Part I

Telecom Sector Organization in Industrialized and Developing Countries

TV density (% of HH with TV set, 2001)

**Telephone density** (per 100 HH, 2001)


**Internet users** (users per 100 POP, 2001)


**Sector organization**

- **Broadcasting.**
  - Public (state owned and run) broadcasting systems dominant until late 1980s.
  - Gradual commercialization and privatization.
- **Voice, data, and Internet.**
  - PTTs (Posts, Telephone, and Telegraph) as state owned providers of telecom services.
  - Gradual liberalization beginning in 1980s.
- **Cable TV** often provided by PTTs (at least the network infrastructure).
Major trends

- **Privatization.**
  - Full or partial sale of state-owned telecom service providers.
  - Total sales volume from PTT privatization >$200 billion.
  - Large sales are British Telecom (BT), Nippon Telegraph & Telephone (NTT), Deutsche Telekom (DT), France Telecom (FT).
  - An example of broadcasting privatization is TF 1 (France).

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Major trends ...

- **Liberalization.**
  - Opening of the monopoly to competitors.
  - Sequence of CPE --> value added services and wireless --> basic services --> infrastructure in most countries.
  - Regional liberalization process in the European Union (EU) and multi-lateral, more global, process within World Trade Organization (WTO).
  - Elimination of foreign ownership restrictions.

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Major trends ...

- **Globalization of major service providers.**
  - More than 200 foreign investment projects by U.S. telephone companies since the 1980s.
  - Formation of global alliances.
    - Global One (Sprint, FT, DT).
    - Concert (BT, AT&T).
  - Emergence of global media empires (New Corporation, CNN, Bertelsmann, ...).
- **Future of national regulation?**
Part II

International voice and data communications

International services

- Rapid growth in international voice and data traffic
- Until early 1990s joint provisioning by respective national monopolies
  - Each participating organization operated and was paid for a half circuit
  - National monopolies had the exclusive right to terminate and originate traffic
- Gradual bilateral and multilateral opening of national markets

International routing

- Joint provisioning. Classic paradigm of international service provision in which each carrier provides national service.
- Hubbed service. A third PTO provides hub service to several other PTOs.
- Transit service. Third party provides hub and transit services.
- End-to-end service. Third party provides full end-to-end service.
Satellite communications

- **Int’l service classification**
  - Fixed satellite services (FSS)
  - Broadcast satellite services (BSS)
  - Mobile satellite services (MSS)
- **Classification by orbit**
  - Geosynchronous orbits (22,300 miles)
  - Medium Earth Orbits (MEOs)
  - Low Earth Orbits (LEOs)
  - Highly Elliptical Orbits (HEOs)

Satellite industry

- **Geosat service providers**
  - International consortia (e.g., Intelsat, Inmarsat)
  - Regional organizations (e.g., Eutelsat, Panaftel)
  - National organizations (e.g., SITE, Molyna)
  - Private carriers (e.g., PanAmSat)
- **MEOs** (e.g., U.S. Navistar GPS System, Odyssey, ICO (went bankrupt))
- **LEOs** (Globalstar, Iridium, Teledesic)
- **Manufacturers** (Loral, Hughes, Lockheed)

Satellite industry ...

- **Satellite service providers need**
  - National license(s) for the spectrum used (e.g., in U.S. administered by FCC)
  - Access to the desired orbit in compliance with international regulations
  - Agreements with providers of the earth segment
- **Offer wholesale** (capacity, carrier services), **retail services** (voice, data, Internet, DTH)
Submarine facilities

- Early cables privately owned and operated on a whole circuit basis
- Radio links and higher-capacity cables jointly owned and operated (by PTTs and private TOs, such as AT&T):
  - Based on the legal assumption that each "correspondent" owns a "half circuit" (e.g., 1/2 distance between UK and US)
  - Third parties (e.g., record carries in the U.S.) granted "Indefeasible Rights of Use" (IRUs)

Submarine facilities ...

