

Tokyo's Central Role in the Knowledge-Based Economy

Masatoshi KURATANI and Yukihiro ENDO

Nomura Research Institute

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While Tokyo has been affected in recent years by rising social instability, it has also been stimulated by the emergence of Japan's knowledge-based economy, leading to a variety of future-oriented reactions. These reactions are indicative of Tokyo's growing importance in Japan's economy and society. The growth of major metropolitan areas is also observed in other countries, and is due mainly to the role of cities in the accumulation of human capital, information and other knowledge.

A number of characteristic trends can be observed in basic data that reflect the transformation of Tokyo. One such development is Tokyo's growing importance as an information gateway. Another is the rising percentage of highly educated women in the city's supply of human capital. There is also evidence of improvements in Tokyo's entrepreneurial infrastructure, dynamic reinvestment in human capital, and the growth of global professional and business services. In the past Tokyo has functioned as an information center with a vertical "command and control" structure. However, these movements in Tokyo symbolize the formation of horizontal networks and new divisions of labor through diverse interactions among highly skilled human capital. As these trends continue, the City of Tokyo is expected to play a major role as the core of the emerging knowledge-based economy. That role will need to be complemented by an advanced market infrastructure. However, improving that infrastructure involves various challenges such as crime prevention, effective management of the intellectual property system, and the further development of telecommunications systems.

I The Current Situation in Tokyo and the Role of Major Cities

1 Social Instability and New Developments

American law professor Robert Ellickson is the author of *Order without Law*. In his book he relates his observations during a field study in a Californian county where cattle ranching is the main industry.

Damage caused by cattle straying onto neighboring ranches is a common occurrence in this area. Ellickson shows that formal legal rules do not play a particularly important role in the resolution of these frequent potential disputes, which are generally settled in a cooperative fashion within the community. This demonstrates that close-knit communities develop informal social norms under which the welfare of the community as a whole is maximized by encouraging each of the residents to engage in cooperative behavior. These social norms include rules that require members of the community to tolerate contingent encroachments. On the other hand, they also include rules that result in self-help punishment, including community-wide negative gossip, in response to deviant behavior.¹

While Tokyo is located in another country and is a major city rather than a ranching community, it once shared some characteristics with the rural area described by Ellickson. For example, it enjoyed a consistently low crime rate compared with the world's other major cities without relying on strict laws or a massive police force. It also maintained good order in public environments, such as among users of public transportation systems. A number of factors contributed to this situation, including sustained economic growth, generally strong family and social rules, relatively predictable life cycles, and social sanctions against disharmonious behavior.

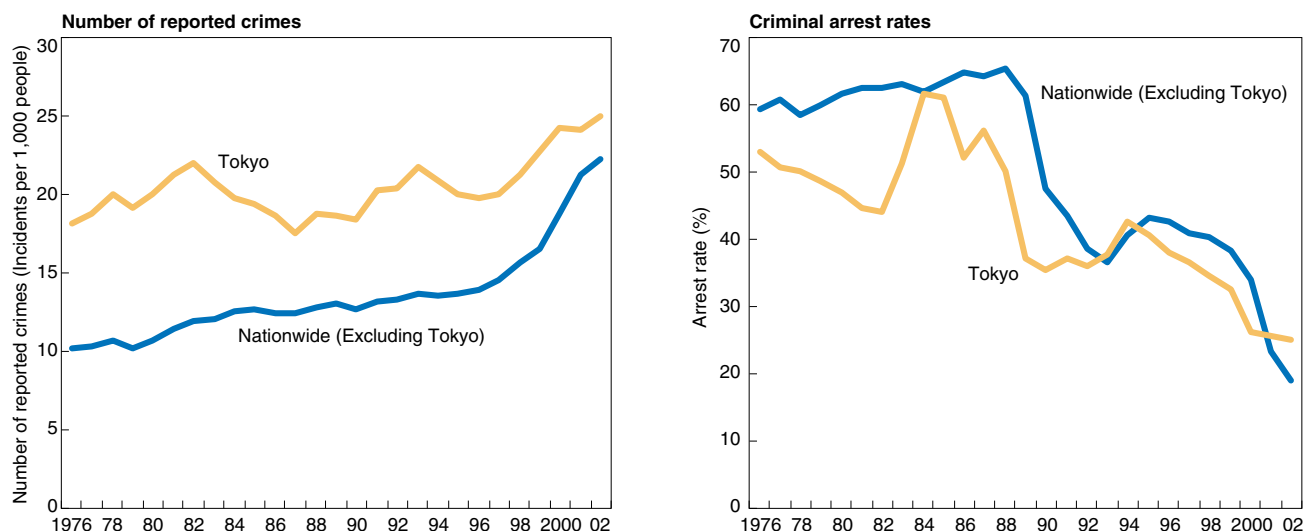
However, the world has changed over the years and events in our own communities indicate that this system of order without law is a thing of the past. This change is clearly apparent from the crime rate. As shown in Figure 1, the incidence of crime has risen dramatically since the second half of the 1990s, while the criminal arrest rate has fallen sharply. A comparison of the pace of change shows that while the same tendency is observed both in Tokyo and the rest of Japan, this deterioration is progressing gradually in Tokyo.

Other indicators of social order are also generally moving toward increasing instability. This development reflects the emergence of growing numbers of people who are losing their psychological balance in response to family and social change, and the consequences of other factors that include decelerating growth and structural change in the economy, the beginning of lifecycle diversification, growing inequality, and information overload. The social norms that regulate behavior should be incorporated into personal preferences and value systems through the interaction of individuals with their families, schools, workplaces and other organizations and systems. In recent times, however, the channels through which these norms are shared and shaped appear to be weakening.

Yet when Tokyo is viewed in relation to the global shift toward the knowledge-based economy, it is also possible to identify signs of renewed energy within this milieu of social and economic transformation:

- Tokyo is assuming an increasingly important role as a gateway city for information flows via the Internet. Information flows within the area have also become extremely active.
- There is a growing tendency for people to move into Tokyo from other regions in recent years. This trend is especially marked among females, particularly those with higher academic qualifications.

Figure 1. Trends in Reported Crimes and Arrest Rates



Source: Statistics Bureau, Ministry of Public Management, Home Affairs, Posts and Telecommunications, *Japan Statistical Yearbook*; Criminal Affairs Bureau, National Police Agency, *Criminal Statistics*.

- Tokyo's entrepreneurial momentum is strong in such areas as software, information processing services, telecommunications and the content industries. The Tokyo metropolitan area also ranks near the top of Japan's prefectures in terms of gross job creation ratios.

2 The Growth and Role of the City

These movements reflect Tokyo's increasing weight in Japan's social and economic activities. The growth of the city is already attracting attention overseas, and this situation has been extensively analyzed over the past few years as a key phenomenon in explaining development mechanisms in advanced economies. A feature of these analyses is the emphasis placed on the role of cities in the accumulation of human capital, information and other types of knowledge. The authors of this paper have surveyed a wide range of Japanese and foreign literature on this matter, and summarize their interpretations of some of these hypotheses below.

Over the vast majority of historical time, minimal increases in world population went together with negligible growth in real per capita incomes. Since the 19th century, however, the spectacular growth in population has been matched by a rapid growth in per capita incomes. Larger populations encourage greater specialization and increased investments in knowledge, mediated in part through bigger and more important cities. High population densities in cities are crucial to their well-developed specialization by skills, and their production and transmission of knowledge.²

Dense urban agglomerations provide a faster rate of contact between individuals, and each new contact provides an opportunity for learning. The subjects of learning in cities are diverse because of the high level of divisions of labor and specialization. Moreover, economies of scale afforded by urban areas may allow better schools to be built in big cities and therefore facilitate formal education. As it becomes increasingly important to use knowledge and skills as production resources in the economy, if cities facilitate skill acquisition, they will continue to be important far into the future.³

Cities are nasty, crowded, dirty, and downright dangerous. Given the choice, many people would rather live where the grass is greener, the air is cleaner, and life is more peaceful. But for commerce, cities are ideal. Since early civilization, the city has been the place to do business. Today, however, cities function less as production centers and more as consumption centers and residential bases. Cities are attractive for living in when they offer a variety of consumption opportunities, a mild climate, proximity to the sea, good schools, low crime, a rich architectural heritage, and a lively cultural life. In

the United States these factors reflected in a new trend called 'reverse commuting,' whereby people live in cities and commute to work in the suburbs.⁴

In recent years, due to declines in the cost of moving people, goods and information, the dispersal of traditional industries at all spatial levels has advanced, while the increased concentration of knowledge creation activities has grown. At first glance, these trends may appear to be contradictory. At the international level, production activities that were once concentrated in advanced nations have been transferred to neighboring countries. Globalization is now beginning to affect service industries as well as manufacturing. For example, the call centers of American companies may be linked to India. Meanwhile, leading-edge innovative activities have tended to cluster in specific locations, such as Silicon Valley in the United States.⁵

In other words, the following advantages are gained from population growth and concentration in cities:

- The availability of a wide range of learning opportunities encourages investment in the development of human capital and specialized skills.
- Progressive integration of wide-ranging fields of specialization facilitates the creation of information and other forms of knowledge.

