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The Strategic Implications of ISDN to the Economic Development in Taiwan

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Abstract

In a global economic environment, a country's telecommunication infrastructure will affect its national business comparative advantage. ISDN (Integrated Service Digital Network) is a critical element of an effective business infrastructure for integrating business functions such as intelligence, marketing, manufacturing, and research and development. This paper reviews the recent economic progress between China and Taiwan and discusses the strategic implication of using ISDN to strengthen this progress.

Introduction

East Asian countries, including China, South Korea, Taiwan, Hong Kong, Singapore, Thailand and Malay have enjoyed economic growth at a double-digit rate throughout last decade. Taiwan, Hong Kong and Singapore combined, are replacing Japan as the leading investor in most of South-Eastern Asia and support four-fifths of the venture capital flowing into coastal China, the world's fast-growing industrial area. China could surpass Germany to become the world's third largest by the year 2000. Between 1980 and 1990, US export to Taiwan, Hong Kong and Singapore rose 160 percent, three times the overall rate of US exports.

Two characteristics are noticed from this development. The first is the driving force for Asian economic progress is the globalization of world economy. The other is that it will be difficult to repeat the fast economic growing path unless the telecommunication infrastructure is dramatically improved for those countries.

In a global economic environment, a country's telecommunication infrastructure will affect its national business comparative advantage. Furthermore, ISDN (Integrated Service Digital Network) is a critical element of an effective business infrastructure for integrating business functions such as intelligence, marketing, manufacturing, and research and development. This paper reviews the recent economic progress between China and Taiwan and discusses the strategic implication of using ISDN to strengthen this progress.

Emergence of China's Economic Expansion

China's annual gross national product is galloping at an amazing rate of 12% in 1992 and averaging 8% a year since 1978. During that span, the total value of goods and services produced in China has risen 250% and will double again by the year 2000, giving China the world's third-largest economy (Japan Economic Newswire, 10/19/92). The Chinese economy may continue to expand at a double-digit pace through 1993. The gross industrial output would rise by 20% in 1992 and 19% in 1993; the gross agricultural production would grow in 1993 between 3.5% and 4.0%. The service sector is forecast to grow by 7.4% in 1992 and by 12-13% in 1993. 1992's level of gross fixed capital formation at 720 billion yuan, up more than 30% from 1991. 1993's level of investment is anticipated to reach 880 billion yuan for a 22.2% rise over 1992 (Japan Economic Newswire, 11/29/92).

China's economy may be three times larger than official estimates (Australian Financial Review, 11/9/92). Guan Ma and Professor Ross Garnaut of the Australian National University suggest that China's economy is twice to three times larger than official estimates. They estimate, rather than US $370, per capita Chinese income could be US $700-1,000, or more. This would make China a middle-income country approaching the per capita income of Thailand and also make China the world's fourth largest economy, behind Germany but ahead of Britain.

The Economist (12/28 - 1/4, 1992) even predicts that if China's economy grows as fast for the next 20 years as it has for the past 14 years, it will be the biggest economy on earth. China's real
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The GNP has grown by an average of almost 9% percent a year. By 1994, China's economy is almost sure to be four times bigger than it was in 1978 and by 2002, the economy will be eight times bigger than it was in 1978. At that time, China will have matched the performance of Japan, Taiwan and South Korea during their fastest quarter-centuries of economic growth.

The Growing Business Linkage between Taiwan and China

Though China's products in 1991 helped create trade surpluses of $16 billion with the U.S., $12 billion with the European Community and $6 billion with Japan, only 5% to 20% of the added value actually occurs inside China. And most profits go to foreign-invested firms, notably from Hong Kong and Taiwan, who have global distribution links. Academics, industrialists and politicians from China, Hong Kong and Taiwan have discussed the potential for a so-called greater Chinese economic zone (Michael Duckworth, APDJ 01/22/92).

