Government Is Indispensable for National Informatization and Broadbandization

1 Social Value and Economic Value Brought by Information and Broadband

Researches and practice show that broadband can bring huge social value and economic value. According to a survey that World Bank conducted in some member countries of Organization for Economic Co-operation and Development (OECD) in 2009, GDP grew by 1.21% to 1.38% as the broadband penetration rate increased by 10%.

The Ministry of Internal Affairs and Communications of Japan, in 2011, planned that by 2020:

The GDP of industries (such as manufacture, construction, transportation, education, and health care) driven by the information and communications technology (ICT) industry shall mount up by 30,000 billion JPY.

The GDP of the emerging industry shall reach 70,000 billion JPY and up to 3,800,000 jobs would be created.

Broadband also plays a very important role in social innovation. According to World Bank's assessment in 2011, the average innovation efficiency of the country with the world's highest broadband penetration rate is 2.55, while that of the country with the world's lowest broadband penetration rate is 0.15. The former is 15 times as great as the latter.

After researching the reports of 15 OECD member countries (USA and other 14 European countries) in 2012, International Telecommunication Union-Telecommunication Standardization Sector (ITU-T) pointed out that as the broadband penetration rate increased by 1%, the social production efficiency grew by 0.13%.

Taobao (an online shopping website in China) provided about 18 million jobs in 2012. The total e-commerce sales volume of China attained 7,850 billion RMB in 2012, increasing by 30.8% compared with the same period in 2011, and China's retail ratio of online shopping was close to 6%, surpassing USA's 5%.

In addition, information and broadband also bring a lot of intangible value. Specifically, they contribute significantly to national education and health care. They also play a huge role in eliminating the digital divide and economic inequality, and provide an opportunity for developing countries to present their late-mover advantages.

2 Government's Measures in National Informatization and Broadbandization

Because broadband can bring huge social value and economic value, various governments regard broadband as an important industry and attach importance to the broadband development. By 2012, 134 countries all around the world had completed their own national broadband plans, and 12 countries set about formulating their national broadband plans. The following provides the success stories of various countries' measures in informatization and broadbandization.

1. Government Conducts Informatization and broadbandization Planning

The government of South Korea is a good example in successfully formulating and implementing national broadband planning. South Korea's broadband planning is a part of national informatization planning.
As shown in the left figures, South Korea's national informatization planning consists of several important phases, such as Cyber Korea 21, e-Korea, and U-Korea.

The following figure lists South Korea's national broadband planning. As shown in the following figure, the government of South Korea planned detailed access technologies and access rates in different phases, which properly directed the follow-up implementation of national broadbandization. South Korea's national broadband planning spanned a long period of 20 years and was divided into different phases. Moreover, South Korea insisted on carrying out national broadbandization and achieved the planned targets.

<table>
<thead>
<tr>
<th>Year</th>
<th>Plan</th>
<th>Access Rate</th>
<th>Access Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995-2005</td>
<td>KII Phase1, Phase2, Phase3</td>
<td>2Mbps</td>
<td>ATM/ADSL/Cable</td>
</tr>
<tr>
<td>1998-2000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001-2005</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004-2010</td>
<td>Bcn Phase1, Phase2, Phase3</td>
<td>50-100Mbps</td>
<td>VDSL/FTTx/WiBro/HSDPA/W-CDMA</td>
</tr>
<tr>
<td>2009-2013</td>
<td>UBcn</td>
<td>100M-1G</td>
<td>FTTH/WiBro/HSDPA/W-CDMA</td>
</tr>
</tbody>
</table>

The government of China unveiled the "Broadband China" strategy in August, 2013. The "Broadband China" strategy clearly defines the broadband development targets and important implementation measures. According to the "Broadband China" strategy, the broadband access rate shall mount up to 100 Mbps and the number of broadband users to 410 million by 2020. The implementation plan of the "Broadband China" strategy thoroughly defines the rural broadband development, urban broadband speed-up, technologies to be developed emphatically for the industry chain, content applications, and national broadband management. It also defines national policies on supporting the implementation of the "Broadband China" strategy, including capital support, access openness, and collective infrastructure construction and convenience. Specifically, the "Broadband China" strategy stipulates that airports, stations, schools, and enterprises shall provide support and cooperation for broadband construction. This magnificently promotes China's broadband development.

