China Hi-tech Fair

"Knowledge Economy & Financial Markets"

by

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Mr Chairman,
Distinguished Guests,
Ladies and Gentlemen,

I am very honoured to be invited to say a few words on the subject of knowledge-based economies and international competition. I will try to put this in the context of financial markets, and the experience of Hong Kong in developing our Growth Enterprise Market.

It is now widely recognised that in the 21st century, competition will be amongst nations as knowledge-based economies. The American information philosopher, Robert Lucky[1], has stated that "Since information is the key to power and wealth in the new society, people will wish to possess and control the intellectual property they create or acquire…the necessity to understand how either to control or to derive value from the flows of information is deeply woven into the issue of international competitiveness".

[1] Lucky, Robert, "Silicon Dreams: Information, Man and Machine", St. Martin's Press, 1991

Competition, Production and Knowledge

There are three stages of economic development: primary, secondary and tertiary. The first phase involves development in agriculture and mining; the second involves manufacturing and the third in the services sector. To the three factors of production of land, labour and capital have been added knowledge as a distinct factor. Growth in GDP does not mean just increased production, but also growth in quantity and quality, namely increased productivity and technological progress. Knowledge is now recognised as the driver of productivity and economic growth.

The emergence of the knowledge-based economy depends on how knowledge can be brought to bear to produce knowledge-workers, knowledge-networked organisations and production processes in order to produce: "smart products" and "smart services" that offer the consumer greater choice, speed, accessibility and convenience at lower costs. This has been brought about by the innovation of microchips, rapid advances in computing, telecommunications, biotechnology and transportation.

This has resulted in dramatic changes in global economic structure and competitiveness. The Organisation for Economic Co-operation and Development (OECD) has estimated that since 1960s, service prices have increased three times faster than industrial prices. According to World Bank, 64% of world's wealth comprises "human capital". In 1961, 85% of the US conglomerate General Electric comprised revenue from production. By 1999, 75% of GE revenue was derived from services and only 25% from production.

There is increasing awareness that knowledge-based services are key to international competitiveness. The World Economic Forum/Harvard Institute for International Development study of Global Competitiveness estimates that the correlation between GDP per capita and information infrastructure was particularly high (Table 1). What is of significance is that growth is highly correlated with the nature of competitive advantage, domestic supplier quality and intellectual property protection ($R2 > 0.8$). Other significant factors include business information availability, computer utilisation, regulatory standards, and buyer quality ($R2 > 0.7$). Strangely enough, although financial market

sophistication was important, venture capital availability and quality of business schools were not that significant.

Table 1 Global Microeconomic Competitiveness

Factors affecting income per capita
Bivariate regression results, dependent variable:1998 GDP per capita*
All Countries (n=58)

	Slope	*Adj. R2*
Nature of Competitive Advantage	6143.2**	0.8062
Production Processes	7845.8**	0.7608
A. Factor (input)		
Physical Infrastructure		
Overall Infrastructure Quality	5069.6**	0.7275
Information Infrastructure		
Business Information Availability	706.1**=	0.7420
Computer Utilisation	9888.3**	0.7722
Capital Availability		
Financial Market Sophistication	5368.1**	0.6014
Stock Market Access	621.0**=	0.5289
Venture Capital Availability	5882.3**	0.4427
Human Resources		
Quality of Business Schools	6534.0**	0.3250
Science & Technology		
University/Industry research collaboration	8014.3**	0.6404
B. Demand Conditions		
Buyer Sophistication	875.7**=	0.7765
Demanding Regulatory Standards	7285.3**	0.7772
C. Related and Supporting Issues		
Domestic Supplier Quality	924.1**=	0.8044
Intellectual Property Protection	790.7**=	0.8023

** *denotes p<0.05*; = *denotes regressions for which the question value is squared*
**Source: The Global Competitiveness Report 1999, World Economic Forum, Harvard Institute for International Development*

As the management philosopher Peter Drucker correctly analysed, knowledge has always been applied to *tools, processes and products*. When knowledge was applied to knowledge itself, we moved from a technology revolution to a management revolution. This meant two key issues: risk management and corporate governance or knowledge management.

However, with the arrival of both the microchip, wireless and broadband telecommunications and consequently the World Wide Web, we have moved to a mass knowledge society where information, at different levels, can be accessed cheaply and readily by the public. Knowledge then shifted from a private good to a public good. This effectively means that the competition of economies effectively become the competition of knowledge. This truly is the meaning of competition for value-added, that is, value added by knowledge.