Actually, that process is well under way. Taiwanese businessmen have extended their business with the Chinese counterpart from cross-border trade to direct investment. In 1992, Taiwan's authorities formally lifted barriers to direct investment on the mainland. In 1991, Taiwanese investment in China totalled about one billion U.S. dollars. But in 1992, Taiwan's committed investment in China is expected to exceed last decade's total of 3.42 billion U.S. dollars (DJ, 12/30/1992) up 250% over 1991. The number of projects initiated by Taiwan and approved by China soared 230%. Exact figures for Taiwanese investment are unavailable because much is funnelled through Hong Kong or other countries. Unlike in the past when the Taiwanese concentrated on small- to medium-sized and labour-intensive industries, the new wave of investment will be engaged in aerospace, computer, bio-technology and real estate projects.

ISDN and Global Information Systems

Recent advances in information technology (IT) have significantly changed our economy and the basis of competition in various industries (Porter 1985). IT, like telephone and railroad technologies that helped revolutionize our economy in the 19th and 20th century, enables both business and individuals to substantially compact time and distance needed for processing information. The future role of IT could be even more significant because of its unlimited potential to support the information exchange in international trade. IT will accelerate the rate of technology transfer throughout the world and, consequently, allow for speedier integration of world economies.

In essence, IT creates an electronic infrastructure comprised of computers and inter-connected networks. This infrastructure supports collection, processing, storage, and dissemination of information critical to business and individual activities. Similar to transportation systems that allow people and merchandise to move in our physical world, IT provides reliable, speedy, and inexpensive methods for transmitting information freely in the electronic world. Moreover, in the future, countries will rely on a superior electronic infrastructure to compete in a global economy, much as today's developed countries depend on superior transportation systems.

The Importance of Communication
networks explains why several industrialized countries, like Britain, Japan, and France, have invested heavily in constructing "nationwide information expressways" based on the technology called ISDN (Integrated Services Digital Network) (Lin and Kuo 1991, Kuo and Lin 1992). ISDN can be a cost-effective way for supporting multinational companies which must dynamically transmit updated data about threats and opportunities in the global markets. Offices in different countries can communicate all types of information through ISDN. ISDN can be the backbone of this interoffice international network.

Many national governments, computer companies, telephone telecommunication business, and standard organizations are working together to develop a worldwide ISDN. The list of participants include international business giants such as AT&T, NCR, Siemens, Hitachi, Northern Telecom, IBM, government-controlled telephone monopolies, and every U.S. Regional Bell Operating Company. Lin and Kuo (1992) have surveyed comprehensively about international ISDN development in 1990. They find that advanced nations like US, Canada, France, Britain, Japan, and Germany have been competing and cooperating in the area of ISDN.

Lessons from Singapore:
ISDN Supports National Strategy

In 1989, Singapore's National Computer Board (NCB) teamed with the Telecom and Information Technology Institute to improve the data transfer speed among industrial office workstations using ISDN (Liao 1991). This effort is coordinated with the development of Singapore's national BDI (Electronic Data Interchange) network, TradeNet. To date, more than 1,500 enterprises are using TradeNet to access trade information, place orders, and conduct business transactions. Transactions which used to take half a day to complete now take less than 30 minutes.

To convert all industries to information-based and, therefore, increase their productivity, Singapore's government is planning the IT-2000 (Intelligent Island 2000) project. IT-2000 is a strategic framework consisting of (1) information and communication infrastructure, (2) coordination and collaboration, (3) IT Industry, (4) climate for creativity and enterprise such as IT manpower, (5) IT application, and (6) IT culture. This project will interconnect all existing networks in the country and all major industries including financial services, manufacturing, tourism, real estate, distribution, mass media and publication, transportation, medical care, health care, education, and information technology.

Singapore serves as an example of government involvement in the planning and implementation of information networks (Liao 1991). Singapore's NCB has been a catalyst in helping both government and business to increase productivity. The computer centres of all 25 governmental departments are interconnected. People can use the public network system to do tasks like applying for a passport or checking 700 small to medium-sized multinational enterprises have used IT to improve their output, resulting in increased competitiveness. In mid-August 1991, Singapore's premier Lee announced the Growth Triangle Strategy to develop a regional vertical cooperation with Batam and Johor. This development will further strengthen Singapore's role as the technology leader of Asia.