However, the full potential of these advantages, especially the second, cannot be realized simply through the high population densities of cities. The complementing role of market infrastructure, including effective legal systems to protect private property rights and contract relationships, as well as telecommunications systems capable of carrying large volumes of data at high speed, is also crucial to the effective sharing and integration of knowledge among individuals and enterprises.

These perspectives will be reflected in the remainder of this paper. In Chapter II we will analyze the reactions that are occurring in Tokyo in response to the shift toward a knowledge-based economy, citing various basic data. We will also attempt to identify characteristic developments by comparing Tokyo with the rest of Japan. In Chapter III we will focus on the types of market infrastructure needed to complement Tokyo's role as a metropolis. We will also consider some priorities and issues for the future.

II The Changing Face of Tokyo in the Knowledge-Based Economy

1 Tokyo as an Information Gateway City

One of the major changes that have occurred over the past decade has been the rapid expansion of Internet

use by the private sector, which symbolizes the shift to the knowledge-based economy.

The statistics in Table 1 are for an independent Internet Service Provider (ISP) that is not affiliated to a telephone company or PC manufacturer. The table illustrates the growth of the ISP's own backbone network and changes in its capacity.

The figures indicate hardware capacity, which is the size of the "pipes" through which information is pumped. Strictly speaking, they do not necessarily indicate the routes along which information travels (between origins and destinations), or the actual volume of information traffic passing along those routes. However, ISPs are exempt from universal service obligations, which means that they establish or expand backbones basically for economic reasons, and that such initiatives are likely to occur close to sources of demand. It is therefore reasonable to assume that the capacity approximately represents information traffic.⁶

Tokyo's prominence as a network node is reflected in various ways in these statistics. For example, the volume of data traffic in the Tokyo area is far greater than that in other areas. (In the table, the figures for

each area represent the sums of connections with the backbones of other providers and connections among multiple sub-nodes within each area.) The ISP in question began to provide services in 1993 by establishing links in Tokyo with the WIDE network, a science and research network that pioneered Internet use in Japan. In the decade since then, its capacity within the Tokyo area has increased by a factor of 5,400 times. At the end of 2002, the Tokyo area had 8.5 times the capacity of second-ranked Osaka.

Tokyo also plays a dominant role in international connections. Japan's nodes for international flows of people and goods have proliferated with the opening of new international airports and other facilities. However, the only international data link outside of Tokyo is a route between Osaka and the United States. In this sense, Tokyo enjoys an undisputed position as Japan's premier domestic and international information gateway.

This pattern is not limited to this ISP and can also be observed in the networks of other ISPs. Because the Internet gives users instant desktop access to information from around the world, some may feel that physical distance is no longer an issue. As these data indicate, in

Table 1. Trends in the Backbone Capacity of an Internet Service Provider (Year-End Statistics)

(Unit: Megabits per second)

Node	Connection point	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Sapporo	Sapporo area									150.0	150.0
	Sendai					1.5	3.0	3.0	45.0	45.0	45.0
Tokyo	Tokyo area	3.0	3.8	4.5	110.5	116.5	126.5	436.5	3,736.5	5,769.5	16,169.5
	Osaka	0.2	0.4	1.5	45.0	45.0	155.0	300.0	1,200.0	1,200.0	4,800.0
	Yokohama	0.2	0.8	6.0	6.0	45.0	45.0	45.0	450.0	1,350.0	2,700.0
	Nagoya		0.2	1.5	3.0	3.0	3.0	45.0	150.0	150.0	1,200.0
	Toyama			0.8	1.5	3.0	6.0	6.0	45.0	150.0	150.0
	Sendai			0.8	1.5	6.0	12.0	45.0	90.0	240.0	390.0
	Sapporo				1.5	1.5	4.5	12.0	45.0	195.0	345.0
	Urawa					1.5	3.0	6.0	6.0	12.0	12.0
	Kashiwa						51.0	51.0	6.0	6.0	6.0
	Chiba							1.5	3.0	15.0	15.0
	United States			4.5	45.0	200.0	200.0	555.0	1,325.0	2,075.0	3,875.0
	Asia				100.0	100.0	100.0	100.0	100.0	100.0	100.0
Nagoya	Nagoya area									150.0	150.0
	Hamamatsu					3.0	3.0	3.0	12.0	45.0	45.0
	Okazaki						1.5	3.0	6.0	6.0	6.0
Osaka	Osaka area	0.2	0.2	1.5	1.5	1.5	1.5	1.5	301.5	901.5	1,901.5
	Fukuoka			0.8	6.0	6.0	12.0	50.0	150.0	150.0	600.0
	Hiroshima			1.5	1.5	6.0	6.0	12.0	45.0	150.0	150.0
	Nagoya				6.0	45.0	45.0	45.0	150.0	150.0	600.0
	Okayama				1.5	3.0	3.0	3.0	45.0	150.0	150.0
	Kyoto				1.5	3.0	6.0	12.0	45.0	345.0	345.0
	Kobe				3.0	3.0	6.0	6.0	45.0	45.0	195.0
	Kanazawa						3.0	12.0	150.0	150.0	150.0
	Takamatsu							9.0	45.0	150.0	150.0
	United States				45.0	45.0	45.0	155.0	155.0	5.0	605.0
	Fukuoka	Fukuoka area			0.2	0.2	1.7	1.7	3.0	6.0	156.0
Kumamoto					0.8	0.8	1.5	3.0	12.0	12.0	12.0
Hiroshima							3.0	6.0	45.0	150.0	150.0
Okinawa										12.0	45.0
Other routes	Hamamatsu-Okazaki								6.0	6.0	6.0
	Toyama-Kanazawa						3.0	3.0	45.0	45.0	45.0
	Kyoto-Kobe								45.0	45.0	0.0
	Takamatsu-Okayama								45.0	45.0	45.0

Notes: (1) Tokyo includes the Ariake and West Tokyo sub-nodes. Fukuoka includes the Kitakyushu sub-node; (2) "Area" figures are the sums of the total capacity among multiple sub-nodes and the connection capacity with other networks (such as WIDE).

Source: Based on <http://www.ij.ad.jp/network/backbone-history.html> (accessed on 2/10/2003).

fact, the concentration of Internet activity in Tokyo appears to be increasing rather than decreasing.

The expanding role of major cities as information gateways is not limited to Japan. In 1997 Mitchell L. Moss and Anthony Townsend of New York University conducted a survey of Internet domain names, which are the locations at which web sites are registered. Though somewhat dated now, the results showed that New York's Manhattan area had by far the highest number of domains, followed by San Francisco (Table 2). Other cities with large populations, such as Los Angeles and Chicago, did not even rank in the top 20.⁷

Even the largest corporations normally have only one domain name. The findings are thus indicative of the importance of Manhattan, which is not especially large in area, as a center for information exchanges by both businesses and individuals.

According to Professor Stephen Graham of the University of Newcastle, New York's "Silicon Alley" is a global supply center for the skills, designs and content for the Internet and other multimedia channels, and a base for businesses specializing in such fields as design, advertising, publishing, fashion and music. He notes: "Here, as with the global financial services sectors, the need for ongoing face-to-face contact, to sustain continuous innovation and reflexivity, is combined with exceptionally high use of advanced telecommunications to link relationally and continuously with the rest of the planet."⁶

These comments emphasize the fact that a city's importance is based not only on the volume of data flows, but also on the human interactions, such as those leading to decisions, that occur in a city.