The Rise of the Virtual Economy and Network Enterprises

The American Professor Rosecrance was the first to recognise that in a global economy, traditional power no longer rested with amassing land and labour. Production need not be carried out domestically for exports. Instead, the virtual economy could more profitably manufacture overseas for the foreign market. As he said, "Imperial Great Britain may have been the model for the nineteenth century, but Hong Kong will be the model for the 21st century." The virtual state specialises in modern technical and research services and derives its income from high-value manufacturing, but from product design, marketing and finance. I intend to use the Hong Kong economy to illustrate this point.

Hong Kong is a classic example of growth without natural resources, so it skipped primary economic development rapidly into manufacturing, with a high component of services. In the 1970s and 1980s, Hong Kong concentrated on supporting services to manufacturing, particularly commerce, trading and banking. In the 1990s, Hong Kong rapidly shifted to high value services, such as investment banking, securities and derivative markets. As domestic inflation rose, production shifted to the Mainland. No other economy in the world I know of has shed so much labour in manufacturing in the 1980s and did it so smoothly.

Manufacturing is now done by Hong Kong companies using a network of factories in China and the rest of Asia, with the Hong Kong headquarters doing the marketing, design, financing and shipping. The 6.8 million residents of HKSAR create over 5 million job opportunities in enterprises operating in the Pearl River Delta. Hong Kong is today a Virtual Economy: the economy with the largest service sector component in the world - 84% of GDP: larger than the United States (76%), or Japan (62%).

Hong Kong's rapid advance into the knowledge based society was due to: clear legal and accounting framework, sound infrastructure, free and open press and access to international knowledge and information. The low taxation and free immigration also created conditions for efficient financial markets.

There is increasing awareness that Hong Kong played a strategic role in the knowledge network that linked Hong Kong with the International Chinese Network[2] and the Western markets of Europe and the Americas. From a strategic trading entrepot in the 1960s, Hong Kong small and medium enterprises had important family and marketing links in the Mainland, South-east Asia and overseas markets. As Professor Castells pointed out in the Network Society (1996), "as Hong Kong prospered, many of the small enterprises merged, refinanced, and grew bigger, sometimes linking up with large department stores or manufacturers in Europe and America, to become their surrogate producers." When Western buyers sought cheap products in textiles and light consumer goods, Hong Kong enterprises underwent backward linkages to set up production in the Mainland and other regional economies. At the same time, these enterprises brought in Western equipment, technology, and marketing, packaging, finance and managerial skills.

The Hong Kong network was not just a subcontracting production network, but also an important knowledge distribution network into the Pearl River Delta and global markets. By backward integration into neighbouring economies, particularly the Mainland, products were no longer "Made-in-Hong Kong", but "Made-by-Hong Kong"[3]. Hong Kong enterprise linkage with Mainland and other enterprises epitomize the covergence of organisational