- Private consortia since 1980s
  - Analog cables assigned to users by circuit
  - Digital cables use Minimum assignable units of ownership (MAUO=64 kbps) or synchronous transport modules (STM = 155 Mbps)
- International network owners need:
  - Landing rights in participating countries
  - Transit rights through third countries
  - Licenses to provide international services

Examples of consortia

- Trans-Atlantic Telecommunications (TAT) cables (e.g., TAT-9, TAT-10)
- Trans-Pacific fiber optic cables (e.g., TPC-3)
- Southeast Asia-Middle East-Western Europe 2 (SAE-ME-WE-2) over 18,000 kilometers
- Fiber Optic Link Around the Globe (FLAG)
Cost of submarine facilities

Investment cost per minute

Source: Frieden, 2001, p. 125

Global carriers

- Historical global carriers
  - Cable and Wireless (Commonwealth)
  - France Telecom (French colonies)
- Several carriers intended to build their own global networks
  - Global Crossing or Level 3 Communications
  - Strongly affected by telecom crisis and ensuing lackluster demand
- Joint ventures (e.g., Global One, Concert)

Bandwidth markets

- Facilitated by the abundance of international bandwidth
  - Allow trading of bandwidth in spot and futures transactions
  - Bandwidth exchange acts as a broker
  - Offers standardized contracts for buyers and sellers
  - Example Band X (London and New York)
- Emergence of virtual network operators (VNOs)
Part II

Major Institutions and Players

Intergovernmental players

- United Nations Organizations.
  - International Telecommunication Union (ITU).
  - United Nations Conference on Trade and Development (UNCTAD).
- World Trade Organization (WTO).

ITU ...

The International Telecommunication Constitution

Purposes of the International Telecommunication Union are:

"... to maintain and extend international cooperation between all members of the Union for the improvement and rational use of telecommunications of all kinds, as well as to promote and to offer technical assistance to developing countries in the field of telecommunications ..."

"... to promote the development of technical facilities and their most efficient operation with a view to improving the efficiency of telecommunications services, increasing their usefulness and making them, so far as possible, available to the general public ..."

"... to harmonize the actions of nations in the attainment of those ends ..."

Source: ITU.
ITU (http://www.itu.org)

Plenipotentiary Conference

World Conferences  ITU Council  Radio-communication  Standardization  Development
Secretary General  Director  Director  Director

World TC Advisory Council  Coordination Committee  Radio Bureau  TS Bureau  TD Bureau

Secretary General

ITU ...

- Founded in 1865, integrated as UN organization in 1947.
- 185 members, grouped into five regions.
- Main organizational units:
  - Radiocommunication Sector.
  - Telecommunication Standardization Sector.
  - Development Sector.
  - General Secretariat.

ITU ...

- Policies developed in conferences:
  - Plenipotentiary conference (every 4 years); in between meetings, the Administrative Council acts on behalf of the members.
  - World International Telecommunications Conferences (WTCs).
  - World/Regional Administrative Radio Conferences (WRCs).
  - World/Regional Telecommunication Standardization Conferences (WTSS).
International policy development:
- Conferences draft “protocol.”
- National governments adjoin (without or with reservation).

Major international treaties:
- International Telecommunication Constitution.
- International Telecommunication Convention.
- Radio Regulations.

Standardization and Development.

UNESCO (http://www.unesco.org).
- Founded in 1946 to “advance mutual knowledge and understanding of peoples through all means of mass communications ...”
  - 1940s-1960s: assistance in developing mass communications systems and infrastructure.
  - 1980s-present: long-range policy formation.

WTO (http://www.wto.org)
- Formed in 1995 as the successor of GATT (General Agreement on Tariffs and Trade).
- Promotes and enforces free trade among member states:
  - Ministerial Conference (every 2 years).
  - General Council.
  - WTO Secretariat.
- Dispute resolution and arbitration through national governments.
WIPO <http://www.wipo.org>

- Specialized UN agency
  - "Dedicated to promoting the use and protection of works of the human spirit"
  - Administers 23 IPR treaties
  - 179 member states
  - Budget of 410 million SFR (~275 million US$)
- Important emerging tasks
  - Balancing rights of owners and of users, especially in less developed countries

Standardization

- Asia Pacific Telecommunity (APT).

