Presentation for Hearings at the Democratic Party of Japan’s Information and Telecommunications Diet Members Federation

November 24, 2010
Nippon Telegraph and Telephone Corporation
Realization of “Hikari-no-Michi” (Mobile/Fixed)

Aim for realization of ICT use and facility-based competition by around 2015
Mobile and Fixed

Both at home and outside the home (ubiquitous)

At home

Living hours (excluding sleeping time)

Outside the home

At home

Provided by Samsung
Mobile Internet Use is Established

Mobile

- Mobile handsets
- Smartphones

Fixed

- Desktop PCs
- Laptops

Tablet PCs

2000 - 2010

Provided by Samsung
More Convenient Mobile Use

✔ Already usable across Japan (covering inhabitable area)

✔ Already 120 million users

✔ Ultra high-speed (optical fiber quality)
✔ Efficient use of frequency

Realization of “Hikari-no-Michi”
# Improvement of Utilization Rate by ICT Use

## Accelerate use of educational, medical and government services

⇒ Improvement of utilization rate

<table>
<thead>
<tr>
<th>Use scenario</th>
<th>Home</th>
<th>Office</th>
<th>Education</th>
<th>Government</th>
<th>Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Japan</td>
<td>Approx. 75%</td>
<td>Approx. 81%</td>
<td>Approx. 40%</td>
<td>Approx. 8%</td>
</tr>
<tr>
<td></td>
<td>USA</td>
<td>Approx. 73%</td>
<td>Approx. 94%</td>
<td>Approx. 60%</td>
<td>Approx. 26%</td>
</tr>
<tr>
<td></td>
<td>UK</td>
<td>Approx. 72%</td>
<td>Approx. 87%</td>
<td>Approx. 50%</td>
<td>Approx. 94%</td>
</tr>
<tr>
<td></td>
<td>Korea</td>
<td>Approx. 76%</td>
<td>Approx. 100%</td>
<td>Approx. 80%</td>
<td>Approx. 85%</td>
</tr>
</tbody>
</table>

※Internet utilization rate by corporations is **approx. 99%**

### Use scenario

- **Home**:
  - Approx. 75%
- **Office**:
  - Approx. 81%
- **Education**:
  - Approx. 40%
- **Government**:
  - Approx. 8%
- **Medicine**:
  - Approx. 26%

### Improvement of Utilization Rate by ICT Use

- **Home**:
  - Approx. 75%
- **Office**:
  - Approx. 81%
- **Education**:
  - Approx. 94%
- **Government**:
  - Approx. 60%
- **Medicine**:
  - Approx. 26%

#### Realization of “Hikari-no-Michi”

- **Penetration rate of Internet users**:
  - Japan: Approx. 75%, USA: Approx. 73%, UK: Approx. 72%, Korea: Approx. 76%
  - Internet utilization rate by corporations is approx. 99%

- **School LAN deployment rate**:
  - Japan: Approx. 81%, USA: Approx. 94%, UK: Approx. 87%, Korea: 100%

- **e-filing rate of income taxes**:
  - Japan: Approx. 40%, USA: Approx. 60%, UK: Approx. 50%, Korea: Approx. 80%

- **Electronic health record introduction rate (clinics only)**:
  - Japan: Approx. 8%, USA: Approx. 26%, UK: Approx. 94%, Korea: Approx. 85%

### Reference

- **Penetration rate of Internet users**:

- **School LAN deployment rate**:
  - “Survey results regarding the actual situation of information education at schools” by the Ministry of Education, Culture, Sports, Science and Technology

- **e-filing rate of income taxes**:
  - “About e-Tax usage” by the National Tax Agency; for U.S., U.K. and Korea, from press reports

- **Electronic health record introduction rate**:
  - “IT strategies in healthcare and social security” by the IT Strategy Headquarters
Solving Socioeconomic Issues and Contributing to Economic Growth Through ICT Use