2. Government Provides Capital Support

The government of South Korea provides capital support for national informatization and broadbandization in 2 aspects: informatization fund and government's IT budget.

a. The informatization fund includes several parts: government capital (39%), private capital (46%), and other capital (15%). From 1993 to 2002, the total volume of the fund was 7.8 billion USD, among which, 15% of the fund was used for broadband construction, while the rest of the fund was used for training, research, and standard formulating.
The successful bandwidth development in South Korea demonstrates that government's capital support has a huge effect on bandwidth development. The government of Malaysia launched the NBI project in 2010. Telekom Malaysia (TM) established the HSBB project to carry out the NBI project. The total investment of the HSBB project was 13 billion MYR. The government of Malaysia injected a total of 2.4 billion MYR in 3 years. The HSBB project achieves a great success. Particularly, the number of users reached 680 thousand in only 1 year, and the overall profit margin of TM was above 10%. The government of Malaysia's contributions to the success of the TM's HSBB project were remarkable. This public-private partnership (PPP) construction mode (The government provides capital allowance and carriers carry out network construction) was very successful.

3. Government Promotes and Supports Collective Infrastructure Construction and Convenience

In Nigeria, power plants route optical fibers above high-voltage power transmission cables. Phase3 (a telecom company of Nigeria) can also route its own optical fibers above high-voltage power transmission cables and lease optical fibers from power plants. Phase3 is the largest optical fiber carrier in Nigeria. Telecom carriers, enterprises, and government departments lease optical fibers from Phase3 for communication. This greatly lowers the costs of fiber users and carriers. According to the estimation of USA's Federal Communications Commission's (FCC), the fiber routing expense is about 144 thousand USD per mile in USA. However, if fibers are routed together with roads or other infrastructures, the fiber routing expense drops to 101 thousand USD per mile. Both material expense and construction expense decrease, among which, the construction expense falls obviously.

In order to accelerate the infrastructure construction of next-generation broadband networks, the Department for Culture, Media & Sport (DCMS) of the UK issues policies, specifying that installation of broadband devices does not require the approval of local planning department. DCMS-issued preferential policies cover:

a The installation of outdoor fiber distribution terminals (FDTs) does not require advance approval.

b Routing aerial cables in any places does not require advance planning.

c Installing broadband devices under or above private lands does not require long-term negotiation.

Besides, DCMS would simplify the planning process of mobile infrastructure rollout.

The Ministry of City Construction and the Quality and Technology Supervision Bureau in China jointly released Code for Construction and Acceptance of Communication Engineering for Fiber to the Home in Residential Districts and Residential Buildings (the Code for short) in 2013. The Code has definite regulations on fiber pipes, telecom shafts, manholes, fiber connections, and device installation in newly-constructed residential districts. In addition, the Code provides detailed acceptance standards. This greatly reduces the FTTH construction difficulty.

4. Government Undertakes and Supports the Universal Service

The UK government kicked off the Broadband Delivery UK (BDUK) project in 2010 to provide broadband coverage for remote areas (in which the population is 30% of the total population of the UK). The UK government planned to invest 1 billion GBP for constructing broadband access networks in remote areas to increase the UK's broadband penetration rate to 90% and above. In March 2011, the first 50 million GBP (startup capital) was allocated to various areas. Each area obtains about 5 to 10 million GBP. In 2012, The UK government invited tenders for the BDUK project, and British Telecom (BT) won the bid. The total investment of the project added up to 2 billion GBP, among which, 1 billion GBP was contributed by BT, 0.5 billion GBP by the central government of the UK, and 0.5 billion GBP by the local governments.

