

Building synergies through infrastructure co-deployment

Subregional Workshop on ICT Co-deployment along Passive Infrastructure in South Asia, New Delhi, 27 June 2019

ICT and Disaster Risk Reduction Division
ESCAP



Outline

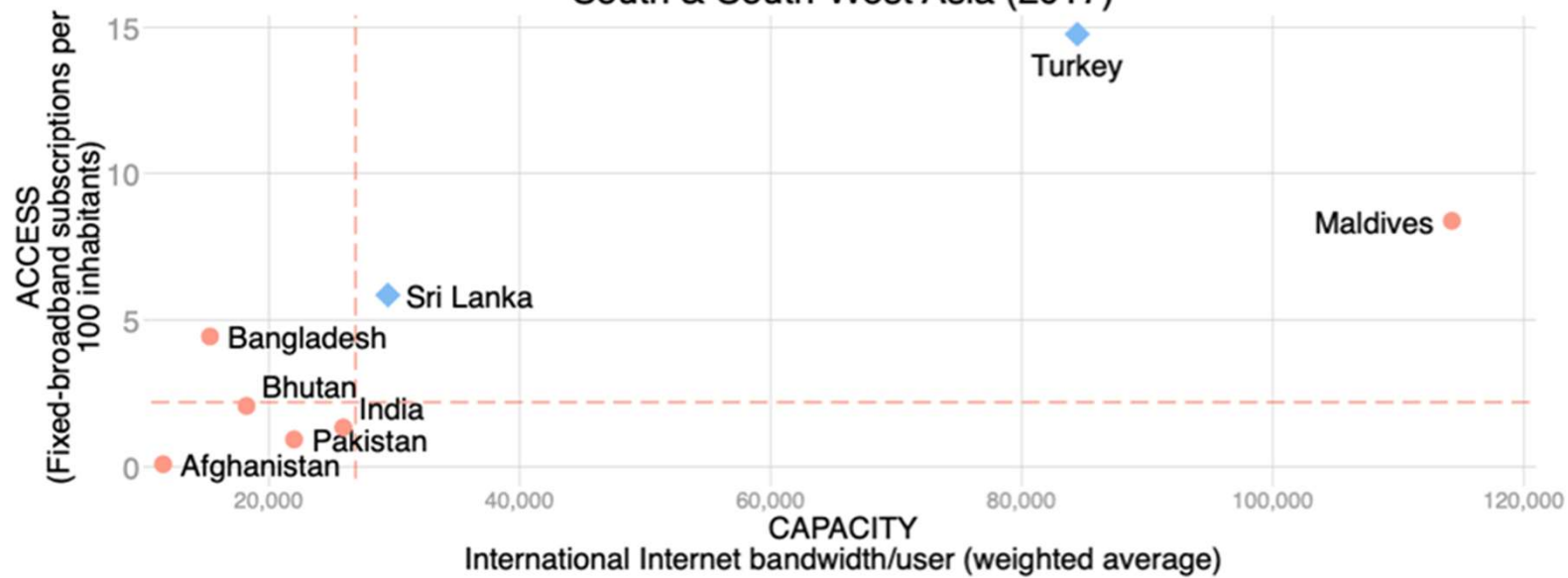
- Status of ICT connectivity
- Regional Cooperation
- ICT co-deployment
- Co-deployment opportunities and challenges
- Conclusion



Status of ICT Connectivity



Broadband (Fixed) Access, Affordability & Capacity South & South-West Asia (2017)



