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0521823722 - The Internet Revolution: A Global Perspective

Edited by Emanuele Giovannetti, Mitsuhiro Kagami and Masatsugu Tsuji

Excerpt

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Introduction

Emanuele Giovannetti, Mitsuhiro Kagami, and Masatsugu Tsuji

Information technology (IT) has dramatically changed both business practice and people's lifestyles, especially since the late 1990s. The impact and influence of this new technology is powerful and far-reaching, and has had a marked effect on almost every aspect of society. At the core of the IT revolution is the Internet, originally developed and opened to the public domain in the late 1960s by Dr. Robert W. Taylor and his group at the US Defense Department. Aided by the reduced cost and increased availability of computers and computer-related products, as well as technological advances in telecommunications, online networks spread rapidly throughout the world over the late 1990s.

Globalization, backed by a market-oriented philosophy of liberalization and deregulation of economic activities, is another factor in stimulating the use of the Internet as the global strategies of multinational corporations have changed. Outsourcing and "fables" enterprises have become mainstream and their objective functions have expanded to include consumer satisfaction at each stage of the supply chain. Contract manufacturers emerged and have been thriving, whilst established manufacturing companies have been transformed into service industries dedicated to design, R&D, and marketing under brand names. Their regional centers have been established close to the world's three main markets – Western Europe, East Asia, and North America – but they procure parts and components worldwide using electronic data interchange (EDI). The Internet has been extensively used for business activities, and instantaneous information exchanges have become a daily phenomenon. Old hierarchical parts-purchasing systems have broken down and many workers' skills are rapidly becoming obsolete due to the appearance of CAD/CAM systems and sophisticated machine tools.

Ordinary individuals' lifestyles have also been dramatically affected by access to the Internet and its most popular applications, the World Wide Web and e-mail. People can download worldwide entertainment contents, such as music and movies, within minutes in their own living rooms. E-mail makes speedy communications with family and friends living anywhere in the world cheap and

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easy, and e-business has allowed individuals easy access to worldwide products such as books, cars, and airline tickets.

Deregulation and privatization of state-owned enterprises are closely correlated to the progress of the IT revolution. Where electricity and telecommunications are state monopolies, the progress of the revolution is slow and expensive, as can be seen in some developing countries. Online networks need efficient, low-cost access to the local loop networks that are usually monopolized by existing, or formerly, public enterprises. Thus, the degree, speed and mode of the process of privatization and deregulation of these incumbent enterprises is of great importance.

In this book, we concentrate on the impact of the IT revolution on:

- 1 the changes affecting production and trade in terms of information, communications, and technology-related products;
- 2 network infrastructures;
- 3 new forms of business activities through electronic online services such as e-commerce (business-to-business [BtoB] and business-to-consumer [BtoC]);
- 4 pricing and charges for online access, services, and e-commerce;
- 5 society, in terms of both the digital divide within and between countries, and the changes induced in business practices and organization (for example online procurement and supply chain management).

This book presents a timely review of the present state of the IT revolution in a wide range of economies, major advanced ones (Japan, Europe, and the USA) as well as several developing and transitional ones (India, Malaysia, Singapore, Thailand, South Africa, and Eastern Europe), plus a scrutiny of its impact on the emerging problems of “digital divide” and computer crimes.

In chapter 1, Tsuji analyzes present progress and problems in the Japanese IT revolution and its relation to the Japanese production and social systems. He spells out Japan’s need for urgent deregulation in the telecommunications industry and the labor market, since the low penetration rate of the Internet and e-commerce is largely due to high charges for telecommunications services. Tsuji also finds the strongest obstacle to the diffusion of the information society to be the Japanese way of thinking: to adhere to tradition and to react with friction when mastering or confronting a new system. Finally, the author advocates the necessity for not only organizations but also the Japanese people themselves to undertake a cultural transformation in order to be able to capture the relevant economies of network made available by the IT revolution.

In chapter 2, Kagami analyzes the dichotomy between the current high-tech monopolies in computer programs, business models and telecommunications standards, and the open-source philosophy of the initial Internet. After an introduction to Japan’s legal infrastructure, and government plans to promote the IT

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revolution, Kagami provides a fascinating description of two unique Japanese ideas: the TRON operating system, based on an open-source philosophy like Linux (and able to widen the use of Chinese characters and of other Asian languages) and i-mode cellular phones as an alternative to PC-based Internet access.

In chapter 3, Tsuji describes the local call market and modalities for Internet access in Japan and maintains that, whilst the Internet penetration rate in Japan lags behind that of other advanced economies, there is strong potential for the diffusion of high-speed broadband and wireless Internet in Japan. However, to fulfil this potential the right public policies are needed, for example radio-wave spectrum auctions, as is a transition toward an m-economy where mobile and wireless will be dominant means of access to the Internet.