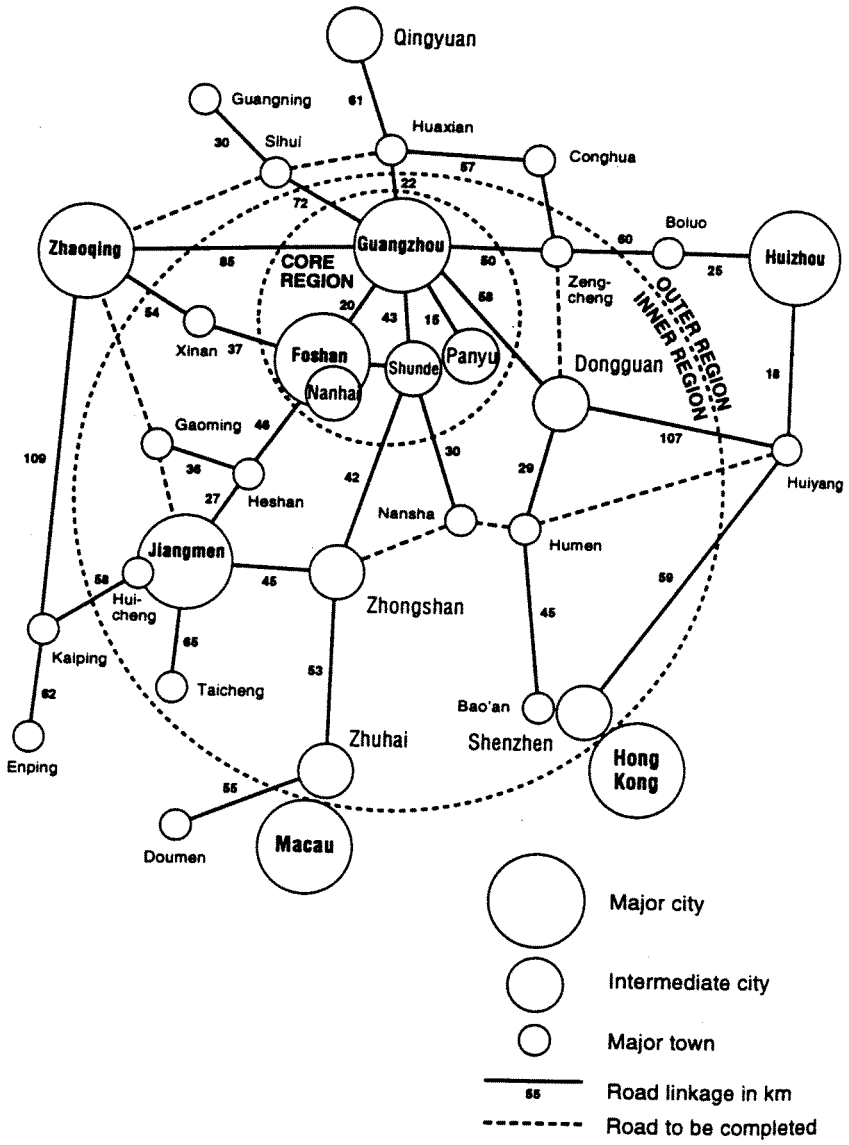
[2] See World Development Report 1999/2000, World Bank pp40, Box 1.2
[3] See Berger & Lester (1997)

change and technological change as the fundamental form of competition in the new, global economy. These enterprises behave in what Castells call "the network enterprise, which makes material the culture of the informational/global economy: it transforms signals into commodities by processing knowledge."[4]

In other words, through the accumulation of knowledge through various networks, "East Asian economies and firms have adapted more rapidly than any other area of the world to the new technologies and to the new forms of global competition, actually altering the balance of world trade and capital accumulation in favor of the Asia Pacific in only 30 years"[5]. The creation of such networks was not only virtual but physical. The Pearl River Delta is rapidly emerging as a global megacity. "Hong Kong is not just its six million people, and Guangzhou is not just its six and a half million people: what is emerging is a megacity of 40 to 50 million people, connecting Hong Kong, Shenzhen, Guangzhou, Zhuhai, Macau, and small towns in the Pearl River Delta[6]" (Figure 1).

[4] Castells (1996) pp 172
[5] Castells (1996) pp 173
[6] Castells (1996) pp 403

Figure 1: Pearl River Delta Network



Source: Castells (1996) page 406

Internet and the Virtual Economy

The emergence of the Internet has allowed knowledge to be diffused rapidly and cheaply throughout the world. This emergence of new technology has reinforced the role of the network enterprise in Hong Kong with other

enterprises, especially in the Mainland. This has brought both opportunities and challenges.

From a hardware point of view, Hong Kong has some of the best technical telecommunications infrastructure in the world, with 150,000 kilometers of fibre optic cables linked to 1,500 buildings in Hong Kong. We have the highest television penetration and mobile and cellular phone penetration in Asia. There are 150 Internet service providers in Hong Kong, with 150 users per 1000 population. Hong Kong is already placed 12th in the world in terms of world Information Technology-driven economies, according to IDC's Information Society Index. Hong Kong is in the first tier of telecommunications market in Asia (Figure 2).

What is most encouraging is that Internet capability is rising very rapidly in Asia. Both Hong Kong and the Mainland have demonstrated extremely rapid growth in Internet host computers in the last 4 years (Figure 3), with China increasing its teledensity by 5 times in 7 years, compared to a regional average of 2.5 times (Figure 4).

