

# Location Patterns of Information Technology Services in Japan

Noboru Hayashi

## **Introduction**

Information technologies have drastically changed the way in which contemporary firms in advanced countries do business. Without the computer-oriented systems controlling many companies' organization with information technologies, firms can't work well. Information technology services, a kind of producer service, help firms to carry out their daily business smoothly. Close interdependence between information technology services and firms defines the spatial integration of these economic activities. As information technology services are heavily dependent on information infrastructures, it seems that they provide services from remote areas using telecommunication means. But, in fact, they tend to be located close to firms agglomerated in the downtown of a city. This chapter shows how information technology services have developed in recent years, and are spreading in Japan. The analysis explores recent trends from two different spatial scales: inter-urban and intra-urban.

## **Location Trends of Information Technology Services**

### *Change in the Number of Service Establishments*

With the diffusion of the Internet from the middle of the 1990s, information technology services using the Internet have greatly increased in Japan. Information technology services are one of the industrial sectors called information technology industries (IT industries). Information technology industries include not only hardware production industries such as computer fabrication but also service industries that develop software and sell them in the market. It is useful to illustrate how these industries have been distributed in the country for a short time because they have a possibility to change the business style of contemporary Japanese firms. However, there are several problems to overcome when investigating these industries using the nation's statistical survey data. Designated statistics gathered by the state have long time intervals and are not suitable for comprehending the changing patterns that have occurred relatively recently. Therefore, it is not unusual to use the telephone

directory data compiled by the affiliate company of NTT (Nippon Telegraph and Telephone Corporation) as a surrogate source. We can map the short-term changes in the location of information technology services by surveying these convenient data updated every half year.

In Japan, the Ministry of Land, Infrastructure and Transport (MLIT) has conducted surveys using the NTT's telephone directory data in order to chart the nation-scale trend of information technology services. According to the result of these surveys, three kinds of business type classified by the NTT's criteria: software-related services, data processing services and Internet-related services, can be grouped into an information technology industry. These are businesses providing various information services to consumers using information technology. It is noticeable that traditional service activities such as telephone services and telecommunication services are not included in this category. This is a burgeoning information service industry that has grown rapidly since the beginning of the diffusion of the Internet.

How has this service industry developed in recent years? To see this trend, we begin by looking at the change in the number of establishments every six months during the period from September 1999 to March 2002. The Internet-related services expanded especially quickly, increasing from 1,691 to 6,097 in one year since September 1999.

The growth continued further, and the number of establishments became 7,695 in the next year. Establishments newly added within six months amount to about 1,600. It is noticeable that the increase from September 1999 to March 2000 was so remarkable that the growth rate became 141.0 per cent. Compared to the Internet-related service, two other services: software-related service and data processing

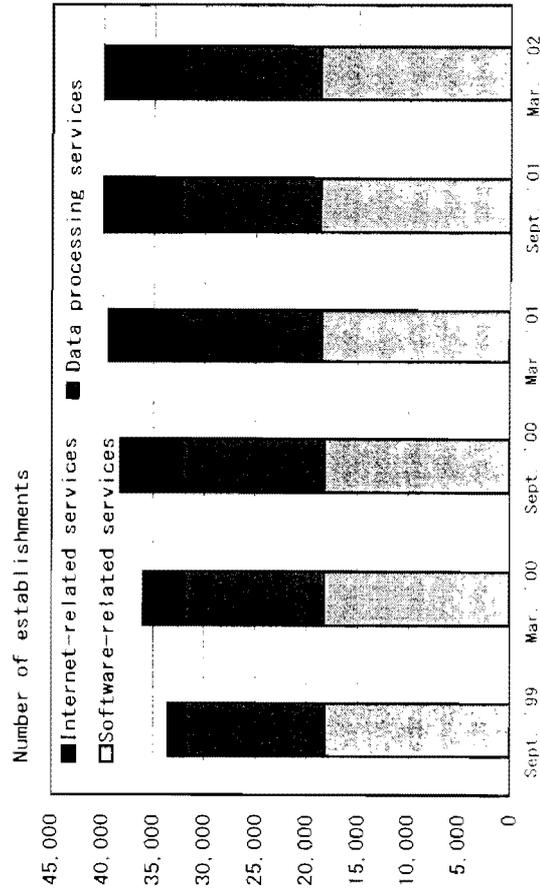


Figure 5.1 Trend in number of information technology establishments, Japan, 1999–2002

service showed relatively slow growth. There was no evident change in the number of establishments of software-related services over a two-year period. Only 424 establishments (from 18,141 to 18,565) were added in this period. In the case of data processing services, the number decreased from 13,637 to 13,506. In effect, the establishments of the information technology industry increased 20 per cent within two and a half years, but almost all the increase was attributed to the growth of Internet-related services. This change can be explained by the fact that the rapid advancement of innovation and diffusion related with the Internet media during this period in Japan inspired the development of the Internet-related services.