In Malaysia, the government undertakes part of responsibility of informatization and broadbandization. The government of Malaysia invests 60 million MYR to set up 246 community broadband service centers all around Malaysia, and invests 40 million MYR to set up 105 e-counters in areas where aborigines live to help achieve e-Government (e-Gov) in remote areas.

5. Government Provides Low-interest or Interest-free Loans and Tax Relief
As stipulated by the government of South Korea, high-tech companies can enjoy national tax relief (partial remission) for 10 years and local tax relief for 15 years. To encourage private investment during the KII-P phase of broadband construction, the government greatly lowered the interest rate of loans and provided interest-free loans for network construction in remote areas. In 2003, the government built the free-trade zone. In the free-trade zone, companies can enjoy rent relief, low-interest loans, and financial support. The government of Cameroon provides guarantees for Cameroon telecom carriers loaning from the Bank of China. They got 198 million USD loans, which is a substantial financial support.

6. Government Leads Information and Application Consumption
   Such measures include:
   IT skill training

<table>
<thead>
<tr>
<th>Target Group</th>
<th>Quantity (Unit: Thousand)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers and students</td>
<td>3979</td>
</tr>
<tr>
<td>Farmers, fishers, workers, and suburban residents</td>
<td>3291</td>
</tr>
<tr>
<td>Homemakers</td>
<td>2000</td>
</tr>
<tr>
<td>Servicemen</td>
<td>740</td>
</tr>
<tr>
<td>Officials and civil servants</td>
<td>710</td>
</tr>
<tr>
<td>Disabled and elderly</td>
<td>378</td>
</tr>
<tr>
<td>Prisoners</td>
<td>32</td>
</tr>
</tbody>
</table>

   At the early stage of broadband development, people's skills to use IT devices has a major impact on broadband development. From 2000 to 2002, South Korea carried out a training program. The number of people who received the training reached 14 million, which is greater than the planned number (10 million people) listed in the left figure. The program covered people from all walks of life, even prisoners can receive the training. This program greatly pushed broadband development in Korea.

Support and encouragement of broadband usage
The government of South Korea stipulates that Educational, government, and medical institutions and schools must have access to broadband. In the KII phase of broadband development, the government of South Korea invested in the backbone network construction first, government institutions took the lead and had the main broadband users. In the KII-P phase, private investments were encouraged and broadband services were provided for home and enterprise users. In KII-T phase, both government and private investments were involved, and broadband services were provided for research and educational institutions. The government of South Korea encouraged lots of broadband users for the development, promotion, and professional application of broadband.

The government of Malaysia also invests a lot of efforts in encouraging broadband users. The government of Malaysia stipulates that civil servants (1.2 million) can apply for 5000 MYR every 3 years for purchasing computers. It also uses 1 billion MYR to purchase 1.2 million of desktops and distributes the desktops to low-income people and students. The low-income people and students who receive the desktops need to sign a 2-year on-net contract with Telekom Malaysia, and they need to pay only about 38 MYR rent per month. In this way, the broadband penetration rate in Malaysia is improved by 5%. For common Malaysians who buy computers, the government stipulates that they can be exempted from sales 3000 MYR of taxes and this right is renewed every 3 years. From 2010 to 2012, a broadband user can be exempted from 500 MYR of sales taxes after applying for broadband services of 68 MYR or exempted from 456 MYR of sales taxes after applying for broadband services of 38 MYR. These measures greatly contribute to the information and broadband development.

Boosting information demand:

<table>
<thead>
<tr>
<th>E-banking user (unit: 10 thousand)</th>
<th>1998</th>
<th>1999</th>
<th>2001</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The government of South Korea planned for information development. The planning, including e-Gov, e-health, and e-education, has well supported the initial development of broadband. The data listed in the left table effectively demonstrates that the information development promotes broadband development. Thanks to the Government of South Korea's step-by-step efforts, the broadband in South Korea gained continuous development. The access rate and penetration rate of South Korea broadband are among the highest in the world. In content applications, South Korea broadband even takes the lead in the world. The measures adopted by the South Korea government can be learned by other countries.

