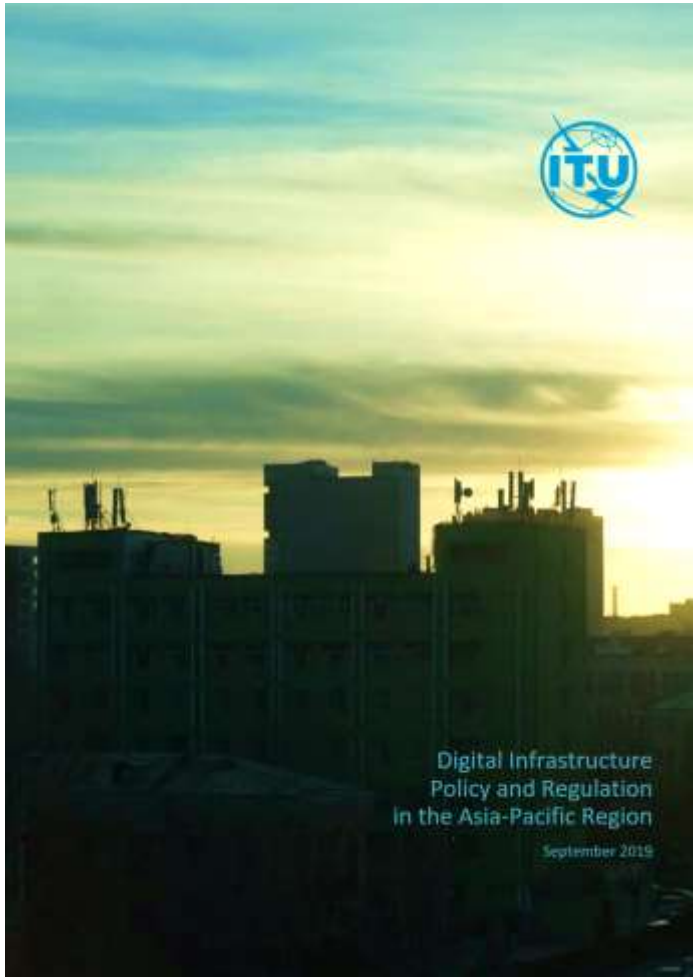
- Make broadband universal and accessible
- Migration from circuit switched 2G/3G to IP with 4G/5G services
- High speed Internet with gigabit capability
- Affordable broadband tariffs
- 5G ready before 2021 (if possible and warranted by demand)
- All fiber-connected smart city
- Radio spectrum planning, management and assignment

(2) Exemplar Regulation approaches to facilitating the delivery of digital infrastructure

- Easy ROW acquisition with low cost
- Infrastructure sharing and collaborated construction
- Support the establishment of towercos
- FTTH in new built and refurbished buildings
- Quality of service for broadband access
- Maintain momentum of market competition

Stimulus measures to facilitate broadband expansion and ICT utilisation

Capability building to foster national human capital



Key Recommendations

1 Set broadband targets for digital infrastructure

Develop national plans for affordable broadband targeting 65% in developing and 35% in least developed nations

2 Ensure legislation is updated and fit for purpose

Promote independent regulatory bodies, fair non-discriminatory rules, open access and rights of way

3 Incentives for the deployment of digital infrastructure

Balance regulatory and tax imposts of operators to encourage infrastructure deployment

4 Issue new rules addressing rights of way

Overcome barriers to rights of way processes to facilitate more rapid infrastructure deployment

5 Facilitate fixed broadband and 5G infrastructure deployment

Encourage sharing infrastructure for 5G, build check-before-you-dig national database, one-stop approvals

6 Releasing more IMT spectrum for wireless broadband and 5G

Expand allocations to at least 840 MHz in contagious blocks to encourage investments by operators

7 Facilitate switch-off of legacy 2G/3G services

Promote orderly migration to newer technologies for benefits such as spectral efficiency and lower capex and opex

8 Improve quality of broadband services

Require accurate advertising and assessment of actual broadband speeds, encourage higher speed targets

9 Improve regulatory skillsets

Build skillsets in economics, finance, content regulation, cybersecurity, law, competition analysis, tax and cross-government experience.

Thank You