![GDP (Nominal) Graph](image-url)
Enhancement Through Competition Among carriers

**Number of subscribers**

**Mobile broadband**
- NTT DOCOMO: 55 million
- KDDI: 32 million
- Softbank: 24 million
- EMOBILE: 3 million

**Fixed broadband**
- NTT East & NTT West: 17 million
- CATV: 5 million
- Electric utilities: 2 million
- Softbank: 4 million
- eAccess: 2 million
- KDDI: 1.5 million
- Others: 1.5 million

**Investment**
- 5 trillion yen investment to date
- 3 trillion yen investment to date

Number of subscribers have increased at 50% per annum (FY2004→FY2009)

(Source) Mobile broadband (3G mobile): TCA published value (as of Oct. 30, 2010); fixed broadband: MIC published value and NTT research (as of Jun. 30, 2010)
34 Million Fixed Broadband Subscribers

- Already 70% of households subscribe to fixed broadband.
- ADSL peaked at 14 million subscribers.
Nationwide Expansion of FTTH Services by Electric Utilities

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Cumulative investment</strong></td>
<td>2.1 trillion yen</td>
</tr>
<tr>
<td><strong>Fiber cable quantity</strong></td>
<td>450,000km</td>
</tr>
</tbody>
</table>

(Source) Excerpt from K-Opticom Corporation’s hearing material “Task Force for ICT Policy in the Global Age” (April 20, 2010)
CATV Connectable to 90% of Households

Besides copper and fiber-optic lines, CATV cables have been installed and built into many households

☞ CATV providers can connect to approx. 90% of total households

(Actual provision of services: Approx. 67%* households)

*Source: MIC, Current state of CATV

Total 49 million households

Connectable households: 44.23 million (90%)

Connected households 32.64 million (67%)

Unconnected households 11.59 million (23%)

(Source) MIC, Current state of CATV; CATV Almanac 2009

(Source) Excerpt from Jupiter Telecommunications Co., Ltd.'s hearing material "Task Force for ICT Policy in the Global Age" (Nov. 9, 2010)
Fixed Broadband Penetration achieved through Facility-based Competition

【Household penetration rate】

Total fixed broadband (FTTH • CATV • DSL)

FTTH < CATV

(Source) MIC published value (as of June 30, 2010)
Japan’s Broadband Use is at World-Leading Levels

**Mobile Broadband**

Used by approx. 90% of the Japanese people
【3G mobile subscriber penetration rate】

<table>
<thead>
<tr>
<th></th>
<th>Japan</th>
<th>Korea</th>
<th>U.S.</th>
<th>France</th>
<th>Germany</th>
<th>U.K.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3G</td>
<td>87%</td>
<td>94%</td>
<td>65%</td>
<td>30%</td>
<td>32%</td>
<td>48%</td>
</tr>
</tbody>
</table>

**Fixed Broadband**

Used by approx. 70% of households
【Household penetration rate】

<table>
<thead>
<tr>
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<th>Germany</th>
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</tr>
</thead>
<tbody>
<tr>
<td>FTTH</td>
<td>36%</td>
<td>44%</td>
<td>4%</td>
<td>0.2%</td>
<td>0.04%</td>
<td>0%</td>
</tr>
<tr>
<td>Household</td>
<td>67%</td>
<td>87%</td>
<td>71%</td>
<td>75%</td>
<td>64%</td>
<td>72%</td>
</tr>
</tbody>
</table>

(Source) Mobile broadband (3G) subscriber penetration rate: World Cellular Information Service (Informa) (June 2010)
Household penetration rate for fixed broadband: ITU briefing paper (2009)
FTTH broadband penetration rate: regulatory bodies of each country, etc. (as of Sept. 30, 2010; except for Japan (March 2010))
Accumulation of Investments and R&D

Investments: Over 8 trillion yen
- Mobile broadband: 5 trillion yen*1
- Optical broadband: 3 trillion yen*2, and others

R&D:
- Cost reduction
- Improvement of services

*1: Total capital expenditures for FY2001~FY2010 (Planned)
*2: Total capital expenditures for FY2001~FY2010 (Planned) (for optical access only)
Cost Reduction Efforts by NTT East and NTT West