Some may argue that Tokyo has a long tradition as a domestic and international information gateway. However, the pattern shown in Figure 1 can be seen symbolically as indicating a transition from vertical to horizontal information flows. The nature of those flows appears to be shifting from a command and control mode, whereby information and directives are conveyed from government agencies to industries, and from corporate head offices to regional subsidiary offices (and reports in the opposite direction) to interaction on a more equal footing.

Table 2. US Cities Ranked by Number of Domains

Rank	City	Domains	Domain Density
1	Manhattan	15,139	9.9
2	San Francisco	7,518	10.2
3	Seattle	4,080	7.8
4	Dallas	3,988	3.9
5	Boston	3,981	7.3
6	San Jose	3,863	4.7
7	Phoenix	3,760	3.6
8	Washington	3,522	6.2
9	Austin	3,306	6.4
10	Atlanta	3,115	7.9

Note: "Domain Density" represents number of domains per 1,000 population. Source: Based on Mitchell, L. Moss and Anthony Townsend, *Manhattan Leads the 'Net' Nation*, August 1997.

As will be shown later in this paper, this conclusion is supported by the fact that new information industry clusters are forming in non-traditional locations, such as Shibuya, which do not necessarily enjoy proximity to rail or air hubs and are not particularly convenient meeting places for people from branch offices. Furthermore, these new clusters are not necessarily close to central government offices in Kasumigaseki.⁸

2 Growing Importance of Highly Educated Women in Tokyo's Supply of Human Capital

Outlined below are some of the supply-side changes that have affected the human capital situation in recent years.

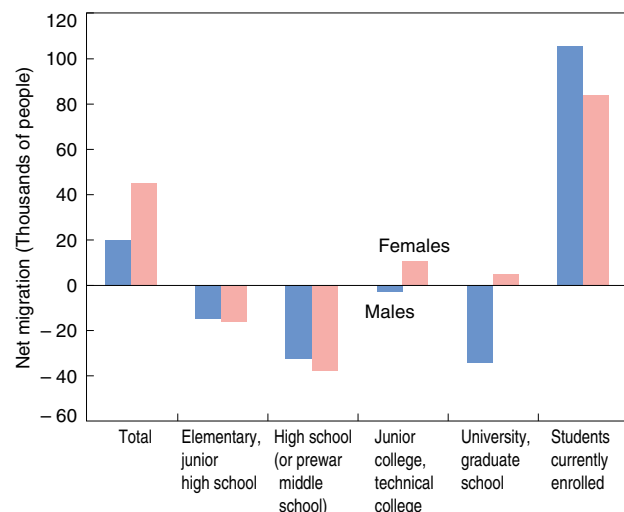
(1) Migration into Tokyo

After a long period of decline, the permanent (night-time) population of the 23 wards of Tokyo proper started to rise again in 1997. There has even been a conspicuous population recovery in the three central wards (Chiyoda, Chuo, Minato).

Until the mid-1990s, the established pattern for people in their teens and early 20s was to move to Tokyo to attend university or technical college, and then to move to other prefectures after graduation to take up a job, or at the time of marriage or childbirth. Since the second half of the decade, however, the number of people leaving Tokyo has declined in all age groups, and there is now a net inflow among people in age groups up to the mid-forties.

Figure 2 is based on national census statistics for 2000. It analyzes trends in net migration from other prefectures over the past five years according to gender and academic background. Males have continued to follow the earlier pattern, and the only net increase in domestic

Figure 2. Net Migration from Other Prefectures into Tokyo by Academic Background (1995-2000)



Note: "Total" includes people who have not yet attended school. Source: 2000 National Census (Files used: k13a011-2.xls, k13a012-1.xls).

migration figures is among students currently enrolled in educational institutions. After graduation, there is a net outflow of population at all educational levels. Among females, there is a net inflow of population not only among current students, but also among highly educated women with qualifications at junior college level or higher. Overall, net inward migration is more than double the level for males.

Also of interest is the profile of people who were resident in Tokyo as of 2000 but were living overseas five years before that time (including non-Japanese). Net increases cannot be calculated due to statistical limitations, since there are no figures showing how many people who were resident in Tokyo in 1995 had moved overseas by 2000. However, it is apparent that 20 percent of all people who have migrated from overseas to Japan live in Tokyo. This is double the figure that would be predicted based on Tokyo's share of Japan's population (9.5%). Moreover, the percentage of people with advanced educational qualifications is extremely high among both males and females moving from overseas (Figure 3).

Highly educated people have always made up a large percentage of Tokyo's population. In 1980, 23.9 percent of people aged 15 and older were graduates of higher educational institutions, compared with the national average of 13.7 percent. The trend toward higher education has continued since then, and in 2000 the per-

centage had risen to 35.3 percent, compared with the national average of 24.6 percent.

The growth of the nighttime population has been accompanied by a decline in the daytime-nighttime population gap. There is now a gradual move toward residence in closer proximity to places of work in the 23 wards of Tokyo and the surrounding areas.⁹ The international comparison in Table 3 is quoted from *the Urban White Paper on the Tokyo Metropolis 2000*, which was compiled by the Tokyo Metropolitan Government's Bureau of City Planning. It is based on statistics from around 1998, when Tokyo's daytime-nighttime population gap was still expanding. The trend toward residence in close proximity to workplaces emerged immediately after this period, and today Tokyo exhibits a pattern similar to that in New York and other overseas cities.

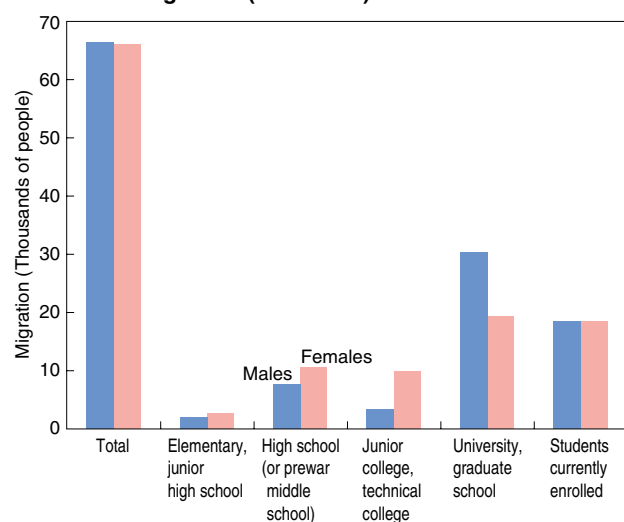
According to the results of a questionnaire survey of people who have bought condominiums in the Tokyo area, those in relatively older age groups (50 or older) and single women account for a large percentage of people returning to central Tokyo.¹⁰ This pattern is attributable in part to the increased affordability of housing in central Tokyo with the decline in real estate values since the collapse of the economic bubble. Improvements in the urban environment, including the supply of condominiums suitable for single people, and ease of access to consumer goods required for daily life, also appear to have played a major role.

There is now an established lifestyle in districts like Aoyama in Tokyo, which are not only close to places of work but also to upscale supermarkets, good restaurants, sports facilities and so on, all located within a 30-minute radius on foot.¹¹ According to the results of another survey, foreign residents appreciate Tokyo's clean streets, convenient shopping and good public safety.¹²

(2) Employment patterns and wages

The population recovery is also having an effect on employment patterns. An analysis of the employment pattern (by major industrial sector) for net migration from other prefectures to Tokyo as of 2000 shows that the only industries to show an increase in the number of male employees compared with 1995 levels were wholesaling and retailing, services and miscellaneous (unclassifiable) businesses. There were net decreases in all other industries, and the overall figure also showed a negative trend. In contrast, there were substantial increases in the number of females employed in services

Figure 3. Migration from Overseas to Tokyo by Academic Background (1995-2000)