In Singapore, virtually all commerce chambers, professional associations, and private businesses are actively involved in identifying applications supporting intra- and inter-company business activities. The success of Singapore's TradeNet has spurred the implementation of other networks such as LawNet for legal affairs and MediNet for medical care.

Singapore Telecom will have a fully digital network by 1994, well ahead of U.S. or European competition. ISDN services with data rates of up to 150 million bits-per-second will be tried 1992. The company also has interests in fibre cable systems linking it with the Middle East, Europe, other nations in Southeast Asia, as well as Korea, Japan and China (Blankenhorn, 1991).

In a survey conducted by PFI Funtus, American executives ranked Singapore as the most desirable head office locations in the world, considering telecommunications capabilities, cost of office space and proximity to both local markets and US operations (Colombo, 1992, p. 14). Ironically, the centre of the Industrial Revolution such as Manchester, was ranked as one of the least desirable.

What can Taiwan do with ISDN

Considering what developed countries have done and what Singapore is trying to do, there is a large scope for IT-based businesses which have invested in China. More hands-on management and more productive team work can help resolve the problems of these businesses. But such solution requires close physical linkages between the two countries and, therefore, is not immediately attractive due to the political situation still facing China and Taiwan and to the fact that the ISDN standard in China is still considered not acceptable by Taiwanese investors and their families. The solution may reside in an electronic ISDN-based linkages between these two countries.

Taiwan has started ISDN experiment in 1989 and planned to implement island-wide
within ten years. The Hsinchu Science Park in Taiwan is one of the major centres of computer and telecommunication centres. Microchips, hard disks, optical fibres, SONET, even the micro telecommunication are new products generated from those high-tech businesses in the park. The Park has established an information optical communication network which is expected to improve the competitiveness of the manufacturing plants in the international business (OPTO News & Letters, 1992).

Chinese government has also emphasized the strategic importance of information technologies in the country's economic development in the 1990s (People's Daily, 1991). By the end of November, the total number of telephone subscribers in China reached about 8.9 million, a 35.5% increase over the same period last year. In the first 11 months of 1992, the Ministry of Posts and Telecommunications (MPT) hooked up about 2.2 million new local telephone subscribers. Local telephone exchange capacity increased by 21.6% and rose by 2.236 million lines. Long-distance exchange capacity increased by 46.2% and grew by 132,000 lines.

China has taken optical fibres as a strategic element in national economic construction. Several major long-haul links are finished or under construction, such as Ningbo-Wuhan, Nanjing-Shanghai along Eastern section of Yangzi River, Shanghai-Fuzhou-Guangzhou along the South-Eastern Coastal area, Beijing-Shenyang-Haerbin in the heartland of the Manchuria, and Beijing-Wuhan-Guangdong along the strategic North-South axle (Tong, 1991). China started some experiments on ISDN in 1986 and aims to commercialize ISDN in some limited areas before 2000. Long-distance Optical connection recently extend from Nanjing through Shanghai, Xiamen, down to Guangdong is just finished. Taiwan also has connected a line between Xiamen and Taiwan. The potential will be that Xiamen and Xiamen connect with optical fibre. China is still underdeveloped, but observing her recent strategic move, one can not argue that the nation is moving very fast in the digital communication. The fast developing telecommunication infrastructure certainly will lay ground for the coming ISDN.

ISDN Education in Taiwan. So, what are the implications for Taiwanese government and businesses if they wish to consider an ISDN-based infrastructure as a viable alternative to foster a stronger economic development between Taiwan and China? One thing must be done right away is educating decision makers the benefits and limitations of ISDN. Taiwan's Department of Transportation, who administers the government-owned telephone and telegraphy business, has sponsored an experiment and surveyed the business to understand if they wish to invest in ISDN (Chu, 1992).

The study clearly finds both government and business users are still in the very beginning-stage. Several of the companies that tested ISDN are unclear of the power of ISDN.

Support Economic Development of Underdeveloped Area. Both China and Taiwan can learn from the British experience in the Highlands & Islands, which have been experiencing severe economic decline in recent years because of their perceived remoteness by interested companies. To solve this problem, ISDN links have been installed to upgrade the area's transmission infrastructure for multimedia voice, text, and image (British Telecommunications PLC, 1991). This brings the area's businesses closer to customers, colleagues, and suppliers. This project suggests that many underdeveloped areas throughout the world can be integrated into the world economy through ISDN-based networks.

