

Conclusion

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CONCLUSION

Mitsuhiro Kagami
Masatsugu Tsuji

Deregulation and liberalization during the 1990s have brought about competition in the telecommunications sector. Relaxation of market ownership restrictions and the lowering of entry barriers resulted in cross-market entry and made many combined business activities possible. Coupled with computer and wireless technologies, especially, digitization produced convergence among telecommunications, computer, and broadcasting industries. As a result, telephony (fixed and mobile), CATV, satellite, computer, and even home appliances have been connected through the Internet. Such services as voice, packet- or circuit-switched data, movies/videos, images (photos), TV, and e-business can be enjoyed by Internet users. Particularly, broadband access services have been expanding and they will be the mainstream in the future network society.

From our two-year joint study we can draw some lessons from the rapidly changing state of the IT Revolution, especially, from the developing countries' point of view. Negative aspects are: (i) digital divide and universal service; (ii) monopoly and hegemony; and (iii) demand consideration, while the positive sides are: (iv) leapfrogging the industrialization process; and (v) broadband expansion.

1. DIGITAL DIVIDE AND UNIVERSAL SERVICE

We noticed that the disparity in Internet access among socio-economic groups is growing within countries. It is observed that higher income groups can better utilize the Internet than other income groups. Education and ethnicity also affect Internet diffusion. In particular, large cities are unevenly distributed in Internet use and the urban poor have very limited access. In addition, the gap between rural and urban areas is also expanding. An even more serious issue from our point of view is the disparity among developing countries.

It is clearly detected that Latin America as a region lags far behind East Asia in terms of Internet penetration. According to the International Telecommunication Union (ITU), Chile, the leading regional country in

Internet use (1,155 per 10-thousand inhabitants in 2000) is less than Malaysia (1,590), the sixth ranked (after Korea, Japan, Hong Kong, Singapore, and Taiwan) in East Asia. Why is Internet penetration in Latin America delayed? There are mainly four reasons though the situation varies country by country. First, there exist enormous income disparities that cause low penetration. Low-income groups cannot have Internet access even in advanced countries, so this tendency is strengthened in Latin America. Moreover, as broadband access develops, these deficiencies will further intensify.

Second, the lack of basic infrastructure is crucial. Telephone networks are basic for Internet connection. DSL/ADSL also use these telephone lines. Prompt and secure mail delivery services are very important for e-business for distributing ordered online products. Stable electricity supply is also essential for computers and IT-related equipment. It is said that basic infrastructure and services remain weak in Latin America.

Third, privatization of state-owned enterprises (SOEs) did not necessarily bring about efficient Internet diffusion. During the 1980s and 1990s state-owned telephone companies were privatized in the region but these incumbent companies still have monopolistic power and interconnection charges were not lowered as had been initially thought.

Fourth, Latin America lacks interconnection between major network access points within the region. More concerted investment efforts for interconnection are required.

Regarding universal service or universal access, more efforts should be made to increase public/private access centers to underserved and disadvantaged groups. Although some countries in Latin America have their own plans to establish telecenters and discount Internet rates, examples from other countries such as 'E-rate grants' and the Technology Opportunity Program (TOP) in the US, 'telecottages' in Hungary, the 'Village Road Program' in Estonia, and 'PC bangs' in Korea are useful.

2. MONOPOLY AND HEGEMONY

Generally speaking, new entrants in Internet access businesses have two options: to build new networks or to lease lines from incumbent carriers. As mentioned above, incumbent telecommunications companies have monopolistic power due to their huge sunk cost and influential stakeholders such as the government and powerful politicians, so access prices failed to decline as expected in developing countries (they have gradual-

ly decreased due to competition and new entrants such as cable and satellite TV as compared with ten years ago, for example). However, an even more complicated problem has emerged regarding interconnection charges.

Simply put, Internet connection has three-tier groups: final users, Internet service providers (ISPs), and Internet backbone providers (IBPs). In this geographical classification, price structure is basically divided into two: retail prices which users pay for ISPs (prices for the 'last mile'), and wholesale prices which ISPs pay for IBPs (sometimes called 'upstream' connectivity prices). IBPs are generally global conglomerates such as AT&T and Sprint. Because of technical reasons it is difficult to trace packet-data information routes. Moreover, confidential contracts among carriers make wholesale price structure ambiguous. Recent trends of mergers and acquisitions (M&As) among large IBPs have made this problem more complex. Anti-competitive activities and irrational price setting should be monitored and regulated. In this volume tracing the information routes (number of hops) was examined and these trials will help with efforts to fix rational prices in the upstream connectivity.