Thus, it can be said that the information technology industry has relied on Internet-related services for its expansion from the latter part of 1999 to early 2002. However, it should be noted that this trend was the result of the difference between absolute increase and decrease of the establishments. While there seems to be no change in the software-related service and the data processing service, the birth and death of establishments in fact happened. Accordingly, if we examine the patterns in the births and deaths of firms, we can clarify more clearly the trend of this service industry.

In the Internet-related services, which showed the largest relative increase, about 1,500 births were repeated every six months from September 1999 to March 2002. The number of births always outnumbered that of deaths, so the establishments continued to increase. However, the rate of birth began to decrease from September 2000, and the difference between the rate of birth and that of death diminished. This service sector seemingly continued to grow, but it should be recognized that the rate of death was about 15 per cent since March 2000. The rate of birth in the software-related services continued to outnumber that of death until September 2001, but the difference diminished within the next six months. The rate of birth was 15.9 per cent and that of death was 16.2 per cent in this period. Only this service sector increased in the rate of birth from March 2001. It is indicated from this that while the two other service sectors have gradually abated because of the nature of business, software-related services have still grown owing to the increasing demand for software development from firms.

The birth rate of data processing services began to decrease in March 2000, and continued to decrease afterwards. The rate of death outnumbered that of birth by March 2001, and the absolute number of establishments began to decrease from September 2000. It is very common that many firms enter and withdraw from the market in the information technology services. It is also common that firms change their businesses and develop new services. Some of firms dealing with data processing services switched from conventional or routine services to creative businesses; software-related services or Internet-related services, to pursue more profit. The trend of information technology services from September 1999 to March 2002 in Japan is characterized by the fact that while Internet-related services developed greatly in the early part of this period, software-related services expanded at the end of this period at the expense of the relative decline of data processing services.

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Services and Economic Development in the Asia-Pacific

Regional Location of Service Establishments and Trends in Opening and Closing

What is the regional distribution of information technology services in Japan? According to the calculation of the share of service establishments by prefecture, Tokyo has the largest share (30.5 per cent) and is followed by Osaka (9.4 per cent) (Table 5.1). Kanagawa (6.1 per cent), Aichi (5.1 per cent), Fukuoka (4.1 per cent) and Hokkaido (3.7 per cent) follow further in this order. This rank order is the same as that of regional share by each kind of business. The total share of these six prefectures amounts to almost 60 per cent in the software-related and data processing services, but the total share is below 50 per cent in the Internet-related services. This suggests that the establishments of the Internet-related services are more widely dispersed than the other two services. These spatial patterns were stable from September 1999 to March 2002. The share decreased by 0.7 points in Tokyo and by 0.6 points in Kanagawa, respectively, but there was no clear change in the other four prefectures.

It is, to a certain degree, predictable that the information technology industry will be distributed in accordance with the size of prefecture on the basis of population

Figure 5.2 Specialization coefficients for information technology services, Japan

Table 5.1 Number of establishments of information technology services by prefecture, Japan, March 2003

Prefecture	Software-related service	Data processing service	Internet-related service	Total	per cent
Tokyo	6,530	3,531	1,903	10,910	30.5
Osaka	1,712	1,239	590	3,349	9.4
Kanagawa	1,289	766	391	2,168	6.1
Aichi	888	769	373	1,824	5.1
Fukuoka	696	648	337	1,483	4.1
Hokkaido	572	591	322	1,329	3.7
Others	6,878	5,962	4,028	14,722	41.1
Total	18,565	13,506	7,944	35,785	100.0

Source: Dial Information Company of Nippon Telegraph and Telephone Corporation (2003)