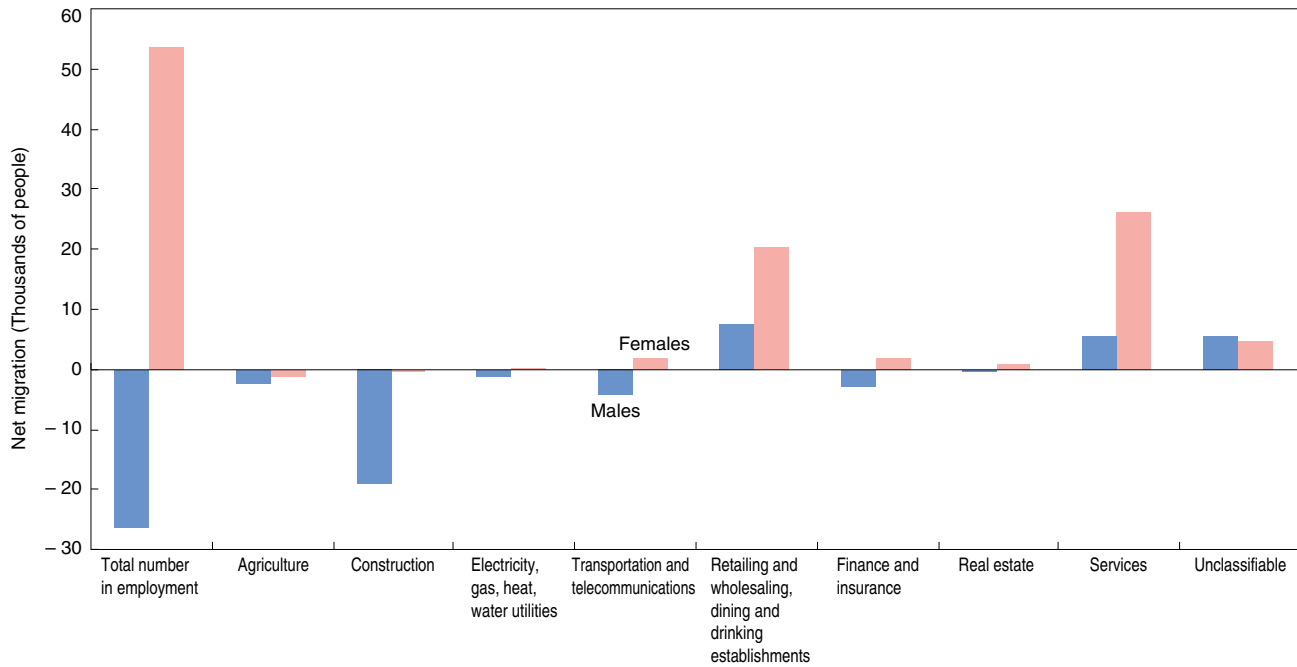
Note: "Total" includes people who have not yet attended school. Source: 2000 National Census (Files used: k13a011-2.xls, k13a012-1.xls).

Table 3. International Comparison of Daytime-Nighttime Population Ratios

	Tokyo		New York		London		Paris	
	A decade ago	Present	A decade ago	Present	A decade ago	Present	A decade ago	Present
Central districts + suburbs	2.28	2.36	1.78	1.41	1.48	1.38	0.84	0.76
Entire area	0.89	0.90	0.57	0.48	0.65	0.59	0.56	0.54

Notes: (1) The daytime-nighttime population ratio is calculated by dividing the daytime population by nighttime population; (2) "A decade ago" means 1982-90, while "Present" indicates 1995-1999.

Source: Bureau of City Planning, Tokyo Metropolitan Government, *Urban White Paper on Tokyo Metropolis 2000*.

Figure 4. Employment Trends by Industrial Sector of Net Domestic Migration into Tokyo (1995-2000)

Source: 2000 National Census (files used: k13a008-2.xls, k13a009-1.xls).

Table 4. Top 30 Industries in Terms of Growth in Female Employment (1996-2001)

Rank	Tokyo			National (Excluding Tokyo)		
	Industrial Sector	Increase (Numerical)	Increase (Percentage)	Industrial Sector	Increase (Numerical)	Increase (Percentage)
1	Business services not classified elsewhere (e.g., temporary staffing services)	46,732	32.1	Business services not classified elsewhere (e.g., temporary staffing services)	123,892	61.0
2	Software	21,861	70.2	Retailing of foodstuffs	119,949	15.7
3	Consumer services not classified elsewhere	20,038	643.7	Elderly welfare services	119,177	76.2
4	Retailing of pharmaceuticals and cosmetics	9,595	32.1	Restaurants and cafeterias	87,746	10.8
5	Other specialized services	8,305	22.2	Hospitals	79,783	7.4
6	Information processing and distribution services	8,130	21.2	Child welfare services	77,314	22.2
7	General clinics	7,781	18.3	Other medical services	76,728	224.3
8	Elderly welfare facilities	7,339	49.3	General clinics	66,174	14.8
9	Restaurants and cafeterias	6,720	4.7	Retailing of pharmaceuticals and cosmetics	64,037	28.9
10	Services relating to telecommunications (e.g., mobile phone sales)	5,500	306.1	Consumer services not classified elsewhere	40,711	242.3
11	Domestic telecommunications	5,164	70.3	Retailing of miscellaneous foodstuffs and beverages	39,207	8.3
12	Private tutoring services	4,383	11.0	Services relating to telecommunications (e.g., mobile phone sales)	35,864	262.1
13	Child welfare services	4,332	8.4	Bars, beer halls, etc.	35,160	14.2
14	Beauty care	4,273	11.2	Miscellaneous social insurance and welfare	33,182	70.2
15	Retail businesses not classified elsewhere	3,644	10.0	Building services	29,670	10.3
16	Bars, beer halls, etc.	3,568	6.6	Retailing not classified elsewhere	28,817	11.2
17	Real estate management	3,541	20.6	Department stores	24,294	6.2
18	Dental clinics	3,481	12.1	Miscellaneous bars and restaurants	21,840	16.3
19	Retailing of miscellaneous textiles, apparel and accessories	3,143	19.2	Private tutoring services	21,072	7.5
20	Massage and physical therapy	3,136	47.8	Dental clinics	18,380	9.2
21	Higher educational institutions	2,972	10.2	General freight trucking	18,280	11.8
22	Miscellaneous retailing	2,540	82.6	Beauty care	16,912	5.4
23	Other medical services	2,404	145.2	Postal services	15,428	18.1
24	Production and distribution of movies and videos	2,189	26.8	Municipal agencies	15,163	7.7
25	Retailing of second-hand goods (items not classified elsewhere)	1,798	77.5	Software	15,003	31.0
26	Retailing of miscellaneous food and beverages	1,648	3.0	Higher educational institutions	12,655	17.2
27	Manufacturing of computers and peripherals	1,475	27.9	Welfare services for the physically and intellectually handicapped	12,547	22.3
28	Law and patent offices	1,467	15.6	Government agencies	12,533	31.1
29	Other general dining and drinking establishments	1,374	5.7	Health consultation facilities	12,231	55.7
30	Municipal agencies	1,369	8.5	Parks and amusement parks	11,170	47.1

Note: The shaded sectors are those regarded as being particularly significant to the knowledge-based economy.

Source: Ministry of Public Management, Home Affairs, Posts and Telecommunications, *Establishment and Enterprise Census (2001)*.

and wholesaling and retailing, as well as marginal increases in other industries, including finance and insurance, transportation and telecommunications, and real estate (Figure 4).

Table 4 provides a more detailed analysis of changes in employment patterns. It examines industries in which there were large net increases in employee numbers between 1996 and 2001, using data from *Establishment and Enterprise Census (2001)* compiled by the Ministry of Public Management, Home Affairs, Posts and Telecommunications. Industries showing particularly large increases in Tokyo include software and information services and research, professional business services (including law offices), and movie and video production and distribution. This trend, especially in the statistics for females, becomes particularly conspicuous when Tokyo is compared with other regions (Table 4).