Standards and intellectual property rights are another issue. International standards have often been used as a global strategy, or hegemony, to sell own-products by multinational corporations (MNCs) or even governments of advanced countries. In the high-tech world, innovations become very complex and difficult to understand, backed by enormous R&D investment. Recent examples include third generation cellular phones, digital TV methods, and encryption for online networks. Some measures are necessary to control these hegemonic movements and to bring transparency in decision making of *de jure* standards. In this context, it is worth mentioning that the US government offered the advanced encryption standard (AES) for e-government use for public subscription in 1997. By the same token, industrial ownership or intellectual property rights have also sometimes been misused for late comer developing countries. Recent WTO decisions to produce generic HIV-drugs at a lower cost than the original royalty payment is a good example of a situation where modifications to the present system can be carried out if necessary.

3. DEMAND CONSIDERATION

High-tech products are sometimes too high-tech. People do not want to deal with overly complex equipment or contents that are too sophisticated. Multifunctional equipment with a high price tag all too often does not correspond with consumers who want simple functions. It is very important to read consumers' preferences and people's real demands something that suppliers or producers often forget. Sometimes IT machines seem to exist for themselves, not for users.

Japan's failures illustrate this point. NTT heavily invested in ISDN but users ignored it because of its slow download time. NHK's invention of analog-type high-definition TV was also left on the shelf after digital TV appeared. Both giant companies invested heavily in wrong products and their investments were never recovered.

Governments also fail in discerning real demand and allocate limited budgets for bad projects. Too many over-the-top IT plans such as the Multimedia Super Corridor in Malaysia have been promoted far outstripping people's demands. In this regard, hasty and expensive terrestrial digital TV projects in Japan and Brazil seem to be under scrutiny from the demand point of view.

4. LEAPFROGGING INDUSTRIALIZATION

It is interesting that the growth and dissemination of mobile phones in developing countries that generally have very limited traditional telephone copper-line networks has been so rapid. Basically in this situation the wireless or cellular phone networks leapfrog the fixed-line system. This sort of leapfrogging ('digital jump') can be observed in other high-tech industries such as IT.

Analysis in this volume of the Indian software industry suggests that certain developing countries may follow a different, not the traditional path, to successful industrialization. It concludes that Indian domestic firms may follow an alternative route in overcoming the difficulties of promotion and join the high value club after comparing profiles of three-types of software entities in India: foreign firms; domestic firms with foreign subsidiaries; and domestic firms. The software sector has two distinct characteristics. One advantage is its absence of backward linkages, or what we call an 'island of competitiveness.' The other is its small initial investment due to knowledge intensity. Due to these charac-

teristics we can set up software businesses anywhere.

However, a pre-condition may be relatively high education levels in English, mathematics and computer sciences. Moreover, location — a place where knowledge is agglomerated such as proximity to universities or national research centers, or where satellite links are easily facilitated — is also important.

We have to carefully watch the Indian case further and hope that some developing countries can use the software sector as leverage for development.

5. BROADBAND EXPANSION

Basic trends can be observed in the IT Revolution in terms of structural changes. That is: (a) from fixed to mobile telephone; (b) from telephony to the Internet; and (c) from narrowband to broadband. Particularly, the growth of high-speed Internet or broadband access (DSL/ADSL, CATV, FTTH, and FWA) is unprecedented. Demand is expected to increase further, if access prices go down and content quality improves. Therefore, for further broadband expansion the following points must be addressed.

First, new entry and competition should be promoted to reduce access prices. Second, distribution of quality contents such as excellent movies which satisfy consumer tastes, educational programs that feature nature, and the fine arts such as opera, ballet, and paintings, need to be promoted. Third, videos/movies or other images that contain pornography, obscenity and violence should be controlled. The arrival of easily accessed broadband can act as a 'big bang' to get away from the present IT recession.

In the near future multimedia convergence will take place and TVs and PCs will have the same function in the digital age. Third generation mobile phones can be used as a high-speed information terminal communicating voice, data, and pictures. Portable PCs with wireless LAN cards can work as small intelligent offices if handy wireless LAN boxes are facilitated in nearby shops like restaurants and coffee stands in towns. We hope that technological progress will find astonishing breakthroughs for enriching our lives at lower cost. However, as we progress into this 'Brave New World' we should not forget about the disadvantaged groups of people in developing countries and in pockets of developed countries who are excluded from benefiting from such achievements.