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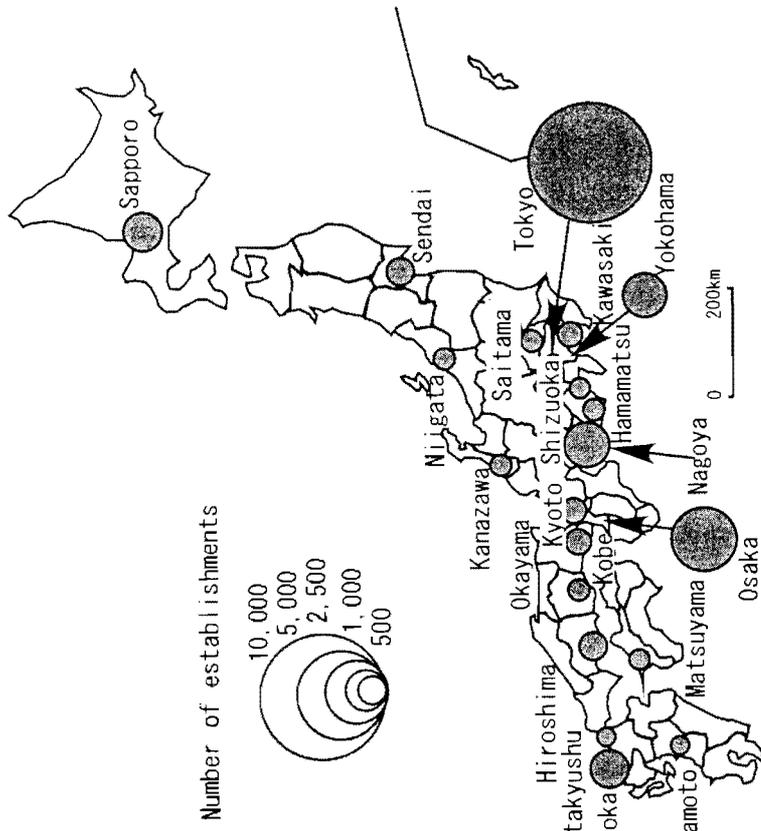
or share of other economic activities. The specialization coefficient, which is calculated by dividing the share of service establishment by that of population of each prefecture, can be used to confirm this prediction. Among the top group by population, only three prefectures: Tokyo (3.21), Osaka (1.35), and Fukuoka (1.05) have a specialization coefficient greater than 1.0. These are the regions that have more service establishments than expected. In the lower group, Ishikawa (1.21), Fukui (1.08) and Nagano (1.08) are the prefectures that have specialization coefficients of more than 1.0.

The calculation of the specialization coefficient by each kind of business shows first, that for the software-related services, Tokyo (3.07), Osaka (1.33), Nagano (1.07) and Kanagawa (1.04) are the prefectures with more establishments than expected. Tokyo (2.75), Osaka (1.32), Ishikawa (1.20), Toyama (1.19), Nagano (1.11), Fukui (1.08), Aichi (1.03) and Miyagi (1.03) have relatively more data processing service establishments. The specialization coefficient for Tokyo of this service is lower than that of the software-related services and, in contrast, other prefectures show higher specialization coefficients than those of software-related services. This trend is strengthened for Internet-related services, because this service is spread more widely throughout the country. Tokyo's specialization coefficient is 2.52, and nine prefectures: Ishikawa (1.89), Fukui (1.79), Nagano (1.41), Toyama (1.34), Okayama (1.25), Hiroshima (1.24), Osaka (1.07), Fukuoka (1.07) and Saga (1.04) have specialization coefficients above 1.0. Summing up, it can be concluded that the information technology industry is mainly distributed in the prefectures with large metropolitan areas and the prefectures located in the central north (Hokuriku) and Nagano.

While the locational pattern of information technology industry in March 2002 is described above, what is the temporal change in the birth and death rate of establishments? If the three kinds of business are considered, it is clear that the number of birth and death is nearly equal in every prefecture. In Tokyo, for example, 757 firms opened between September 2001 and March 2002 and 717 firms closed during the same period. In Osaka, 226 firms entered into the market and 215 firms withdrew from it during the same period. Consideration of the change in each kind of business at national level reveals that there are regional differences. The birth rate of software-related services is generally higher in western Japan than in the eastern part of the country. The rate of birth of the data processing is higher in Hokkaido, Aomori, Kinki and northern Shikoku, while Tohoku, Kinki and Kyushu show a higher birth rate for Internet-related services.