(FY2000)

NTT East

Operating Revenues

NTT West

Operating Expenses

5.5 trillion yen

5.4 trillion yen

(FY2009)

NTT East

Operating Revenues

NTT West

Operating Expenses

3.6 trillion yen

3.7 trillion yen

Significant cost reduction
Approx. 2 trillion yen
Reduction of Optical Fiber Costs*

* Actual cost per one dark fiber (NTT East)

**FY2000**
- 17,600 yen

**FY2009**
- 4,600 yen

Approx. 75% decrease

(yen/fiber line)
Reduction in Fiber-optic Service Charges
~Convenience according to Customer~

- Includes ISP charges

- House: 9,900 yen in FY2000, 6,200 yen in FY2009 (approx. 40-50% decrease)
- Multi-unit dwelling: 7,600 yen in FY2000, 3,500 yen in FY2009 (approx. 40-50% decrease)

*Includes ISP charges
World’s Greatest Commitment towards Open Fixed Networks
~No. 1 in the world for open copper and FTTH networks~

【Unbundling obligations for fixed access in foreign countries】

<table>
<thead>
<tr>
<th></th>
<th>Japan</th>
<th>U.S.</th>
<th>U.K.</th>
<th>Germany</th>
<th>France</th>
<th>Korea</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Copper</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dry copper</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Line sharing</td>
<td>Yes</td>
<td>Yes→No (Abolished in 2003)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>FTTH</strong></td>
<td>Yes</td>
<td>Yes→No (Abolished in 2003)</td>
<td>No</td>
<td>Yes→No (Abolished in 2005)</td>
<td>No</td>
<td>No*</td>
</tr>
</tbody>
</table>

* Optical cables laid down after 2004 are exempt from unbundling obligations
Strengthen Firewalls Completely

☞ Separation of operations among services and facilities divisions
☞ Thorough blocking of information systems
☞ Complete framework for oversight and audit
Enhancement and expansion of services

◎ Internet connection service

◎ Video services
  ・ Mobile phone specific television (“BeeTV”)
  ・ Retransmission of terrestrial digital broadcasts (“Hikari TV”) and others

◎ Behavior support services for mobile phones
  ・ Distribution of information useful for daily life (“i-concier”)
    Examples: train information, weather forecasts
  ・ Distribution of news (“i-channel”)

◎ User support
  ・ PC installation, remote support, etc.
Steady Contribution in Eliminating the Digital Divide

In
- mountain areas
- remote islands

Provide FTTH services by leasing fiber-optic facilities installed and owned by local governments

☞ Publicly structured and privately operated (IRU method)
Steady Contribution in Eliminating the Digital Divide

Creative efforts in urban areas

Example: For ducts with little space in multi-unit dwellings and underground duct lines with little space ⇒ Respond with the development of thin cables

Optical fiber (conventional)

Thin: cross-sectional area conventional ratio 1/2

Low friction: coefficient of kinetic friction conventional ratio 1/5

Optical fiber (thin low-friction)
Disaster Rescue and Recovery
~As NTT’s DNA~

Earthquakes

Typhoons
Continuing Facilities Surveillance Night and Day

24-hour centralized monitoring

Joint emergency drills with Japan Self-Defense Force, etc.
NTT Group’s Concerted Support for International Conferences

☞ Protection and special maintenance for telecommunications facilities (line backup, patrol)
☞ Special surveillance against cyber-terrorism

Protection from cyber-attacks

Operation Center
Steady Maintenance Efforts

Maintenance of telephone poles in heavy snow

Maintenance of steel towers
Steady Maintenance Efforts

Relocation of telephone poles due to road-widening construction
Nationwide Support for ICT Use

Supporting ICT Use
- Government services
- Education
- Medicine
- Tourism, etc.