In chapter 4, Ohki studies world IT trade and production and thoroughly analyzes the structure of the international division of labor in IT-related production in East Asia. In particular, he provides a description of the migration of Taiwanese firms to Southern China, especially to the Chu-Chiang River Delta, in response to changes in cost and outsourcing patterns. He also describes the evolution of multilayered cobweb relations along the supply chain and their transnational trends.

Chapter 5, by Ueki, sheds light on the evolution of supply chain management in the electronic industry in East Asia. He draws an updated Asian electronic map of comparative advantages, where Singapore plays an important role as regional hub and where China is catching up in the production of new electronic commodities such as DVD players and mobile handsets.

Chapter 6, by Yamada, portrays the IT situation in three ASEAN countries: Singapore, Malaysia, and Thailand. He describes the IT policies started twenty years ago which made Singapore one of the world's most advanced IT countries (including the early introduction of computers into secondary schools) and describes the Malaysian Multimedia Super Corridor Plan launched in 1996. Yamada's chapter also focuses on the drawbacks of the Southeast Asian experiences, such as oversupply of government-led infrastructure and services in Singapore, the regional gap between rural and urban areas, and the increasing gap between rich and poor in Internet penetration rates, due to policies which have often neglected these issues.

In chapter 7, Giovannetti reviews the regulatory debate which has been informing the ongoing liberalization process in the European Union. Compared to the USA, Western Europe has indeed arrived late in liberalizing the telecommunications sector, and this shows in their different Internet penetration levels. All of the 380 million people of the European Union now live in a fully liberalized telecommunications market. Nevertheless, in all EU member states the incumbents continue to hold a firm bottleneck control on competition in the local loop. As a consequence, whilst competition in long-distance and international

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telephony is developing at a rapid pace, the incumbent operators still dominate the local markets where prices are crucial for Internet penetration. Giovannetti describes how the European Commission tackled this problem by launching, in December 1999, the *eEurope* initiative with the objective of speeding up the process of bringing Europe online. The chapter also discusses some of the theoretical and practical problems associated with pricing the access of network components required by the unbundling process, and the human capital shortages facing Europe in the coming years.

In chapter 8, McDaniel discusses many of the IT issues confronting Central and Eastern European countries (CEECs). The conditions among these countries differ for a number of reasons; location, the magnitude of foreign direct investment, labor force skills, electricity infrastructure, and private sector participation also influence national access to and use of information. In this chapter, McDaniel argues that for the CEECs, the information age has corresponded to an age of transition from centrally planned to market economies, and their adoption of IT is associated with transition reforms. Communication infrastructure varies in CEECs and can be outdated or insufficient. The need for significant upgrading expenditures along with the benefits of being connected to neighboring networks can provide additional incentives for economic reforms. Moreover, McDaniel describes how the dangers of lagging behind in e-commerce for the CEECs can be seen in business-to-business (BtoB) transactions where there are a number of obstacles for entrepreneurs in Central and Eastern Europe. Among these are several psychological barriers due to national experiences with corruption. Others are more tangible and include the lack of transaction security as expressed by the low number of secure sites. This is seen as an indication of a country's potential to take advantage of online commercial activity.

In chapter 9, Kattuman and Iyer describe the beneficial window of opportunity open for India by the IT revolution. The Indian software and services industry is estimated to have grown at nearly 50 percent annually over the last five years. Over the next five years, software and services might come to account for 25 percent of total Indian exports, up from the current 5 percent. Indian firms hold 18.5 percent of the global market in customized software and attracted close to 40 percent of Fortune 500 companies as clients in 2000. Kattuman and Iyer give a fascinating account of this enclave of international competitiveness: since the 1950s, the publicly financed higher education system has increased the output of science and engineering graduates at an impressive rate. But the growing stock of human capital did not find rewards within the country as long as planning and regulations undermined the basis for the growth of private enterprise. The economic liberalization process started slowly in the 1970s with the software sector, and gathered pace in the late 1980s. This coincided with the explosive growth of the international IT market. The combined effect drew both entrepreneurship and human capital into the sector. The cost advantage

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and size of the pool matched the occupational requirements of the software industry for programmers and analysts. In the meantime, the flow of Indian students emigrating since the 1950s had grown into a sizable stream, and by the late 1980s a good number of non-resident Indians (NRIs) had worked their way up the executive structures of multinationals. As the industry took off, these NRI executives helped in matching buyers of software services from the West with sellers from India. The developments in the Indian software industry show a vivid leapfrogging example.