Cross-Strait Coordination. ISDN may assist a more effective division of labor between Taiwan and China. Although China possess enormous amount of cheap raw material and cheap labor force, the lack of sophisticated industrial process will hinder the international business development. ISDN may alleviate this problem by leaving the monetary, exchange, logistics coordination, decision to Taiwan. Taiwan has recently established optical links between the main Taiwan islands with two frontier tiny islands, near China, Kinmen and Matsu. Meanwhile, China also established a major optical link along Eastern coastal cities from Shanghai to Guangdong. Given opportunities in the future when political hostility between two sides subsides more, the optical net in Matsu and Xiamen can connect across a few kilometers and connect to the one in Fuzhou and Xiamen easily.

Create Competitive Advantages. ISDN can play a key role in maintaining Taiwanese businesses' competitive advantages in China. Such strategy has been shown to be useful for companies like Federal Express, which uses ISDN to coordinate production around the world (Panditno, 1990). For example, several multinational Japanese companies have geographically structured their organizations to maximize participation in the global market place. Factories are located in places where production is most efficient and least expensive or where trading barriers are least. These
Companies constantly collect information regarding threats and opportunities to which managers can respond by searching for innovative solutions from around the world. Note that this information exchange is often multimedia (e.g., text, graphic and verbal exchange of opinions) and may employ ideographic languages (i.e., Chinese and Japanese). An ISDN-based LAN can satisfy such diverse needs and allow multinational companies to effectively manage their business in the complex global market. In the examples above, ISDN is integrated into the strategic plan for these companies (Regan, 1990).

Integrating Corporate's Enterprise-Wide Communication Networks For Taiwanese business-persons geographically dispersed in China, new ISDN development provides a reliable and speedy an enterprise-wide network. For example, Pacific Bell and Groupware Authors have teamed up to integrate ISDN into a PCs and to develop low-cost applications to support distributed computing (Pacific Bell, 1990). Perceiving the strategic implication of ISDN on the banking business, Mellon Bank Co. is implementing an ISDN conferencing facility between its Pittsburgh and Philadelphia offices (Miles, 1990a). These two examples show how today's Taiwanese managers use ISDN to build an enterprise-wide communication system. ISDN can be used to consolidate voice and data networks and allow managers to communicate freely, timely, and globally with other managers. Personal, mini, and mainframe computers can be linked across national boundaries to provide uniform access to services such as executive information systems, electronic mail, voice mail, technical database, and a growing list of networked group productivity applications.

Bring Business Partners Together Trading partners throughout China and Taiwan can be easily linked to support applications like electronic data interchange (EDI), electronic fund transfer (EFT) and Just-in-time (JIT) inventory. Some recent development makes it easier to unify LANs and ISDN (Kessler, 1990). Major computer and telecommunication vendors, such as AT&T, IBM, and Apple have announced the development of ISDN cards and programming kits for IBM compatible computers (March, 1991, Simogyi, 1990). These developments represent a major step towards the construction of global ISDN-based expressways, speeding up information exchange between businesses.

Strengthening the Value Chain Finally, Taiwan's national policy on ISDN should draw two strategic concept from Porter (1) Value Chain -- national value chain created by ISDN and (2) the National Competitive Advantage against the neighbouring tigers. Although Porter discuss the concept of value chain in a particular industry. The idea can be applied to a national level. Taiwan's information infrastructure as the backbone of the value chain is of critical importance to many local small business. They could not afford to lease a dedicated line, or establish their own computer networks (WAN). The national ISDN infrastructure will be contributing greatly to the national value chain. Taiwanese government and business should also pay attention to how did the ISDN is going to affect the high-information content of products. Obviously the following business may enjoy such strategic opportunities: stock investment, banking, software development, newspaper, desktop publishing, fashion design, publishing, library, consultation, etc. Success in these industries can pave the way for a major adoption of ISDN in other critical industries.

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