### Urban Hierarchy and Location of Information Technology Services

Tokyo has about 30 per cent of all the information technology service establishments, and the three largest metropolitan areas including Tokyo house more than 50 per cent of all firms. Fukuoka prefecture with Fukuoka as the largest city and Hokkaido prefecture with Sapporo also have a large share. From this, it is evident that information technology industries are mainly located in the metropolitan areas.



**Figure 5.3** Agglomeration of information technology services, by city, Japan, 2002

An analysis of the proportion of these industries in the country's prominent cities reveals that Tokyo (only 23 ward areas) has a share of 22.7 per cent of the national total, the government-designated cities (12 cities in total), 25.0 per cent and other cities, 52.3 per cent. Tokyo's share of data processing services is 24.5 per cent and the government-designated cities 29.4 per cent of this service. This means that data processing services tend to be agglomerated in the larger cities. The share of software-related services among a smaller hierarchy of cities is very similar to that of the Internet-related service.

It has already been mentioned that the growth in the number of establishments began to slow down in every service sector after September 1999. This trend was common to all cities except Tokyo where the number continued to expand from September 1999 to September 2000. The government-designated cities in particular experienced a slow down allowing lower class cities to gain increased information technology services. This means that there has been a relative spatial disperse of service activities to local areas lower down the urban hierarchy.

*To what extent does the spatial relocation of information technology services reflect this shift?*

Suitable data for explaining this directly is not to be found, but the result of the investigation conducted by MLIT provides some clues. It is the data that shows where and how often establishments have changed their addresses and how far they have moved. This shows that 1,079 establishments out of 31,769 relocated between September 1999 and March 2000. It means that 3.4 per cent of all establishments moved from one place to another, and this level of relocation was maintained every six months. Most of relocation (90 per cent) occurred within the same cities with movement within the same prefecture occupying 5 per cent. There was far less relocation from the metropolitan areas to lower class localities.

