#### Rural Telecommunications (2) Historical Aspects – Missing Link -

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### **Reading Assignment**

Report of the Independent Commission for Worldwide Telecommunications Development "The Missing Link," December 1984.

- <u>http://www.itu.int/osg/spu/sfo/missinglink/index.html</u>
- Read page 1-70 of the above document.
  Consider the answer to the following questions while reading:
  - 1. What are the roles of telecommunications? After 27 years, what are new and obsolete roles?
  - 2. Itemize the issues about the telecommunications development.
  - 3. List the available technologies to solve the problems. After 27 years, what are the significant changes?

#### Issues about Telecommunications Development (Question 2)

- Disparity of telecommunication services
- Availability and quality of service
- Funding
- Equipment supply

#### Disparity in Extent of Telecommunication Services



2/3 of world population had no telephone access.

#### Extent of Service in Developing Countries

- Telephone service far from <u>universal</u>
- Only in larger towns and business centers
- Great tracts of territory with no telecom



#### People per Telephone in 1982



#### Availability and Quality of Service

- Long waiting list 3 years not uncommon
  Shortage of equipments and cables
- Poor service limited time, call drop
  - Shortage of equipments
  - Inadequate maintenance
  - Shortage of trained staffs



## Funding

- Too small investment to meet demands
- No manufacturing industries
   Import cost
- Low priority
  - Compared to agriculture, health, education, roads,...

## Funding

- Strategy of world telecommunication firms
  - Export markets
  - Arrangement of funding
- Important considerations
  - Credits or loans = indebtedness
  - Equipments chosen related to financing, not suitability or other merits
  - Different types of equipments
    = difficulty of maintenance

## Equipment Supply

- Products on the market
  - Designed for advanced countries
    - Temperate climates
    - High population density
    - Good maintenance of equipments and networks
  - Deployment into developing countries
    - High temperature
    - High humidity
    - No trained staffs

## Equipment Supply

- Manufacturer driven
  - Stop making older system
  - Enforce developing countries to exchange systems
- Smaller and poorer countries
  - Limited quantities
    - = high cost for transport and support

#### **Problems of Remote Areas**

- No form of telecommunication services outside the town
- Limited service time
  - Large distance
  - Difficulty of terrain
  - Sparseness of population
  - => Less interest in business

High cost

## International Cooperation

- International Telecommunication Union (ITU)
  - Technical cooperation
- United Nations Development Programme (UNDP)
  - US\$ 21.6m in 1982
- International Bank for Reconstruction and Development (World Bank)
- United Nations Educational, Scientific and Cultural Organization (UNESCO)







#### **Global Communication Service**

- Satellite operators
  - INTELSAT
  - INTERSPUTNIK Soviet Union based
  - INMARSAT Maritime

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### **Opinions from Students**

- Defense related restriction of product export
  - Encryption
  - Geolocation
  - Advanced CMOS process
- Proprietary technology for interoperation with difference companies' products due to IPR issue

### **Opinions from Students**

- Incompatibility of regulations in different countires
  - 2.4 GHz in Philippines sold to private company to prevent deployment of WiFi
- Interoperability with old system
  - AMPS (1G) in USA
  - How about GSM (2G) ? Migration to 3G?
    - Core network is common sustainability and interoperability

## What have changed during 27 years? (input from students)

- Technological change
  - Manual exchange to automatic high capacity exchange
- Shift to mobile technology
  - Free from wireline
  - Easier to design network due to digital technology
  - Easier to expand scalability
  - Reduction cost Infrastructure and equipment
    - Digital technology
    - Trickle-down effect penetration in developed countries
- Shift from circuit switching to packet switching
  - IP technology
  - Replacement from exchange 100,000,000yen to router 4,000,000yen (quite a few years ago)

# What have changed during 27 years? (input from students)

 Development sector has been established in ITU to facilitate the cooperation in telecommunication development after the report.

## What have changed during 27 years?

- Disparity of telecommunication services
  - Gap still exists, but getting smaller.
  - Reduction of cost; semiconductors, Internet, mobile phone
  - Different development model of telecommunications: wireless connection needs less infrastructure investment
- Availability and quality of service
  - Improved
- Funding
- Equipment supply
  - Major global suppliers e.g. Huawei, Samsung, LG, Nokia, Motorola, Sony Ericsson, HTC, focus more on the developing market: They now provide the products more suitable for the use in developing areas

Choice of Technology (Question 3)

- Elements
  - Subscriber terminals
  - Subscriber lines
  - Local exchanges
  - Transmit (toll) exchanges
  - Interexchange circuits

#### Subscriber Terminals

- Telephone
- Concept of "non-voice"



#### Subscriber Lines

- Pair wires
  - overhead or buried
- Radio telephony

   VHF/UHF/SHF
   Line of eight CO 70
  - Line of sight; 60-70 km
- Satellite
  - when radio repeater infeasible



#### Local and Transmit Exchange Systems

- Manual systems with plugs and jacks
  Still widely used
- Automatic analogue system
  - Electro-mechanical
  - Obsolete
- Stored program control
  - Computer and solid state switches
- Digital switching system

## Integrated Digital Network

- ISDN
  - First concept in 1972
  - First standard in 1984



## Choice of Technology

- "The latest technology is not always the best solution."
- Digital systems preferable
- Long term strategy
- Optimal use of existing resources
  - Human
  - Material
  - Financial

#### Recommendations for Technology Choice

- Manufactures and operators are encouraged to develop the systems enabling the needs of more remote areas at low cost, by using the latest technologies including satellites.
- ITU in conjunction with manufacturers should consider compiling catalogue of suppliers and systems in use.

### **Internal Organizations**

- Most telecommunication systems run by a department of central government.
  - US AT&T divided into baby-Bells in 1982
  - Privatization of NTT Japan in 1985
- Rapid evolution of technology
  - Decision needed based on factors below:
    - Finance
    - Procurement
    - Marketing
    - Personnel
    - Training ...