### 3 Suggestions on Policies of the Broadband Industry

1. **From formulating and optimizing the strategic planning of national information and broadband development to carry out the planning step by step**
   
   Different countries may have vast differences in economy, politics, geography, national education, and infrastructures. Thereby, the planning and implementation of broadband development strategies may vary widely.
   
   During planning, governments are recommended to objectively assess the value that will be brought by information and broadband development and finalize the most-important measures that need to be taken. Based on the successful practice of Japan, USA, South Korea, and Malaysia, the most-important measures should be:
   
   - Well planning of national information and broadband development
   - Finalizing the investment volume, plan, and direction
   - Providing conveniences for broadband construction in terms of municipal pipelines, right of way (ROW), household pipelines, and telecom shafts
   - Providing IT skill training, encouraging information development, and giving financial allowance to certain broadband users
   
   During the implementation phase, the government needs to ask the most professional and experienced carriers (including cable operators) to construct, operate, maintain, and run the broadband network. The government only fulfills the responsibility of supervision. Specifically, the government should check whether the carriers are following the plans.

2. **Encouraging investments**

   The Regulation Holiday policy is recommended for new fiber construction. For infrastructure networks that are in service for many years, it is recommended to lift the regulations.

   As proved by practice, explicit fiber regulations are beneficial to ultra-broadband penetration, network access rate, and other network KPIs. Thereby, governments are recommended to explicate the fiber regulations. As huge investments are needed in infrastructure construction, it is recommended to adopt Regulation Holiday, that is, to specify the fiber investment protection period and lift the regulation after this period expires, or adopt the open-bitstream policy used by the British government. After the open-bitstream policy is carried out in Britain, the number of ultra-broadband users is increased by 10 million, which is a remarkable increase.
The government encourages carriers (that have partnership based on business interests) to share access-layer pipelines to improve investment productivity. In October, 2012, Jazztel and Telefonica signed cooperation agreements to construct a network that covers 3 million FTTH users in Spain. In March, 2013, Vodafone and FT declared that they would jointly invest 1 billion EUR on their Spanish subnets and build and share FTTH networks in 50 Spanish cities. The cooperation helps avoid wasteful investments and contribute to fast network construction.

For existing infrastructure networks or even networks that are in service for years or decades (such as HFC or power grid), if the government is one of the investors or even the main investor, governments are recommended to lift the regulations on such networks. This helps avoid wasteful investments and save the overall social costs.

3. Coordinating collaborative infrastructure construction and providing convenience

Governments are recommended to grant operating licenses of communication cables to big infrastructure investors.

Compared with railways, roads, power transmission cables, oil/gas pipelines, or municipal pipelines, telecom infrastructure construction requires much fewer investments and is of smaller scale. Moreover, the construction of roads and municipal pipelines precedes the construction of telecom infrastructure. If the government grants operating licenses of communication cables to the big infrastructure investors, those investors can add a small amount of investment on communication cable layout after road and municipal pipeline construction. Then, they can lease the telecom network to telecom carriers. This method can greatly encourage telecom infrastructure construction and lower the follow-up telecom network costs. During the implementation of this method, the government also needs to regulate the prices involved.

Carrying out policies for promoting collaborative infrastructure construction

The government of Kenya gives tax rebates to carriers who share infrastructures such as pipelines and fibers. When governments use tax rebates and financing methods/means to encourage the collaborative infrastructure construction, wasteful investments can be reduced. Besides this carrot approach, governments can also use stick approaches. For example, in USA, the "dig once" law stipulates that the infrastructure at a place can be trenched only once during a certain period. This forces companies to collaborate in infrastructure construction.