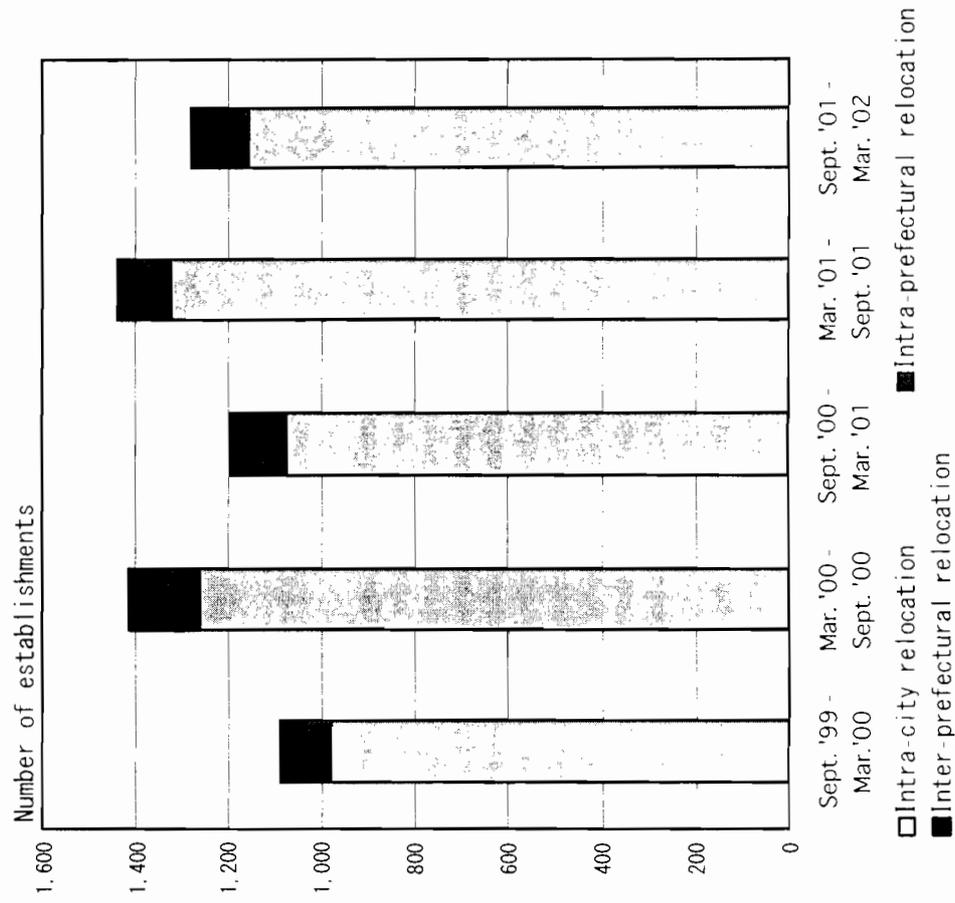


Figure 5.4 Regional relocation of establishments, Japan, 1999-2002

### Location of Information Technology Services within the Metropolitan Areas

#### *Location of Establishments in the Wards and around the Main Stations of Tokyo*

Tokyo has about 30 per cent of all information technology services in Japan, and they are mainly concentrated in three central wards (Chiyoda, Chuo and Minato) and neighboring wards (Shibuya and Shinjuku). More than 800 establishments are located in each of the wards mentioned above, and these wards occupy 59.9 per cent of this metropolis. Every ward, except Chuo, has nearly the same share of establishments (12-13 per cent). It means that there is no clear regional differentiation in the location. Minato, Chiyoda and Shibuya continued to increase the shares after September 1999. From this, we can say that there seems to be an agglomeration trend within these wards. Shinjuku decreased its share from 12.5 per cent to 12.0 per cent within two and half years. There is some difference between Chuo's position and that of other main wards in that it increased its share from 8.4 per cent to 9.0 per cent. In any event, it is certain that there is a discrepancy between these main wards and other peripheral wards regarding the location of establishments. About 20 per cent of information technology services in Japan are grouped within the CBD and sub-centers of Tokyo.

There is no clear differentiation in the constitution of information technology services amongst the leading five wards of Tokyo. Overall, software-related service comprises about 50 per cent, data processing service about 30 per cent, and the Internet-related services about 20 per cent. The share of the Internet-related service is more than 20 per cent in Minato and Shibuya, and the share of data processing is

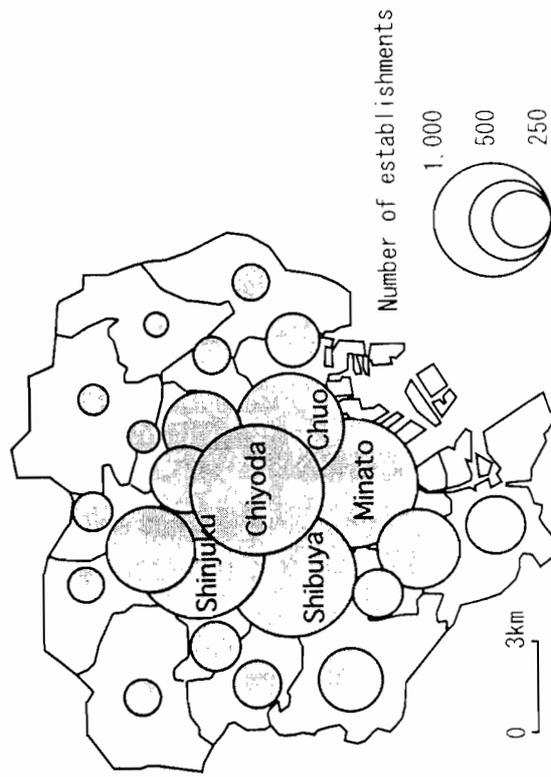
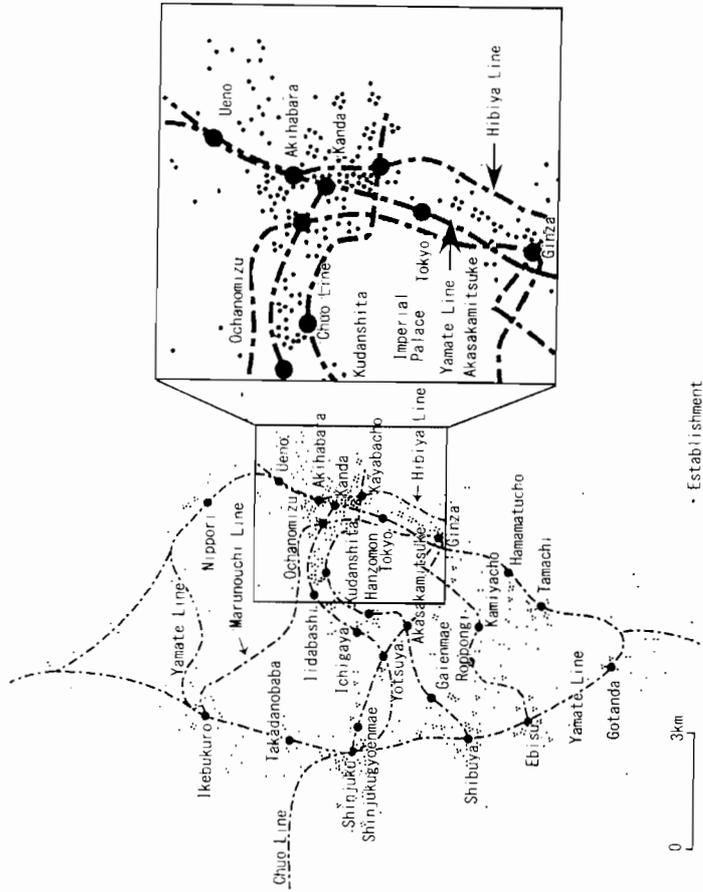