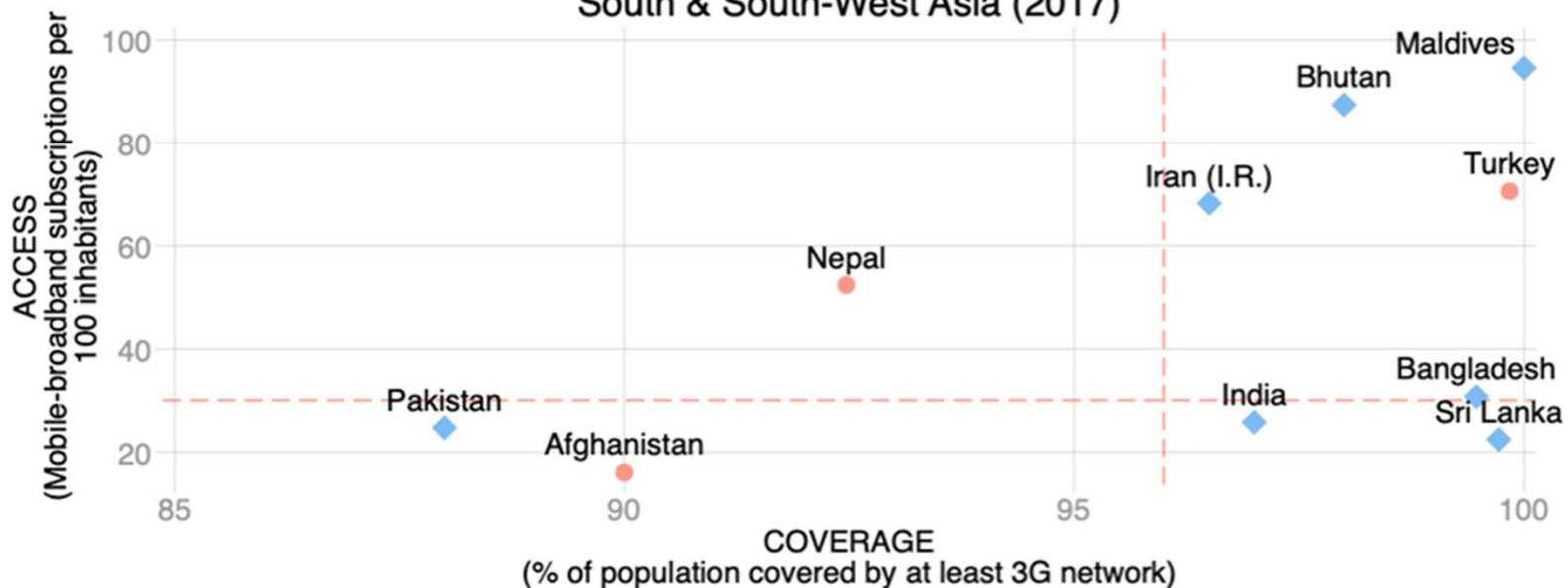
AFFORDABILITY:

◆ <2% - Affordable: monthly expenditure as % of GNI/capita

● >2% - Unaffordable: monthly expenditure as % of GNI/capita

Source: Produced by ESCAP based on ITU's World Telecommunication/ICT Indicators Database (December 2018 Edition)

Broadband (Mobile) Access, Affordability & Network Coverage South & South-West Asia (2017)



AFFORDABILITY:

◆ <2% - Affordable: monthly expenditure as % of GNI/capita

● >2% - Unaffordable: monthly expenditure as % of GNI/capita

Source: Produced by ESCAP based on ITU's World Telecommunication/ICT Indicators Database (December 2018 Edition)

Regional cooperation on ICT



ASIA-PACIFIC
INFORMATION
SUPERHIGHWAY

亚太信息高速公路

АЗИАТСКО-
ТИХООКЕАНСКАЯ
ИНФОРМАЦИОННАЯ
СУПЕРМАГИСТРАЛЬ

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Regional cooperation on ICT

The Asia-Pacific Information Superhighway initiative aims to increase the availability and affordability of broadband Internet across Asia and the Pacific, by strengthening the underlying Internet infrastructure in the region.