The information technology (IT) industry and industries that use IT have enjoyed conspicuous growth in Tokyo. Another growth area has been professional business services, such as law and accounting firms. As discussed later in this paper, there are increasingly powerful indications that Tokyo is starting to fulfill the requirements of a "Global City," which Chicago University sociologist Saskia Sassen defines as a city with an accumulation of organizations providing specialized services that function as the outsourced central nervous system for large global corporations.¹³

Furthermore, an analysis of wage trends (raw data, not adjusted for the effects of age, academic background and other factors) shows that relative wages in Tokyo have tended to be higher than the national average for the past two decades. Clearly this is because women's wages have risen relatively fast. Also, while the wage gap between males and females has tended to

Table 5. Trends in Cash Wages in the Tokyo Metropolitan Area

		Average monthly cash wages (¥)					Increase (Times)	
		1981	1986	1991	1996	2001	1981-2001	1991-2001
By industrial sector (Total males and females)								
Total of all industrial sectors surveyed	National	279,096	327,041	384,787	413,096	397,366	1.42	1.03
	Tokyo	330,622	400,571	475,250	509,627	503,268	1.52	1.06
Manufacturing	National	259,729	305,414	368,011	401,051	406,089	1.56	1.10
	Tokyo	321,905	384,366	474,765	524,194	535,438	1.66	1.13
Finance and insurance	National	346,494	425,479	491,745	546,258	546,639	1.58	1.11
	Tokyo	371,137	499,570	586,910	627,169	655,928	1.77	1.12
Services	National	300,704	351,655	395,470	413,434	402,939	1.34	1.02
	Tokyo	344,356	404,051	442,203	490,751	457,245	1.33	1.03
Males and females (National)								
Total of all industrial sectors surveyed	Males	328,001	388,899	465,720	499,972	492,937	1.50	1.06
	Females	174,895	202,664	236,505	256,396	243,433	1.39	1.03

		Average monthly basic cash wages in the Tokyo Metropolitan Area (Thousand ¥)					Increase (Times)	
		1981	1986	1991	1996	2001	1981-2001	1991-2001
Males								
All age groups		241.9	297.2	355.6	396.2	406.0	1.68	1.14
Up to 17		95.8	116.8	145.3	131.4	132.5	1.38	0.91
18-19		113.3	130.1	166.6	172.6	177.5	1.57	1.07
20-24		137.1	162.6	200.0	214.1	218.2	1.59	1.09
25-29		175.4	202.3	244.4	263.1	265.8	1.52	1.09
30-34		224.0	262.2	310.9	335.1	333.6	1.49	1.07
35-39		271.5	316.8	369.5	411.5	408.7	1.51	1.11
40-44		304.0	364.4	422.8	467.8	470.5	1.55	1.11
45-49		326.1	396.4	466.8	511.5	511.5	1.57	1.10
50-54		325.0	401.8	482.0	533.8	542.5	1.67	1.13
55-59		282.1	347.7	441.6	488.5	511.6	1.81	1.16
60-64		211.2	285.1	334.2	374.7	389.9	1.85	1.17
65		192.2	226.4	299.3	319.0	345.9	1.80	1.16
Females								
All age groups		145.9	179.0	215.7	250.5	268.9	1.84	1.25
Up to 17		96.6	107.4	133.1	152.7	NA	NA	NA
18-19		105.9	123.9	149.1	166.8	165.0	1.56	1.11
20-24		123.5	145.0	177.2	195.5	203.9	1.65	1.15
25-29		147.5	175.3	209.2	230.6	237.1	1.61	1.13
30-34		163.3	203.3	241.3	264.8	278.8	1.71	1.16
35-39		175.0	218.8	254.3	307.9	308.9	1.77	1.21
40-44		176.8	222.0	261.4	313.5	334.9	1.89	1.28
45-49		176.6	226.0	264.3	326.1	348.9	1.98	1.32
50-54		183.1	229.3	274.5	307.6	324.8	1.77	1.18
55-59		183.1	238.7	266.0	299.5	301.9	1.65	1.13
60-64		163.0	212.1	272.5	283.7	284.4	1.74	1.04
65		152.4	191.2	223.4	310.1	277.0	1.82	1.24

Note: The statistics refer to business establishments with 30 or more employees.

Source: Ministry of Health, Labour and Welfare, *Yearbook of Labor Statistics* (various annual editions).

expand nationally (also based on data that has not been adjusted for various factors), that gap is narrowing in Tokyo (Table 5).

Possible hypotheses to explain this phenomenon include an increase in the percentage of women completing higher education, an upward movement in the average number of years worked by women, and arbitrage away from relatively expensive male employees. Whatever the reason, there has been a continuous improvement in the relative status of female employees in Tokyo in terms of wages.

Data showing changes in employee numbers by industrial sector do not indicate occupational categories, such as professional or secretarial work. However, the growth in the numbers of secretarial workers can probably be gauged from increases in the number of people employed in the temporary staffing industry (Table 4). When these figures are seen in conjunction with wage data, the response to the demand for knowl-

edge-intensive workers appears to have been especially strong among highly educated female workers in Tokyo.

3 Enhanced Entrepreneurial Infrastructure

Table 6, which is also based on the *Establishment and Enterprise Census (2001)*, ranks industries (minor categories) according to growth in the number of business establishments. When these rankings are compared to those for industries showing net increases in employee numbers, a similar pattern emerges—except in a few areas such as higher educational institutions. This indicates that larger percentages of new businesses established in Tokyo are in fields relating to new knowledge and technology. The statistics also show that employment growth is associated more with the creation of new businesses, rather than the expansion of existing establishments.

Table 6. Top 30 Industries in Terms of Growth in Number of Business Establishments (1996-2001)

Rank	Tokyo			National (Excluding Tokyo)		
	Industry	Increase (Numerical)	Increase (Percentage)	Industry	Increase (Numerical)	Increase (Percentage)
1	Software	2,782	61.2	Services relating to telecommunications (e.g., mobile phone sales)	10,086	457.6
2	Other specialized services	1,753	17.9	Automobile dealership	8,731	11.6
3	Business services not classified elsewhere (e.g., temporary staffing services)	1,591	23.0	Bars, beer halls, etc.	7,489	5.8
4	Massage and physical therapy	1,560	28.3	Beauty care	7,463	4.7
5	Beauty care	1,020	7.1	Elderly welfare services	6,615	80.6
6	Retail businesses not classified elsewhere	872	5.9	Massage and physical therapy	5,120	10.1
7	Services relating to telecommunications (e.g., mobile phone sales)	856	296.2	Business services not classified elsewhere (e.g., temporary staffing services)	4,044	17.3
8	Retailing of second-hand goods (items not classified elsewhere)	714	45.7	Restaurants and cafeterias	3,780	1.8
9	Dental clinics	638	7.4	Software	3,748	43.7
10	Consumer services not classified elsewhere	629	84.1	Retailing of second-hand goods (items not classified elsewhere)	3,693	44.4
11	Law and patent offices	554	10.5	Dental clinics	3,682	7.7
12	Elderly welfare services	553	73.0	General clinics	3,330	5.4
13	Non-profit organizations not classified elsewhere	473	23.8	Private tutoring services	3,167	2.5
14	Building services	464	12.5	Child welfare services	2,927	9.0
15	Information processing and distribution services	460	16.7	Other medical services	2,842	208.7
16	Real estate leasing (excluding housing and room rentals)	441	4.7	Other specialized services	2,620	7.6
17	Real estate management	439	6.5	Real estate leasing (excluding housing and room rentals)	2,447	8.1
18	Child welfare services	296	9.1	Retailing not classified elsewhere	2,267	1.8
19	Retailing of miscellaneous goods	268	64.1	Insurance agency business	2,109	10.7
20	Meeting halls	222	41.2	Other construction work classified by occupation	2,103	5.1
21	Welfare services for the physically and intellectually handicapped	214	51.6	Welfare services for the physically and intellectually handicapped	2,010	50.0
22	Production and distribution of movies and videos	212	12.1	Building services	2,009	13.7
23	Retailing of miscellaneous textiles, apparel and accessories	176	3.5	Social education	1,782	10.9
24	Other general eating and drinking establishments	171	5.4	Consumer services not classified elsewhere	1,776	16.9
25	Storage services	166	84.3	Pavement construction	1,568	23.9
26	CPA and tax accounting offices	165	2.3	Photography	1,511	6.1
27	Design services	157	4.1	Plumbing (excluding well excavation)	1,396	2.6
28	Other medical services	154	151.0	Meeting halls	1,390	24.5
29	Telecommunications and signaling equipment installation	144	14.0	Industrial waste disposal	1,074	26.4
30	General clinics	138	1.6	Wholesaling of miscellaneous machinery	1,068	8.0

Note: The shaded sectors are those regarded as being particularly significant to the knowledge-based economy.