Figure 5.5 Location of information technology services in Tokyo, 2002





**Figure 5.8** Location of information technology services opened in the central area of Tokyo, September 2001–March 2002

Among them, Akihabara and its neighbouring stations, Kanda and Ochanomizu, are places that attracted numerous establishments. Newly located establishments are more often found in these places than in Shibuya and Akasaka, which are called Bit valley. In Tokyo, where the railroad density is comprehensively high, establishments increased not only near the main stations but also along the arterial railroads such as the Chuo-line, Yamanote-line, Hanzomon-line and Hibiya-line.

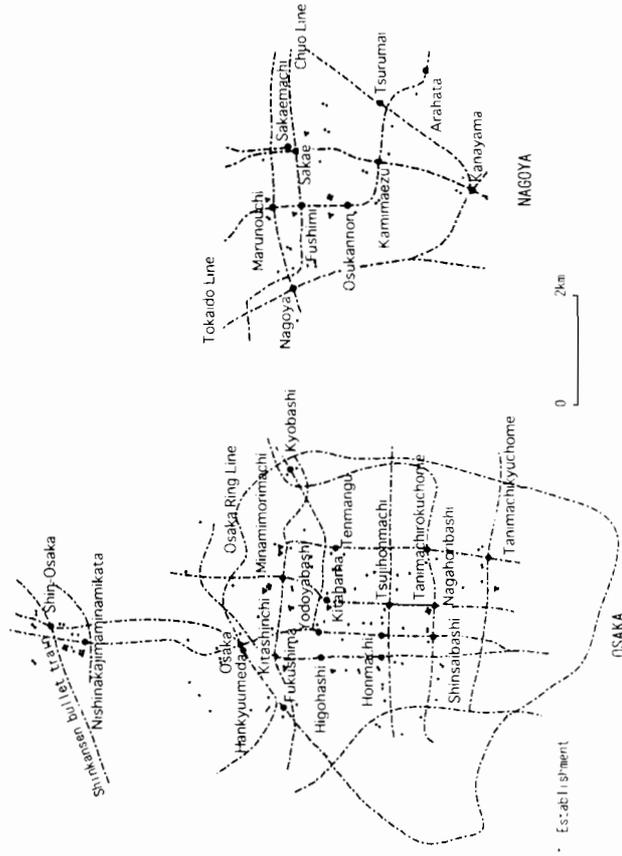
**Location of Establishments in the Wards and around the Main Stations of Osaka and Nagoya**

Osaka is the second largest prefecture for the location of information technology services, with the majority concentrated in the city of Osaka. It had 2,630 establishments in March 2002. There are four main wards with more than 370 establishments, they are Chuo (796), Kita (597), Yodogawa (389) and Nishi (375). They occupied 80.2 per cent of all ITS firms in the city of Osaka. In Chuo ward, the largest agglomeration, the share of software-related service was 51.4 per cent, and data processing 33.4 per cent. The share of the Internet-related services was relatively low. The composition of information technology services in Chuo was