Policy and financing

- Asian-Pacific Economic Cooperation.
NGOs

- Institute of Electrical and Electronic Engineers (IEEE, http://www.ieee.org).

Part III

Major International Issues

Transborder broadcasting

- Problem of “uninvited broadcasts.”
- Free flow of information versus “electronic colonization” debate.
- New World Information and Communications Order (McBride Commission, 1980).
  - Balanced reporting.
  - Right to reply.
- Impact of non-spatial technologies.
NWICO

- New World Information and Communication Order initiative in 1980s.
  - Problem of "one-way flow of information" raised by developing countries (Varis & Nordenstreng; MacBride Commission both for UNESCO).
  - NWICO attempted to give nations a more powerful role in achieving a balanced news and information flow.
- Failed due to weakening of UNESCO.

Resource management

- International spectrum management.
- Satellite orbit management.
  - Right of every country to geostationary orbit slot in 90° arc over national territory for C-band satellites by 2010.
  - Ku- and Ka-band satellite slots allotted on first-come, first-served basis.
- Number and address management.
  - International numbering plan (ITU).
  - Internet addresses and domain names.

Standard setting

- International cooperation procedures:
  - International Telecommunication Union.
  - International Organization for Standardization.
  - International Electrotechnical Commission (IEC).
  - Regional standard setting bodies (e.g., ETSI, CEN, CENELEC, APT).
  - National organizations (e.g., ANSI, NIST, CBEMA, JSA, SISIR).
- Voluntary agreements.
- De facto standards.
Accounting rates
- Price paid to foreign operator for the termination of a call.
  - Accounting rates are negotiated.
  - If incremental costs of international call plus accounting rate > price of call - > loss.
  - If outgoing calls exceed incoming calls - > outflow of funds to foreign operators.
- FCC benchmark plan (6-15¢ high income, 6-19¢ middle income, 6-23¢ low income countries) and ITU accounting rate proposal.

Open markets
- Uruguay Round of GATT negotiations initiated trade in services dialogue.
- Concluded with annex on telecom services to General Agreement on Trade in Services (GATS).
- Negotiating Group on Basic Telecommunications (NGBT) drafted new rules.
- Agreement signed in February 1997.

Open markets ...
- 70 countries made offers on:
  - Most favored nation (MFN) treatment.
  - National treatment of foreign carriers.
- 55 countries made offers on regulatory principles.
  - Independent regulator.
  - Elimination of cross subsidies.
  - Transparent interconnection arrangements.
  - Transparent licensing procedures.
**Open markets ...**

- 50 countries made offers to improve market access for international services.
- 52 countries agreed to open satellite markets.
- 70 countries agreed to relax foreign ownership restrictions.
  - 48 countries allowed full foreign control.
  - 22 countries allowed significant control.

**Intellectual property**

- World Intellectual Property Organization (WIPO) treaties.
  - Expands protection of copyrights, patents, etc. to signatory nations.
  - Protects computer programs and databases as “literary works”.
- Problems of international piracy.

**Developing countries**

- Developing countries face many unique and daunting issues
  - How to bridge information gap to maintain link with industrialized world
  - Raise the capital necessary for huge infrastructure projects
  - Face uncomfortable choice between foreign direct investment and further delays
- Creation of GII major challenge
Bridging the digital divide

- **Universal access (rather than universal service to every household)**
  - Bhutan: a phone in every village
  - Kenya: a phone in walking distance
  - Zambia: telephone booths in public places

- **Policy options**
  - Market-based reforms
  - Specific roll-out obligations
  - International contributions

WSIS

- **World Summit on the Information Society 2003-2005**
  - Convened by ITU as global conference in Geneva (12/03) and Tunis (11/05)
  - Includes governments, industry, civil society
  - Intends to rejuvenate discussion of principles that should govern global information society
  - More information and rich documentation at http://www.itu.int/wsis/

Further readings

Frieden, Rob (2001). Managing Internet-Driven Change in International Telecommunications (Boston: Artech House)