In chapter 10, Giovannetti describes the South African experience of privatization, its slow liberalization of the telecommunications sector and its impact on Internet penetration and the digital divide. The chapter focuses on the trade-offs given by the need to foster competition whilst, at the same time, extending universal service. In this chapter, Giovannetti also describes the implementation of policies aimed at extending Internet penetration via shared access. A typical example is given by the establishment of Multipurpose Community Telecenters that are public multifunctional loci of shared access where demand for connectivity can be pooled, and supply becomes commercially feasible and self sustaining after an assisted start-up period. These are typical and relevant examples of the technological possibilities created by the IT revolution and show how access can be increased in a segmented and geographically dispersed society.

In chapter 11, Choi and Whinston focus their attention on the current situation and problems of the IT revolution in the USA, with special emphasis on its productivity effects. The authors show how the growing importance of the IT sector in the US economy is demonstrated by the rapid growth in labor productivity since 1995. Its share of the overall economy, employment, and contribution to economic growth has been phenomenal. But besides these measurable indicators, the true impact of IT is felt in the way firms are organized and operate in the new world of e-business. A distinguishing feature of an IT-intensive firm is its highly flexible organization and implementation of IT or e-business drivers that enable the horizontal division of labor which promotes distributed enterprises.

In chapter 12, Choi and Whinston describe the effects of the IT revolution on firms and on the global economy. The authors discuss several studies and empirical evidence indicating the rapid development in networked e-business firms which maximize the benefits of IT and the Internet. They find that the strongest performance and success by IT industries and users have been shown since the introduction of the Internet.

Chapter 13, also by Choi and Whinston, investigates whether or how the Internet affects the way in which firms are organized and operated in the world economy. Unlike the vertical division of labor witnessed in the manufacturing-driven twentieth century, the Internet and IT enable a horizontal division of labor that addresses the need to be flexible in the newly emerging value web. Firms

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dependent on IT are virtual firms, often producing digital products and services which can be transported via the Internet. On the global implications of the IT revolution, Choi and Whinston point out how, for developing economies, the shift towards the service sector and the reliance on IT and the Internet poses a serious threat in development policies. On the one hand, highly skilled workers can be retained, lowering the risk of brain drain through the promotion of IT infrastructure and software and other digital product and service projects; on the other hand, the required level of education and training is far higher than for manufacturing jobs. Choi and Whinston conclude this chapter by analyzing how the gap between developing countries and the underdeveloped world seems to be growing as we move into a full-fledged service economy of the digital age.

Thus, this book provides a bird's-eye view of the IT revolution in numerous, and representative, countries of the world, together with an attempt to point out its merits and demerits whilst closely analyzing the economic and social trade-offs faced by the policies that are aimed at facilitating IT diffusion.

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1 Transformation of the Japanese system towards a network economy

Masatsugu Tsuji

Introduction

The Japanese economy is facing its longest period of stagnation since the ‘bubble’ burst in 1990, and is experiencing its poorest performance in terms of growth and unemployment in the post-war period. This period is referred to as the ‘lost ten years’ as the Japanese economy failed to adjust itself to shifting economic trends. As a result, it lags considerably behind the general trend towards the information society.

This is clearly evident in data on the Internet and e-commerce. It is estimated that the number of Japanese Internet users was about 27 million at the end of 1999, compared to the USA’s 163 million, and the EU’s 70 million. As for the Internet penetration ratio, the USA is about 40 percent, ranked 5th in the world, and the UK 24 percent. For Japan, on the other hand, it is 21.4 percent and ranked 13th, the lowest of the OECD economies.¹ According to the survey carried out by the Electric Commerce Promotion Council of Japan (ECOM), the size of e-commerce, business to business (BtoB) as well as business to consumer (BtoC) is as summarised in Tables 1.1, 1.2a, and 1.2b. Although Japanese e-commerce has achieved remarkable growth, it still lags behind the USA, and the gap seems to be growing.

The long stagnation in the 1990s occurred as the Japanese economy entered a stage of stable, but low growth, with an aging population and in a period of globalization. The Japanese economic system was formed during the rapid growth of the 1960s, and is based on the assumption of continuous economic growth. Once the Japanese economy matured and entered a stable growth era, it resulted in the collapse of the assumptions on which the system was based. The old basis, which had been a source of strength, no longer provided any positive effect. As will be discussed later, the success of the Japanese economy in the 1970s and 1980s was due to the “Japanese system,” which was based on economies of scale or economies of scope. Since the 1990s, the efficiency of the system has come from “economies of network,” which the Japanese system

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Table 1.1 *The size of Japanese e-commerce, 1999–2005*
(US\$ billion)

	1999	2000	2001	2002	2003	2004	2005
BtoB	–	220	360	510	670	870	1,110
BtoC	3	8	17	34	56	94	133

Source: ECOM.