Source: Ministry of Public Management, Home Affairs, Posts and Telecommunications, *Establishment and Enterprise Census (2001)*.

Tokyo has a conspicuous advantage in terms of its entrepreneurial environment. In 1997, 2.09 of every 100 people of working age wanted to establish their own businesses (based on responses to a survey of workers wishing to change jobs by starting their own businesses). This is almost 1.5 times higher than the national average of 1.44, and 17 percent higher than the figure for second-ranked Kanagawa prefecture (ratio of 1.79). One indicator of the success rate for new businesses is the number of companies registered for OTC trading per 1,000 business establishments. Tokyo's ratio of 0.58 is more than four times the national average and is considerably above second-ranked Kanagawa prefecture's ratio of 0.18.¹⁴

This suggests that Tokyo has a highly developed entrepreneurial infrastructure. In fact, Tokyo's job creation and job loss ratios are higher than the national averages and the ratios for the three other adjacent prefectures in the greater Tokyo area. Throughout the 1990s Tokyo ranked 40th or lower in terms of net job growth but second in terms of its gross job creation ratio. The extent of the change is remarkable in that Tokyo now accounts for two out of every ten new jobs created in Japan.¹⁵ This indicates that while economic stagnation is reflected in a structural decline in traditional industries, Tokyo also has sectors that are reacting dynamically to the emergence of the knowledge-based economy.

Evidence for this view can be found in responses to a questionnaire survey, which were reported in the 2002 edition of a white paper on small and medium-sized enterprise (SME) management in the Tokyo metropolitan area (service industry section). The report was prepared by the Tokyo Metropolitan Government's Bureau of Industrial and Labor Affairs. While this was the first survey of its kind and comparisons with past data are

not possible, the results are interesting because of the level of horizontal networking that they reveal in the service industry. As noted in the report, there is now an environment in which "services breed services."

Table 7 analyzes the responses of companies participating in the survey based on their client industries. Tokyo's economic structure is reflected in the high percentage of businesses that target the service sector. In contrast, the number of companies specializing in traditional customer industries, such as the financial sector and government agencies, is not especially large (except among relatively large companies acting as major suppliers for them).

Companies participating in the survey were also asked to indicate whether they themselves outsourced services from other companies. As shown in Table 8, 44.8 percent of all participants replied in the affirmative. The figure for the information and content industry was even higher at 52.3 percent. Table 8 also shows that companies in the information and content industry use outsourced services relatively little for traditional areas, such as general administration and accounting, and that information-related activities, planning, development and so on account for a high percentage of outsourcing. There is clear evidence of horizontal expansion in the sense that information businesses are specializing in their own core competencies while obtaining other services, including information-related services, from other suppliers.

This aspect is also apparent from responses to questions concerning the direct benefits of a Tokyo location. Companies in all industries cited the geographical advantages, but those in the information and content industry also emphasized networking with other companies, while venture businesses saw recruitment of personnel as a key requirement (Table 9). As noted by

Table 7. Main Client Industries of Service-Related SMEs in Tokyo (Multiple Responses)

(Unit: %)

	Manufacturing	Wholesaling and retailing	Services	Transportation and telecommunications	Construction	Finance and insurance	Government agencies	Others; unknown
Total	30.7	22.9	47.8	14.7	17.9	6.4	10.1	16.8
Information and content	36.7	20.9	61.0	11.7	6.9	10.1	7.1	15.6
Enterprises with 100 or more employees	34.1	19.5	50.7	20.3	5.8	10.1	17.4	8.7
Enterprises located in central Tokyo	32.0	20.7	50.3	15.5	11.8	6.9	8.7	16.8

Source: Bureau of Industrial and Labor Affairs, Tokyo Metropolitan Government, *Tokyo Metropolitan Government White Paper on SME Management (Service Industries)*, 2002.

Table 8. Usage of Outsourced Services by Sector (Multiple Responses)

(Unit: %)

	Information-related	Research and marketing	Business operations	Administration and accounting	Planning and development
Total	27.6	11.7	31.8	26.2	11.0
Information and content	43.6	19.5	25.8	22.9	18.2

Source: Bureau of Industrial and Labor Affairs, Tokyo Metropolitan Government, *Tokyo Metropolitan Government White Paper on SME Management (Service Industries)*, 2002.

Table 9. Advantages of a Tokyo Location

	1st	2nd	3rd	4th	5th
Total	Geographically convenient access to transportation systems 61.2	Large markets 23.1	Diverse industry clusters 22.8	Networking with other businesses 17.8	Many opportunities to access advanced technology and information 15.6
Information and content	Geographically convenient access to transportation systems 65.8	Networking with other businesses 26.1	Diverse industry clusters 24.6	Large markets 20.3	Many opportunities to access advanced technology and information 18.9
Venture businesses	Geographically convenient access to transportation systems 56.3	Large markets 31	Diverse industry clusters 18.3	Many opportunities to access advanced technology and information 18.3	Easier to recruit talented personnel 15.5
Items specific to venture businesses (differences from totals; ranked by absolute values)	Easier to obtain financing 9.2	Easier to recruit talented personnel 8.8	No particular advantage -8.3	Large markets 7.9	Geographically convenient access to transportation systems -4.9

Source: Bureau of Industrial and Labor Affairs, Tokyo Metropolitan Government, *Tokyo Metropolitan Government White Paper on SME Management (Service Industries)*, 2002.

Professor Richard Florida of Carnegie Mellon University, it is becoming increasingly important for employers to choose locations near the people they need, rather than expecting people to move in search of employers.¹⁶

This aspect is also seen as significant in relation to the formation of new industry clusters. For example, the graying of society has heightened the need to provide for life after retirement, with the result that asset management has become a growth industry. Indeed, asset management companies have continued to grow despite the stagnation in the stock market in recent years. Table 10 depicts trends in the geographical locations of asset management companies listed in the *Quarterly Investment Trust Fund Handbook* compiled by Toyo Keizai Inc. Although advances in information technology might seem to have eliminated geographical constraints on company locations, in fact all of the asset management companies that are listed are located in Tokyo.

Furthermore, while there has been some geographical expansion over the past four years, most of these companies are still concentrated in the three wards of central Tokyo (Chuo, Chiyoda, Minato). Because most asset management companies originated as affiliates of traditional financial service enterprises such as securities firms or banks, their locations may reflect a need to be situated close to their parent companies. However, it is interesting that foreign-affiliated and independent asset management firms, the number of which has increased in recent times, are also choosing similar locations.

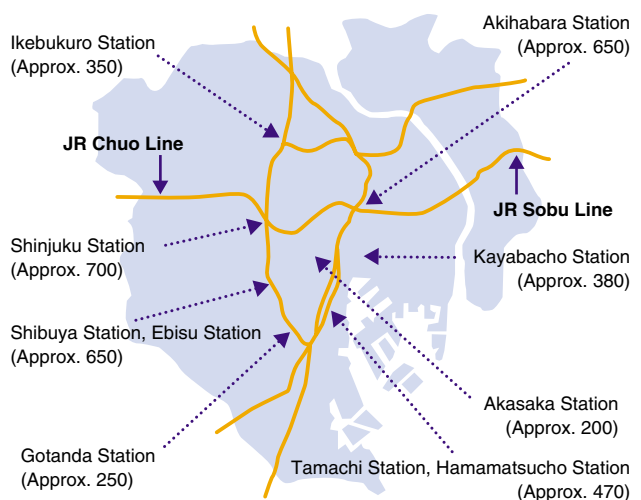
Over one-quarter of all businesses in Japan in industries that use information technology, such as software, games and animation, are located in the 23 wards of Tokyo proper. Clusters of these businesses are springing up in locations that are not traditional business areas, such as Shibuya and Ebisu, mainly to the south

Table 10. Trends in Geographical Distribution of Asset Management Firms

	January 1999	January 2003
Chuo-ku	22	25
Chiyoda-ku	23	33
Minato-ku	5	17
Shibuya-ku	2	5
Shinjuku-ku	0	2
Shinagawa-ku	0	1
Total	52	83

Source: *Quarterly Investment Trust Fund Handbook*.

Figure 5. Clustering of IT-Related (Software) Business Establishments in the 23 Wards of Tokyo Proper



Note: IT-related (software) industries are defined as software, information processing and Internet-related services.