- Promote terrestrial and submarine fibre-optic connectivity
- Provide a regional intergovernmental platform focusing on the missing fibre-optic links between ESCAP countries
- ESCAP resolution 73/6 & 75/7= mandate



ASIA-PACIFIC INFORMATION SUPERHIGHWAY (AP-IS)

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AP-IS PILLAR 1

Connectivity



AP-IS PILLAR 2

**Internet Traffic & Network
Management**



AP-IS PILLAR 3

E-Resilience



AP-IS PILLAR 4

Broadband for All

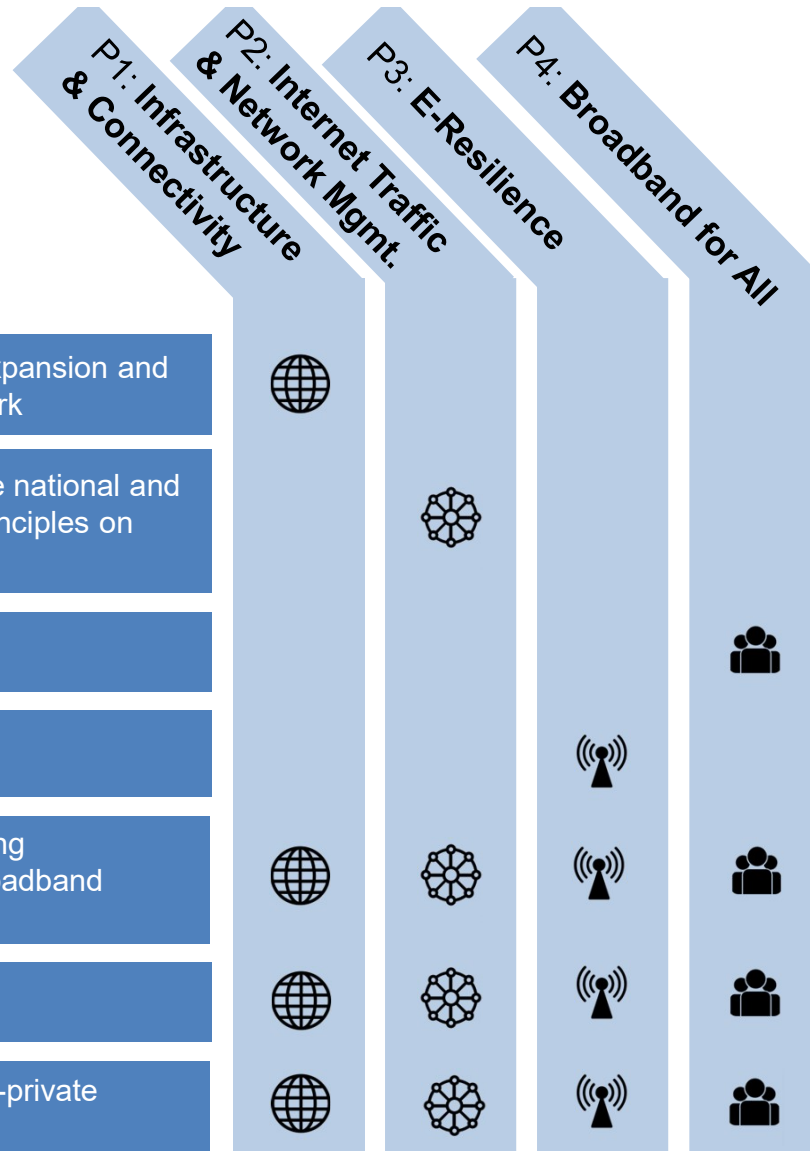


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AP-IS Strategic Initiatives

Strategic Initiatives

1	Identification, coordination, deployment, expansion and integration of the regional backbone network
2	Establish a sufficient number of IXPs at the national and subregional levels and set out common principles on Internet traffic exchange
3	Regional social and economic studies
4	Enhancing ICT infrastructure resilience
5	Policy and regulations for leveraging existing infrastructure, technology and inclusive broadband initiatives
6	Capacity-building
7	AP-IS funding mechanism based on public-private partnerships



AP-IS activities

To implement identified strategic initiatives in the AP-IS Master Plan and support discussions on co-deployment between ICT and other sectors:

- Cost-benefit analysis;
- Case studies;
- Consultations and discussions at the AP-IS Steering Committee meetings.