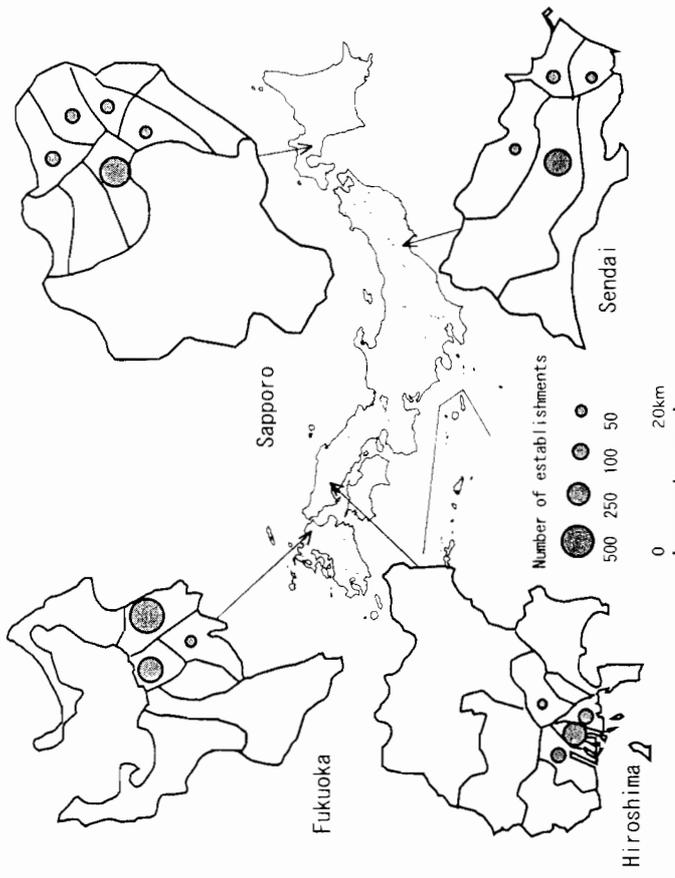
similar to that of Kita, the second largest agglomeration. The share of the Internet-related services was also low in Yodogawa. More than 60 per cent of establishments in this ward were involved with data processing.

In Osaka, like Tokyo, the data calculated for defining the locational agglomeration around the main stations are available. Shinsaibashi, Shin-Osaka, Minamimorimachi and Umeda are the main stations around which many establishments were located. Among them, Shinsaibashi was the largest place (420) followed by Shin-Osaka (370) and Minamimorimachi (360). Three main agglomerations could be found: Shinsaibashi, Minamimorimachi=Umeda and Shin-Osaka, but the density of establishments was lower than that in Tokyo.

Nagoya is the third largest agglomeration for the establishment of information technology services, but its size is only half that of Osaka. The number of establishments by ward is as follows: Naka (516), Nakamura (202) and Higashi (110). These central wards occupy 65.8 per cent of all ITS in the city of Nagoya. In Naka, the largest agglomeration, 50.5 per cent is software-related service, and 36.0 per cent is data processing service. Nakamura, the second largest agglomeration, has a similar structure to Naka. Like the central area of Osaka, the share of the Internet-related service is low. The locational density of Nagoya is also lower than Osaka, and there are only two instances where the number of establishments within 1 km radius from the main station is more than 100 (Figure 5.9).



**Figure 5.9** Location of information technology services newly opened in central areas of Osaka and Nagoya, September 2001–March 2002



**Figure 5.10** Location of information technology services in the regional core cities, Japan, March 2003

Okayama (284), Kanazawa (283), Niigata (259) and Hamamatsu (256), which are not government-designated cities. In Kobe, Chuo ward accounts for 56.6 per cent of the city total. Shimogyo ward in Kyoto, and Kawasaki ward in Kawasaki have smaller share than that of Chuo ward in Kobe, but the agglomeration sizes are larger than Kobe. This means that the locational pattern is more dispersed in Kyoto and Kawasaki than in Kobe. Kokura ward in Kita-Kyushu has 47.4 per cent and Naka ward in Chiba has 48.2 per cent respectively. In Kanazawa, Niigata and Hamamatsu, the main stations attract a lot of establishments. There are 100 establishments within a 1km radius from Niigata station, and 60 establishments exist in the same area of Hamamatsu station.