Table 1.2a *Comparison of e-commerce in Japan and the USA:*
EC ratio of BtoB, 1999–2005 (percent)

	1998	1999	2000	2001	2002	2003	2004	2005
Japan	1.5	–	3.8	6.1	8.5	11.0	14.0	17.5
USA	2.5	–	4.9	7.1	9.7	13.1	17.9	23.1

EC ratio denotes the share of e-commerce to the total charges.
Source: ECOM.

Table 1.2b *Comparison of e-commerce in Japan and the USA:*
EC ratio of BtoC, 1999–2005 (percent)

	1999	2000	2001	2002	2003	2004	2005
Japan	0.1	0.25	0.56	1.1	1.9	3.1	4.5
USA	0.6	1.37	2.16	3.16	4.25	5.51	6.99

Source: ECOM.

is not structured to exhibit, and this has led to the low penetration rate of the Internet and e-commerce.

In what follows, we will focus on Japanese economic systems in the areas of employment and production, which are fundamental to Japanese international competitiveness. We then discuss the source and importance of economies of network in the age of the information society. We make a comparison with the US economy, which has an entirely different economic system, and show how the US economy has changed to take advantage of economies of network. Finally, possible reforms of the Japanese system will be suggested.

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Economies of network²*Definition*

A network is defined by nodes and arcs: in economic terms, the former are agents and the latter are channels connecting the agents. Firms, consumers, governments, organisations, and groups of nations such as the EU and APEC are examples of nodes, and telecommunications cables, roads, railroads, airlines, and electricity cables are arcs.

Economic agents connect to a network to receive a service from it: by using a telephone we can talk to someone in a distant place. The merit of subscribing to this service is measured in terms of utility. In addition to direct utility, agents receive extra utility through the network; the more agents that participate in the network, the more utility they gain. This is the definition of economies of network, or network externality. Externality has the standard economic meaning where one person's utility is affected by the action of others.³ In the business world, economies of network are widely recognised, and competition for subscriptions in the broadcasting, newspaper, and telecommunications industries are typical examples.

A network gives rise to negative as well as positive externalities in the form of congestion. This commonly occurs in a network with limited capacity such as telecommunications and public utilities. Beyond a certain level of participation, negative externality outstrips positive externality.

Basis of economies of network

Economies of network have the following three characteristics:

- 1 Outsourcing of managerial resources: agents can receive all kinds of information via the network that they themselves do not own. If it is costly to obtain those resources by themselves, they can purchase information from other agents, and thus specialize their own activities. This is a primitive example of efficiency through division of labor.
- 2 Quick response to changes in the environment: they can receive information on ongoing changes in real time and thus react immediately.
- 3 Economies of speed: real-time information speeds up decision-making and aids forward and strategic planning.

Economies of network stem from developments in telecommunications technology, especially digitalization and multimedia. Digitalization enables all information to be processed by computer. By combining digitalization and optic

fibers, a huge volume of information can be transmitted all over the world in seconds.

Economies of scale and economies of scope

In this section, other concepts of efficiency will be examined. First, let us consider economies of scale that are related to economies of mass production, that is, where an increase in inputs leads to a greater increase in output. In other words, with the increase of production, the average cost is decreased. Economies of scale arise from: (a) the existence of a fixed cost; (b) indivisibility of production plants; and (c) the nature of physics. Typical industries of this nature are heavy industries such as steel, chemical, and petroleum. These commonly have large-scale production plants.

Secondly, economies of scope: the cost of production of several products within one factory is less than if they are produced separately. The source of this economy is the existence of a common factor of production. Financial institutions typically exhibit economies of scope. Banking and securities are separate activities, but they are quite similar in nature, so if one branch can handle both businesses, it would be less costly than doing them separately. Numerically controlled (NC) machine tools, which are a combination of mechanics and electronics, also share factors of production, as does the assembling and processing industry that includes automobiles, household electrical appliances, and precision machinery.

Japanese employment system

The Japanese system consists of several subsystems (see Figure 1.1): (a) the employment system, which relates to households and firms; (b) industrial groups which connect firms with other firms; (c) the relation between firms and the government sector; and (d) the political relationship of the government sector with the households where there are voters. The first two of these are discussed in this and the following section.

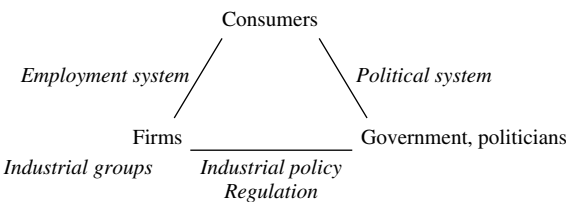


Figure 1.1 The Japanese system