ICT co-deployment



Scope and type of co-deployment

Co-deployment among telecom operators

- Co-deployment of backbone cables for economies of scale
 - Sharing of ducts, towers and landing stations

Co-deployment with transport sector

- Co-deployment along railways and highways
 - Rights-of-way granted by railway and highway authorities
 - Cost saving

Co-deployment with energy sectors

- Co-deployment with energy sectors (power grid, gas pipelines etc.)
- Power lines carry broadband services

Benefits

- ✓ Dig once to reduce cost of investment,
- ✓ Decrease frequency of construction on major highways;
- ✓ Redundancy communication duct can improve coverage



Co-deployment route type with road/railway

Route 1

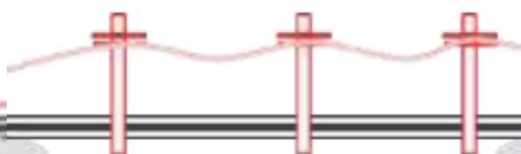
Direct Burial (using Duct)



- Costly (long-term);
- difficulty in maintenance and expansion;
- Higher control on ownership.

Route 2

Aerial (using telegraph poles)



- Cost effective;
- Highly vulnerable to disruption;
- Lower control on ownership.

Route 3

Duct/Conduit installation



- Costly (short-run);
- Lower vulnerability to disruption;
- Flexible to future access needs and reconfigurations;
- Lower control on ownership.

Republic of Korea (Highway)

- Korea Expressway Corporation (KEC) (1992) **installed its own fiber optic cables along highways** for traffic control and operation of expressways.
- The main reason of the KEC's investment in fiber optic cables was
 - 1) To satisfy the demand for internal high-speed communication for **intelligent transportation system (ITS)**, i.e. traffic management system, toll collection system, in-house communication system and emergency telephone, and
 - 2) To diversify KEC's business areas.
- Most of the fiber optic cables were deployed by the highway authorities, e.g. Korea Expressway Corporation (KEC) when the highways were constructed.
- Such **co-deployments are established by law**:
 - *Road Act & National Transport System Efficiency Act*: **mandate the road management authority to provide traffic information** to the road users and establish communication facilities along the roads.
 - *Telecommunications Business Act*: provides a basis for the road authority to provide **communication facilities to telecommunication carriers**.
 - *Korea Expressway Corporation Act*: The Act provides a basis for Korea Expressway Corporation to carry out the business **of leasing their telecommunications facilities**



Republic of Korea (Highway) (cont.)

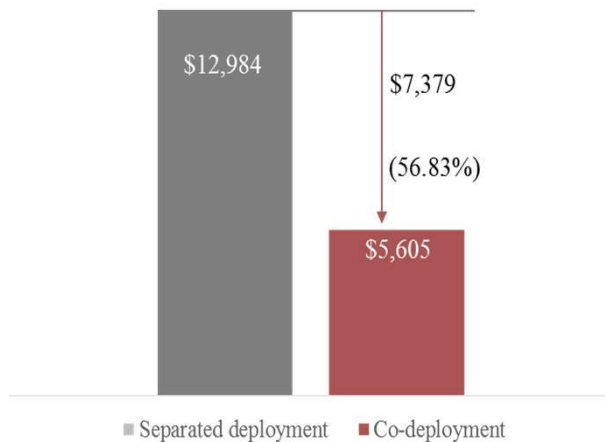
- Benefits realized from co-deployment: Out of 4,000km express way,
 - Investment cost: USD370 million
 - Estimated cost savings: USD1,770 million
 - B/C ratio: 4.78
 - An estimated reduction in highway traffic congestion by 25%, which saves USD112 million annually.
- Lessons from Co-deployment:
 - Established laws to reduce coordination problem
 - Providing specific/detailed principles for contract conditions and pricing criteria, and with joint calculation of the costs between involved parties
 - This helps prevent dispute over calculation of the cost.
 - Having long-term master plan or roadmap for building fiber optic cable network and its utilization provides policy investment condition certainty in the long term (e.g. ITS).