Source: Ministry of Land, Infrastructure and Transport, *Capital Area White Paper 2001*.

of the JR Chuo Line and Sobu Line (Figure 5). The buoyancy of the condominium market in southern Tokyo contrasts with the stagnation in northern Tokyo. This may be another example of the trend toward living close to the workplace.

4 Reinvestment in Human Capital

As noted in Chapter I, the emergence of the knowledge-based economy requires relentless investment in human capital.¹⁷ Specifically, there is an increasing need for formal and informal education to ensure efficient adaptation to new technology and environmental change.

E-learning systems based on information technology are becoming an increasingly popular means of supporting information sharing in the corporate environment. The aim of these initiatives is to change tacit knowledge into explicit knowledge. The need for highly skilled workers is reflected in the provision of short-term programs for adult learners, and in the establishment of many new full-fledged business schools offering MBA programs.

Reactions to these new trends emerged quickly in Tokyo. For example, business schools in Tokyo have a strong advantage in terms of their ability to provide full-time workers with weekday evening programs that they can attend safely and with minimal expenditure of time. Also, the interaction that occurs among a diverse range of people in Tokyo is a highly effective source of new business ideas.

In addition, more technology licensing organizations (TLOs) have been established in Tokyo than in any other Japanese city. The role of TLOs is to convert under-exploited technology in universities into clearly recognized and commercial intellectual assets, such as patents.

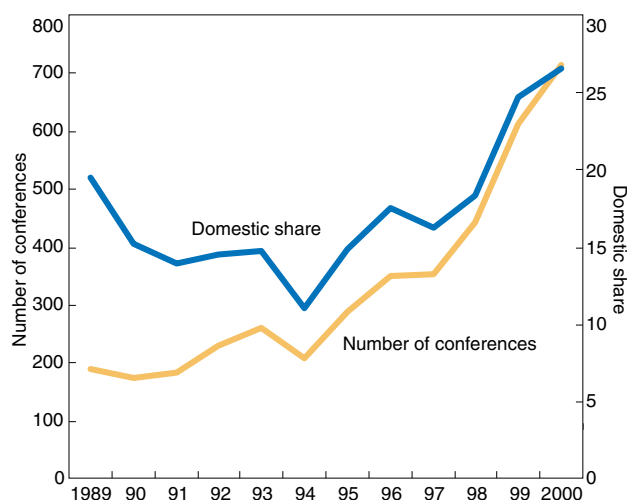
5 Evolution of Global Professional Business Services

As noted in the analysis of changing employment patterns, there has been an increase in the scope of professional business services offered by companies located in Tokyo. These services, which include legal advice, accounting, consultation and IT services, function as a kind of central nervous system supporting the global business activities of corporations. This role is at the heart of Saskia Sassen's Global City concept, and the availability of such services indicates that Tokyo is assuming an importance that places it alongside New York and London.

Though Tokyo's international competitiveness in some sectors, such as finance, has declined significantly since in the 1980s, there has been a marked rise in its relative status as a venue for international conferences (Figure 6). The improvement of the necessary infrastructure including hotel facilities has helped to enhance Tokyo's attractiveness as a venue for face-to-face initiatives in response to global issues.

A broader indicator of trends in the movement of people is provided by centrality rankings based on international air passenger traffic data. As shown in Table

Figure 6. Trends in the Frequency of International Conferences in Tokyo and Tokyo's Share of All International Conferences Held in Japan



Source: Development Bank of Japan, *Regional Handbook 2002*.

11, Tokyo has maintained a ranking second only to London by this measure. There are limitations, including the fact that data on other Japanese cities, such as Osaka, are excluded. Also, not all people who use Tokyo's Narita Airport live in Tokyo. However, Tokyo's yearly overseas travel ratio (travelers/population) is higher than any other prefecture, reaching almost 20 percent, compared with 17 percent for second-ranked Kanagawa prefecture.¹⁸ These figures suggest that Tokyo is used as a base by people whose business activities involve international travel.

III Market Infrastructure to Support Tokyo's Urban Role

Japan's productive population has started to decline. Economically, Japan has endured a decade of continuous stagnation and continues to experience powerful deflationary pressures. As noted in Chapter I, there is also a trend toward increasing social instability.

Despite these circumstances, it is significant that Tokyo continues to show a variety of future-oriented reactions to stimuli provided by the emergence of the knowledge-based economy. This tendency is expected to continue and expand, allowing Tokyo to fulfill its role as a center for the effective accumulation of human capital, information and other knowledge.

One of the advantages of growth in the cities identified in Chapter I was the ease with which new information and other knowledge can be created. We also emphasized that the improvement of the market infrastructure to facilitate knowledge exchange and integration is crucial to the effective exploitation of this advantage.

The knowledge held by individuals and companies represents only a small part of the accumulated knowledge that exists within the economy as a whole. That

Table 11. Trends in Rankings of Cities Based on Centrality in the International Air Passenger Network

City	1980		1985		1991		1994		1997	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank
London	1.000	1	1.000	1	1.000	1	1.000	1	1.000	1
Tokyo	0.323	6	0.640	3	0.680	2	0.820	2	0.810	2
Frankfurt	0.405	4	0.360	7	0.540	6	0.630	4	0.700	3
Paris	0.799	2	0.570	4	0.560	5	0.610	5	0.670	4
New York	0.729	3	0.690	2	0.580	4	0.600	6	0.650	5
Seoul	0.136	14	0.240	12	0.210	17	0.320	14	0.580	6
Los Angeles			0.370	6	0.440	8	0.540	8	0.580	7
Hong Kong	0.274	9	0.480	5	0.610	3	0.660	3	0.530	8
Singapore	0.196	12	0.300	11	0.390	9	0.470	9	0.510	9
San Francisco			0.220	13	0.270	12	0.330	10	0.380	10
Milan	0.259	10	0.160	15	0.260	14	0.320	13	0.370	11
Madrid	0.304	7	0.160	17	0.270	11	0.320	15	0.370	12
Chicago			0.170	14	0.250	15	0.330	11	0.370	13
Amsterdam	0.291	8	0.310	10	0.480	7	0.550	7	0.360	14
Zurich	0.230	11	0.340	8	0.310	10	0.320	12	0.350	15
Mexico City	0.349	5	0.160	16	0.260	13	0.290	16	0.290	16
Miami			0.130	18	0.230	16	0.240	17	0.270	17
Sydney	0.097	15	0.330	9	0.150	19	0.200	19	0.210	18
Boston			0.130	19	0.170	18	0.200	18	0.200	19
Montreal	0.182	13	0.120	20	0.150	20	0.170	20	0.160	20

Note: The leading node in the network is given the rank of 1, and the centrality of other nodes is ranked relative to that node.

Source: David Smith and Michael Timberlake, "Hierarchies of Dominance Among World Cities: A Network Approach," in Saskia Sassen, ed., *Global Networks, Linked Cities*, Routledge, 2002.

knowledge cannot be used effectively unless individuals and companies are able to exchange and integrate their knowledge.¹⁹ The market infrastructure provides a structure for this process. In this chapter we will examine issues relating to the market infrastructure that is needed to complement Tokyo's future urban role.

1 Crime Prevention

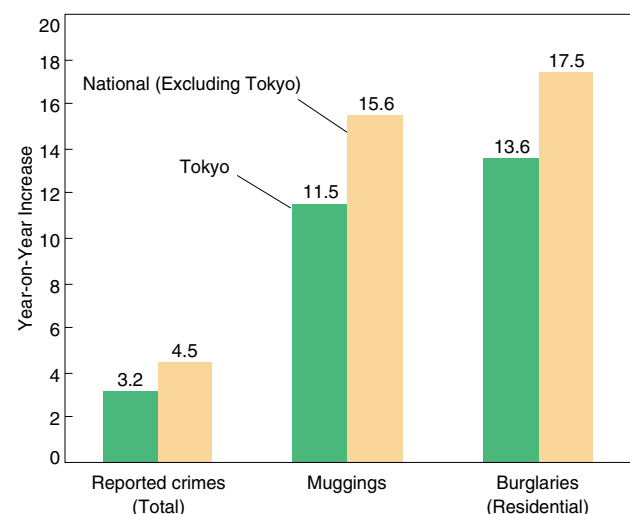
Protection of private property rights and contract relationships is a basic requirement for the efficient functioning of the market economy. Crime is a direct threat to private property rights and has a harmful effect on society. It is therefore important to limit the incentives for lawbreaking. Moreover, countermeasures against crime are a crucial part of efforts to enhance the role of a city as an attractive base for settlement. For example, crime was once seen as a fact of life in New York, but huge efforts have been devoted to crime prevention in recent years. This has resulted in a dramatic resurgence of New York's urban dynamism. Demand for hotel rooms has continued to expand over the past few years, leading to the supply of numerous high-quality hotel accommodations. After a temporary downturn in the wake of September 11, New York is once again benefiting from a hotel boom.²⁰ One of the factors that has made this possible is New York's improved security environment.