Figure 2 : Relative development of Asian telecom markets, 1997

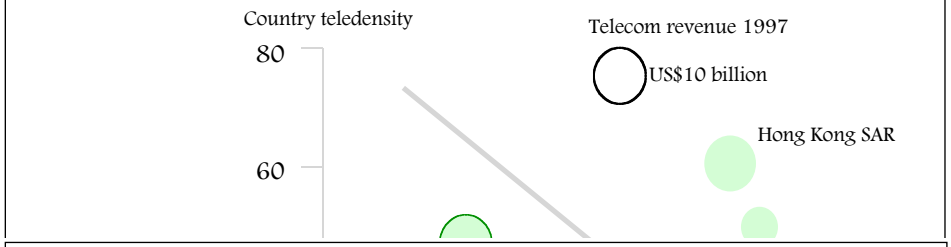


Figure 4 : Growth in teledensity, China and Philippines

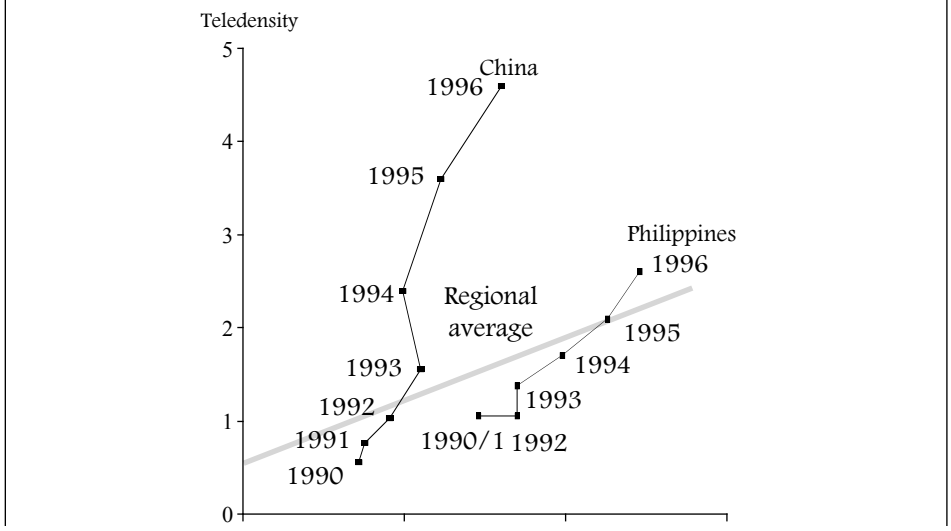
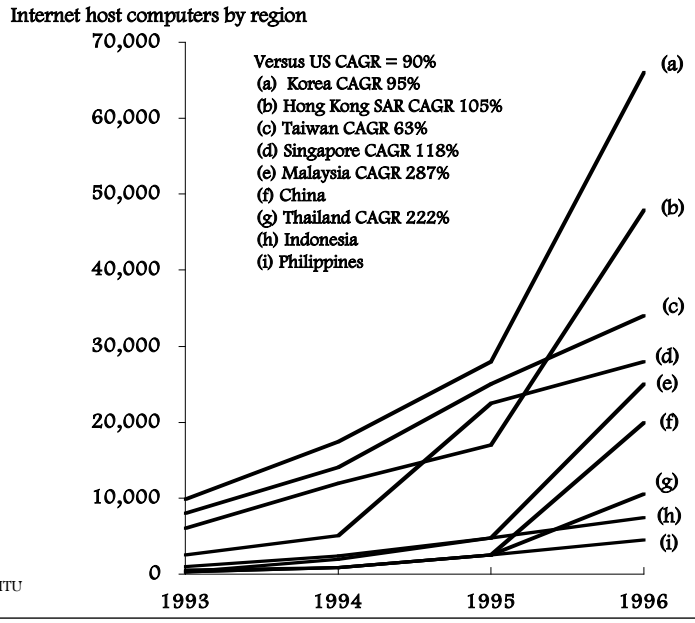


Figure 3 : Growth in Internet capability, 1993-96



Source: ITU

Indeed, the Mainland Internet user base has been estimated by IDC to exceed 33 million by 2003, growing at an annual rate of nearly 60%. Similarly, mobile phone usage grew by 2.34 million subscribers in the first two months this year. By the end of June, total mobile phone subscribers reached 33.1 million, while fixed line subscribers reached 145 million, triple the level three years ago. With the PC base growing from 14 million today to over 37 million by 2003, Mainland growth in teledensity will present huge opportunities in the development of software content and knowledge.

