Cost-benefit Analysis of Fiber-optic Co-deployment with Asian Highway

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KT’s Contribution to APIS

To conduct detailed research in improving broadband connectivity for target countries.

1. Cost-benefit analysis of Asian Highway with utility corridor

2. Cross-sectoral synergies promotion in co-deployment of infrastructure

• To be completed by February, 2018
Three (3) Potential AP-IS Deployment Route Types

Case 1. Route on existing highway(s) with ducts
- Study on duct availability and lease cost

Case 2. Route on existing highway(s) without duct
- Aerial fiber optic cable deployment incl. facility sharing option

Case 3. Route without existing highway, so need to build one
- Duct co-deployment along with highway construction

Scope of work
Korea Case Study

Case 1.

Route on existing highway(s) with ducts

Framework act on National Informatization

Telecommunication Business act

1. Request duct-lease
2. Feedback (within 3 weeks)
3. Agreement by contract
4. Provide ducts
5. Pay for duct-lease

Telecommunication sectors

Transportation authorities*

* Authorities in charge of construction, operation and management of roads, railroads, electrical facilities, telecommunications circuit facilities

Facility sharing between sectors
Korea Case Study

Case 2. Route on existing highway(s) without duct

Infrastructre co-deployment among telecommunication sectors

Telecommunication Business act

1. Recommended for co-deployment
2. Feedback (within 3 weeks)
3. Co-deployment
4. Operation and maintenance

Ministry of ICT

Council* among telecommunication sectors

Telecommunication sector
Case 3.

Route without existing highway, so need to build one

Duct co-deployment between sectors

Korea Case Study

1. Notify new highway plan
2. Request construction ducts
3. Consultation
   - Facility construction
   - Operation and maintenance
   - Cost, etc.
4. Agreement by contract
5. Construct, operate and maintain

Transportation authorities*

Council* between sectors

Framework act on National informatization
Telecommunication Business act
Telecommunication construction act
Road act
1. Cost-benefit analysis
   - Separate deployment
   - Co-deployment
   - Comparative study
   - Generalization

2. Pros/cons research
   - Pros/cons by each stakeholder
   - Issue handling model
   - Cost compensation model

3. Case study
   - A construction standard for utility corridor
   - Global examples
**Methodology**

1. **Target country selection**
   - Cambodia
   - Laos
   - Myanmar
   - Viet Nam

2. **Prerequisite study**
   - Site survey
   - RFP analysis
   - KT’s global reference

3. **Calculation**
   - Unit cost
   - Cost-benefit analysis

4. **Generalization**
   - Cambodia
   - Laos
   - Viet Nam

*PPP: Purchasing Power of Parity

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**Cost-benefit analysis for CLMV Country**

January 15, 2018
## Prerequisite study

### Environment
- Geographical features: plain, mountain, bridge
- Geological features: soil, rock, asphalt, concrete

### Infrastructure status
- Duct: trench depth, # of ducts
- Distance between manholes
- Fiber optic cable (FOC): # of core

### Material specifications
- Duct, manhole, FOC

### Cost
- Labor cost: civil works, FOC installation
- Material cost: duct, manhole, FOC

### Regulation
- Regulation on co-deployment
- Network facility sharing scheme
Reference for Prerequisite Study

Reference: IT infra network expansion project in Myanmar (EDCF, 2016 ~ 2020)

* Can assume unit cost based on MPT project in Myanmar & KT’s global experience

i. Site survey
   - November 21~ November 24, 2017

ii. RFP analysis from MPT*
   - Requirement for civil work
   - Technical specifications

iii. KT’s global experience
   - More than 2,000km deployment in Myanmar

*MPT: Myanmar Post & Telecommunication
Study Result

**Environment**

- Geographical features: plain, mountain, bridge
- Geological features: soil, rock, asphalt, concrete

### Geographical features

- **Plain**: 94.5%
- **Bridge**: 4.2%
- **Mountain**: 1.3%

### Geological features

- **Soil**: 95%
- **Concrete**: 4%
- **Asphalt**: 1%
- **Rock**: 0.1%
### Infrastructure Status

- **Duct**
  - Trench depth (from ground level): 1500 mm
  - # of ducts: 1 direct burial, 1 duct-housing
  - MPT RFP criteria: 2 way duct recommended
  - KT global experience: 96 core

- **Manhole**
  - Distance between manholes: 1 km
  - KT global experience

- **FOC**
  - # of core: 48 core 30%, 96 core 70%
  - KT global experience

### Cost Calculation

- Infrastructure status:
  - Duct: trench depth, # of ducts
  - Distance between manholes
  - Fiber optic cable (FOC): # of core

**Study Result**
<table>
<thead>
<tr>
<th>Geographical Category</th>
<th>Plain</th>
<th>Mountain</th>
<th>Bridge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duct</td>
<td>PVC FC</td>
<td>HDPE</td>
<td>Iron</td>
</tr>
<tr>
<td>Manhole</td>
<td>Site casting</td>
<td>Concrete</td>
<td>Polymer Concrete</td>
</tr>
<tr>
<td>FOC</td>
<td>Loose tube</td>
<td></td>
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</tr>
</tbody>
</table>
**Cost**

- Labor cost: civil works, FOC installation
- Material cost: duct, manhole, FOC

**Labor cost**

- **Civil work**
  - Excavation & backfilling
  - Installation duct
  - Pavement

- **FOC installation**
  - FOC Pulling
  - FOC Splicing & termination
  - FOC test

**Material cost**

- Ducts
- Manhole
- FOC

**Cost calculation**
<table>
<thead>
<tr>
<th>Regulation</th>
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<tr>
<td>• Regulation on co-deployment</td>
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<tr>
<td>• Network facility sharing scheme</td>
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</tbody>
</table>

### Co-deployment
- No regulation on co-deployment
- Only for telecommunication sector

### Network facility sharing
- License based: duration (15 years)
- Fee: registration, initial, annual fee, etc.
- Lease cost per unit: duct, dark fiber

**Need more information**

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**Data gathering from PTD* under MoTC**

* PTD: Post and Telecommunication Department

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**Pros/cons research**

- **Issue handling model**
- **Cost compensation model**
1. **Cost-benefit analysis**
   - 1. Target country selection
   - 2. Prerequisite study
   - 3. Calculation
   - 4. Generalization

2. **Pros/cons research**
   - Pros/cons by each stakeholder
   - Issue handling model
   - Cost compensation model

3. **Case study**
   - A construction standard for utility corridor
   - Global examples
Korea and Korea Telecom

Revenue: 21 Billion US$ in 2016

34 subsidiaries on telecom, ICT service, media, convergence and finance
Thank you
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