Chapter I referred to a sharp rise in Tokyo's crime rate in recent years. Figure 7 provides a more detailed picture in the form of a breakdown of the increase in crime between 2001 and 2002. The statistics show double-digit growth in the incidence of both muggings and residential burglaries. The increases in Tokyo are small-

er than those in the national statistics, although the inclinations are the same.

These criminal offenses that affect the day-to-day lives of ordinary citizens frequently escalate into serious crimes. Moreover, they become a major constraint when making choices of residential locations and commuting routes, and on the way time is allocated to work and other aspects of life. The impact of this deterioration of social order will be magnified as women make an increasing contribution to the supply of human capital in Tokyo.

Crime prevention must therefore be an important aspect of efforts to improve the market infrastructure. However, a return to the past in which Japan could rely on order without law is unlikely in the foreseeable future.

Figure 7. Year-on-Year Increase in Reported Crime in 2002

Source: National Police Agency, *Criminal Statistics*.

Instead we will need to confront head-on the question of how the legal system, the police force and the court system can be used most effectively.²¹ Unfortunately the resources needed for this purpose are being eroded by a tendency for government funding to be monopolized by groups with special interests.

For the future, it will be necessary to enhance the sophistication of crime analysis, curb behavior that tends to result in serious crimes, and maintain high arrest rates when crimes are committed. Prompt verdicts and appropriate punishments are also crucial. To achieve such goals, there is a need for a broad focusing of public opinion toward the investment of sufficient resources in the judicial and law enforcement systems.

2 Effective Management of Intellectual Property Systems

The emergence of the knowledge-based economy is magnifying the importance of intellectual property rights. The rapid growth of knowledge, especially in such fields as computer software and biotechnology, has been paralleled by an upsurge in the creation of intellectual property rights. Today even business models are being patented, and there is a stronger correlation between intellectual property and entrepreneurial activity. In terms of the direction of change in Tokyo, as described in the previous chapter, these moves are closely linked to Tokyo's future as a major city.

Intellectual property laws give creators of expressions and ideas that meet specific conditions the exclusive right to use those expressions and ideas and earn royalties from them for specified periods. The first advantage of this approach is that it provides an increased incentive for people to create works and inventions that bring major benefits to society. In this sense, there is a symmetry between the benefits sought through the protection of intellectual property rights and the prevention of crime as a factor that harms the interests of society.

Some researchers have suggested that protection of intellectual property rights actually hinders subsequent inventions in research and development of a continuous nature. This view assumes that new inventions must necessarily depend to a large extent on existing ones. However, another major benefit provided by intellectual property laws apart from the incentive to create is the disclosure of information about inventions. This facilitates the formation of markets for intellectual property rights and allows inventions to be used by other companies for purposes that generate high added values through licensing agreements. An additional benefit of such disclosure is the fact that anyone can use intellectual property after the period of protection has expired.^{22, 23}

Intellectual property strategies are currently the focus of debate in Japan, and a new law is about to be enacted. The primary aims of the new law appear to be reducing

the cost of managing intellectual property systems, expanding the human infrastructure that creates expressions and ideas, and increasing public awareness of the importance of intellectual property.

Management costs for intellectual property systems are a more serious issue with patents than with copyrights. Specifically, there are costs relating to establishing the scope of patents, enforcement activities to protect patents, and the costs relating to the information and transactions needed to maximize the social value of intellectual property. The reduction of these costs and the improvement of related mechanisms to facilitate the use of intellectual property systems are among the most important challenges in developing Tokyo's urban market infrastructure.

3 Improving Telecommunications Systems—Ubiquitous Networks

The United States reformed its telecommunications systems under the 1996 Telecommunications Act. This resulted in a complete transition from an approach based on antitrust regulation to a legal system designed to encourage competition through measures that include the establishment of interconnection obligations.

Japan is also improving its telecommunications systems, in part because of the influence of developments in the United States and elsewhere. These efforts have focused on promoting competition in the market for fixed-line voice telephone services. However, the focus of growth in recent years has been data communications via the Internet, and the introduction of broadband services in this area. Another growth area has been wireless communications.

Last year the United States adopted a new policy under which broadband services will in principle be unregulated. In contrast to computer services in the era when telecommunications were limited to fixed-line telephone systems, today's broadband services are provided through a wide range of channels, including fiber-optics, ADSL (asymmetric digital subscriber lines), and cable. The new policy reflects the assumption that this diversity will ensure effective competition in the market.²⁴ Japan has started adopting a similar policy.

The expansion of broadband services has led not only to the establishment of high-capacity transmission routes, but also to improved access to information in a wide range of formats, including text, images, video and audio. In the future, broadband services are likely to be augmented by applications based on advanced wireless systems, IC cards and wireless RFID tags. This ubiquitous networking environment is expected to have a wide-ranging impact on the activities of individuals and businesses, on the organization of markets, and on the management of the public sector. The implications for the ways in which individuals allocate their time are analyzed below as an example of this impact.

The scarcest resource in today's economy and society is time. While there are obvious quantitative limitations on time, from a qualitative perspective productivity per unit of time varies according to such factors as spatial location, powers of mental concentration, and access to information and knowledge.

There have been major lifestyle changes in recent times. For example, many functions that were traditionally associated with the home are being replaced by external urban functions, while work tends to move closer to home through proliferation of the small-office and home office (SOHO) environments.

Other developments to emerge include multiple jobs as a way of optimizing the risk-return structure of labor, and multiple residences, which allows people to enjoy the benefits of urban spaces and the natural environment. There is also a growing need for opportunities to acquire the information and other knowledge needed at various lifecycle stages.²⁵

These trends, which are especially conspicuous in Tokyo, are reflected in the growing complexity of time management. For women in particular, it has become increasingly important to coordinate time on multiple levels to accommodate tasks that include work, housework, childcare, community activities, health management, information gathering, and the acquisition of knowledge. As time is fragmented, productivity tends to decline because of the difficulty of maintaining concentration.²⁶

In this environment, the growth of ubiquitous networking will bring major advantages, including the ability to maintain the same work environment when moving from place to place, reducing the time cost of housework and transportation, and the ability to learn in spaces and at times when mental concentration can be maintained. By improving productivity and lifestyle flexibility, ubiquitous networking is expected to function as a sophisticated market infrastructure.

A noted American venture capitalist, who has placed increased importance on investment in e-commerce, has observed, "What we're doing is stealing back bits of time that otherwise are wasted driving back and forth to the dry cleaner's. And we're giving people that time to invest back in family and community, in terms of interaction and relationships. Most of these online businesses are designed to add back time for what you and I might consider the more important things in life."²⁷ These words can also be seen as a reflection of society's need to improve the productive management of time.

Although on the surface Japan's overall macroeconomic situation appears to be mirrored in a strong sense of stagnation in Tokyo at the present time, Tokyo's metabolism is dynamic. While old industries fade away, horizontal networks and new divisions of labor are forming in step with the emergence of the knowledge-based economy. When the process of backward-looking restructuring passes its peak, there is a strong likelihood

that new activities will rapidly come to the fore as the much-needed market infrastructure begins to develop.

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Masatoshi KURATANI is a counselor at NRI. He holds a PhD in economics, and his specialties include applied microeconomics.

Yukihiko ENDO is a research fellow at the Nomura School of Advanced Management. He specializes in the coordination of management education programs for corporate executives.

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Inquiries to: Corporate Communications Department
Nomura Research Institute, Ltd.
E-mail: nri-papers@nri.co.jp
FAX: +81-3-5255-9312