Venture Support
- Venture funds
- Venture forums

Remote health guidance
Past Initiatives to Promote ICT Use

Supporting the various uses of ICT by local governments nationwide

【Examples of initiatives】

**Government**
- Electronic applications and tax payments
- Remote surveillance (water channels, roads)
- Delivering information on disasters

**Education**
- Remote classes
- LAN within the school (PC, electronic blackboards)
- Emergency communications system

**Medicine**
- Electronic charts
- Regional healthcare service integration
- Remote health guidance

**Traffic**
- On-demand traffic system (inexpensive door-to-door system)

**Environment**
- Environmental sensing (such as information on pollen, etc.)

**Tourism**
- Live streaming images of the tourism destination
Additional Initiatives Going Forward

☞ Promoting ICT use in education, medicine and other fields
  • Participating in the “Future School” promotion project
  • NTT Group’s unique initiatives
    ~ Exhibit synergy with “Future School”

☞ Increasing the *educational discount* (discounts for schools) for fiber-optic service
  • Discount for the ultra high-speed 1 Gbps fiber-optic service, etc.
Initiatives Going Forward to Eliminate the Digital Divide in Remote Area

Example: Extending the coverage range of fiber-optics (ONU/OLT) + utilizing wireless (currently under research and development)

OLT (Optical Line Terminal): Optical subscriber line terminating devices installed inside NTT offices
ONU (Optical Network Unit): Optical subscriber line terminating devices installed inside users’ homes
Achievement of Ultra High-speed Mobile Transmission Ahead of Competitors

◎ Achieve ultra high-speed transmission on mobile phones

Maximum 75 Mbps* = fiber-optic speed

Global standard LTE service (to be commercialized about 2 years ahead of the competitors)

7 Mbps

2010

by around 2014

Maximum 100 Mbps

2015

Supplemented by the expansion of public wireless LAN
～Inner-city area・subway・underground～
<table>
<thead>
<tr>
<th>Global Standard Plan</th>
<th>Galapagos Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile and/or fixed</td>
<td>Focused on fiber-optics</td>
</tr>
<tr>
<td>Facility-based competition</td>
<td>Establishment of specialized company for fiber access</td>
</tr>
<tr>
<td>Users’ freedom of choice</td>
<td>Mandatory for all households</td>
</tr>
</tbody>
</table>
Realize “Hikari-no-Michi” by around 2015 through ICT use and facility-based competition

~Maximizing the potential of mobile and fixed networks~

In order to achieve this goal, we ask that you promote the use of ICT (such as e-government), efficiently use frequencies, and support infrastructure development for local governments.
Global Expansion

☞ Supporting the adoption of ICT by global companies
☞ Supporting the expansion of Japanese content
☞ Using the growth opportunities of emerging countries
Global Expansion

Support the Adoption of ICT by Global Companies
Global Expansion

Support the Expansion of Japanese Contents

To 31 countries and regions
Global Expansion

Using the Growth Opportunities of Emerging Countries

Transition in the number of subscriptions (worldwide total)

- 1.0 Billion subscriptions in 1999
- 5.3 Billion subscriptions in 2010 (E)

Acquisition of mobile customers in India

- Exceeded 80 million subscriptions (As of October 2010)

(Source) ITU World Telecom/ICT Indicators
Paradigm Shift in the Telecommunications Market

~A movement toward broadband mobile and globalization~

**Market**
- 1990s: Telephone
- 2000s: Contents/applications

**Players**
- Domestic communications carriers
- Numerous global players

**Players in Japan**
- NTT
- KDDI
- Softbank

**Players in the World**
- Google, Amazon, Microsoft, etc.

**Hardware/software businesses**
- Sweeping over the information and telecommunications markets.

**Players in Terminals**
- Apple, Samsung, Nokia, etc.
Conversion to be in-Principle Deregulation and where necessary, Ex-post Regulation

◎ User-friendliness

◎ Global competitiveness

◎ Innovation and Investment Incentive
NTT Group will continue to provide a world-leading broadband and ubiquitous environment and safe, secure and convenient services, and will continue to serve as a company always trusted by its customers.