As the leading network hub with access to the Mainland and also overseas markets, Hong Kong SAR can play a pivotal role in developing eCommerce and eTrading (in securities).

In the 21st century, output and employment will grow fastest in the high technology and knowledge based industries: computers, electronics, aerospace, medical science, and biotechnology. But knowledge-intensive industries, such as education, telecommunications, media and information, finance and risk management will grow even more in terms of value-added.

Some people claim that Hong Kong does not possess comparative advantage in specialised high technology, such as computers, aerospace or biotechnology. However, Hong Kong's skills as an international financial and trading centre can play a vital role as a catalyst for growth, utilising global knowledge and the technology skills of the Mainland in addressing the challenge of the digital economy of the new millennium.

Finance and Corporate Governance

It is commonly acknowledged that financial markets have four key functions:

- Resource allocation;

- Price discovery;
- Risk Management; and
- Corporate Governance

Financial markets allocate resources in the form of land, labour, capital and most important, information and knowledge. Indeed, in the matching of supply and demand, the price discovery process of financial markets generates new information for users. Such information is necessary for decision-makers to manage their risks. Financial markets allow the exchange of property rights. Since knowledge is a property right, financial markets play a critical role in the management of knowledge and in corporate governance as the foundations of the successful knowledge economy.

However, for knowledge to have value, it must be shared and organised. Hence, financial markets have the crucial role of information distribution and organisation: in other words, *financial markets are better understood as networks*.

The appreciation of financial markets as networks helps us to understand that networks have negative and positive externality. In other words, the wider the network, the more valuable it becomes as it can draw on a wider resource and knowledge base to be shared, processed and exchanged. Accordingly, as financial markets become globally integrated, local markets are like local area networks linked to the global network of finance. There are huge externalities in networks. But networks also have huge contagion or feedback impacts. The Asian financial system suffered a crisis that had a simple engineering or derivative model analogy. The system was designed for two or three standard deviations of shocks, but in 1997/98, Asia suffered a 15 standard deviation shock or power surge and some systems blew a fuse.

This is why financial markets have the risk management and corporate governance functions that have not always been appreciated in emerging markets. First of all, having specialised knowledge is of itself no value, unless that knowledge can be applied to a new and commonly demanded function. Whether that knowledge has any value would depend upon its market test:

hence high technology available in universities or research units did not take off until several conditions could be fulfilled:

- Such technology could be tested, packaged and applied for the market, subject to further investment, in which investors could be found to share the risk of research and development;
- Such knowledge of technology, organisation, management, packaging, marketing and financing could be independently verified and trusted so that present and future investors in the project would not be cheated; and
- The risk, reward and regulation aspect of investing in high technology must be balanced fairly. In other words, insiders should not gain unfairly, nor should the state bear the risks without the rewards by incurring unnecessary moral hazard.

I have every confidence that the Hong Kong financial markets fulfill the above necessary conditions. First, Hong Kong has the highest concentration of venture capital professionals managing the largest pool of venture capital funds outside of Japan. According to the Asian Venture Capital Journal, there were 107 such funds, in Hong Kong in 1997, managing more than US$10.7 bn or nearly one-third of total venture capital funds in Asia.

Second, Hong Kong has long had the experience of bringing tested technology into the Mainland and the rest of Asia, through its investments in Mainland and other manufacturing ventures, by blending Western demand, Asian skilled labour and management and financing based in Hong Kong. Products are no longer made in Hong Kong, but made by Hong Kong-based enterprises.

Third, Hong Kong has the most liquid pool of risk capital in Asia, and a financial regulatory framework that ranks with the best internationally. The low tax base, with no capital gains tax, high disclosure environment, and deep professional and retail base of investors all auger well for the establishment of the Growth Enterprise Market, which will be launched in Hong Kong soon. Recent studies have shown that the venture capital industry can only succeed when there are well-developed stock markets so that the venture funds can exit through IPOs. These conditions apply in Hong Kong.

In conclusion, Hong Kong may not have the full range of high technology that some claim is necessary for a full-scale knowledge-based economy. As a small open economy, it cannot claim to play that role. However, it has comparative advantages in its low tax, openness to information, superior infrastructure, deep financial markets, and professional and managerial skills. These play a vital catalytic role for the larger markets of the Mainland and Asia, where the high technology skills and knowledge-based skills workers exist.

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