Myanmar

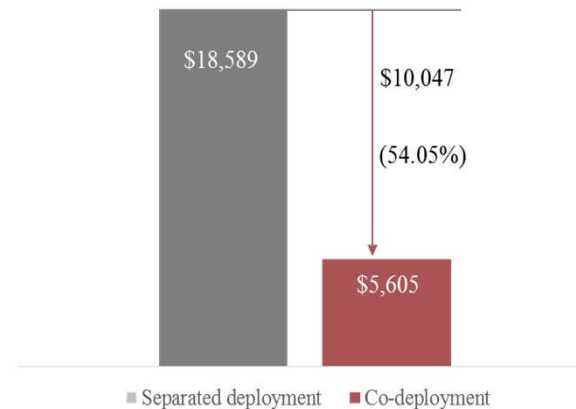
- Cost analysis and comparison between co-deployment and separate deployment of fiber-optic cables along the Asian Highway
- Co-deployment has been estimated to save at least **USD7,379 per km or 56.83%** of the total project's costs.

Result of comparative study case 1



Cost saved from co-deployment of ducts (two-way) = USD 7,379/km
Percentage of cost saving (two-way) = 56.83%

Result of comparative study case 2



Cost saved from co-deployment of ducts (four-way) = USD 10,047/km
Percentage of cost saving (four-way) = 54.05%



Myanmar (cont.)

- Most of the **cost savings** are derived from eliminating overlapping civil works:
 - **Excavation, backfilling and reinstatement** are the services with the greatest cost saving, as the earthwork is the largest cost component of duct deployment
 - These works are already included in the construction cost of the highway.
- In light of Myanmar's 3,009km Asian Highway network, the total **saving** is around **USD30 Million**.
- **Road sector** incurred an additional **0.87%-3.55%** of the highway construction costs to road construction, while they will have the **opportunity to generate new revenues**.
- The cost savings on **co-deployment in Myanmar provide useful insights** to potential cost-savings in other **developing countries** in the region.



Opportunities and challenges of ICT co-deployment



Opportunities for co-deployment

For the road sector

- Enabling infrastructure to support intelligent transportation systems, smart cities and future applications;
- Monetizing the potential value of existing infrastructure by leasing excess facilities; and
- Reducing cost while increasing efficiency of internal telecommunication network.

For Government

- Expanding the broadband infrastructure in a cost-effective manner;
- Enhancing national intelligent transportation systems for a digital economy; and
- Enhance socio-economic and environmental impacts of the transportation section



Opportunities for co-deployment

For dominant telecom operators:

- Reduce the cost and time to obtain permission for Right of Way (RoW) to roads/railways; and
- Increase resilience through multiple redundancies of additional routes available during emergency times.

For new entrant operators:

- Reducing cost and time to obtain duct construction permission and construction;
- Reducing barrier (cost) to enter the telecommunication market; and
- Competing on equal competition rights with other operators in the market.



Challenges of co-deployment

- Major cross-sectoral **coordination** exercise among multiple government authorities, regulators and the private sector;
 - Requires comprehensive **domestic policies** backed by law and a framework **for international cooperation**;
-
- **Regulatory framework to support co-deployment** and to streamline network sharing practices; and
 - Establishing **cross-border links** are complicated since issues such as **revenue sharing/business models**, different provision by laws and regulations, and **mechanisms to resolve cross-border** are costly.



Conclusion

- Strengthening **ICT infrastructure connectivity** is critical for the **development of intelligent smart transport (ITS)**, smart cities and digital economies in the subregion;
- **Co-deployment of ICT along roads/railways** not only **strengthen ITS, smart cities** and other future applications, but also improve access of citizens to the Internet (**reduce the digital divide**);
- A **subregional platform** for **coordination** and negotiation of regional infrastructure initiatives is helpful.
- Establishing an **inter-governmental agreement** that **clearly stipulates** the type of highways, installation specifications for the co-deployment, revenue sharing/business models and regulatory mechanisms, is very helpful to resolve cross-border challenges.



Thank you!

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