### Activities of Information Technology Services and their Changes

#### *Nature and Environment of Information Technology Services*

As indicated in the previous section, ITS are located in the metropolises centering on Tokyo and Osaka. They are mainly located around the central stations and the CBDs. What are the environmental conditions for ITS like? How are software-related services, data processing services and Internet-related services being provided? The

### Location of Establishments in the Lower Class Cities

#### *Where are the Establishments of Information Technology Services Located in the Lower Class Cities?*

Yokohama, which is the largest after Nagoya on the basis of number of establishments (1,143), is followed by Fukuoka (1,011), Sapporo (908), Sendai (520), and Hiroshima (509). This means that, with the exception of Yokohama, so-called wide area central cities: Sapporo, Sendai, Hiroshima, and Fukuoka have more than 500 establishments, respectively. This is not out of line with the urban hierarchical structure in so far as the functional structure of Sapporo and Fukuoka are roughly the same, and Sendai and Hiroshima are also the same in terms of the agglomeration of establishments. Summing up, the locational patterns of information technology services resemble the features of the urban hierarchical system depicted by the distribution patterns of wholesale institutions or headquarter offices.

Yokohama, Kannai, and Shin-Yokohama are the main stations in Yokohama and each has more than 100 establishments located within a 1km radius. Yokohama and Shin-Yokohama are 5km apart, so the agglomerations are regarded as distinct entities. Kannai, 2.7km southeast to Yokohama and the nearest station to the new civic center has attracted a lot of establishments because of its locational convenience. In Fukuoka, which is regarded as ranking higher rank amongst the wide-area central cities, two agglomerations are formed around Hakata and Tenjin, 410 and 190 establishments, respectively. The agglomeration size of 410 corresponds with that of Tocho-mae in Tokyo and Shinsaibashi in Osaka. This size can be regarded as large relative to the size of the local city itself. Hakata and Tenjin, which are 2km apart, are the focal points forming the bi-polar agglomeration pattern.

In Sapporo, which is ranked as higher level in the wide-area central cities as well as Fukuoka, many establishments are located around Sapporo station.

Sapporo Valley, a complex of information related businesses, has developed in the northern district of Sapporo station. More than 200 establishments are clustered within 1 km radius from the station. Most of them are formed in Chuo ward, and account for 50.7 per cent of ITS in the entire city. In Sendai, which is one of the other wide-area central cities, Sendai station in Aoba ward attracts 230 establishments within its 1 km radius. Aoba is the main district that has 360 establishments in total, accounting for 69.2 per cent of all the ITS in the city. Aoba in Sendai corresponds with Naka in Hiroshima, another wide-area central city. The share of Naka is only 44.8 per cent, and Hachobori, the main station in Naka, attracts 160 establishments within its 1km radius. Minami and Nishi are the wards that have about 90 establishments respectively in Hiroshima. Compared with Sendai, Hiroshima's locational pattern is relatively dispersed.

The cities below the wide-area central cities in terms of the establishment of information technology services are Kobe (419 establishments), Kyoto (397), and Kawasaki (389). Although Saitama (252), Kita-Kyushu (230) and Chiba (195) are government-designated cities, their ITS agglomerations are smaller than those of

management environment such as the scale of businesses, the content of activities and the Internet environment will be discussed here. The data are drawn from the results of the survey conducted by the MLIT. This survey was conducted targeting the 2,000 establishments listed in the NTT's yellow pages, and the response rate was 14.2 per cent.

As indicated in Figure 5.11, establishment with employees from 1 to 4 occupies 40.6 per cent of respondent establishments (271), and employees from 5 to 9, 24.7 per cent. More than two thirds of respondents are establishments with less than 19 employees. From this, it is clear that small-scale establishments are predominant. To supplement the labour force, more than 60 per cent of establishments hire part-time employees as staff, and about 70 per cent of them employ part-timers ranging from 1 to 4. As to the sales amount, the establishments selling less than 10 million yen occupy 19.7 per cent, followed by the next class: 10 to 50, 30.6 per cent, 50 to 100, 16.1 per cent, and 100 to 300, 11.9 per cent. Half of the establishments sell less than 50 million yen, while only 10 per cent of establishments can sell more than 1,000 million yen.

Services performed by these establishments consist of a wide variety of businesses, and 13 categories of activities were used to correspond with the establishments surveyed. The main activities undertaken by firms are the development of software (37.6 per cent), surrogate business (10.3 per cent), content creation business (8.4 per cent), the building of software infrastructure (8.0 per cent), and physical support (7.3 per cent). Of these, surrogate business is to create the home pages on the Internet, input data, and the management of system servers. The building of software

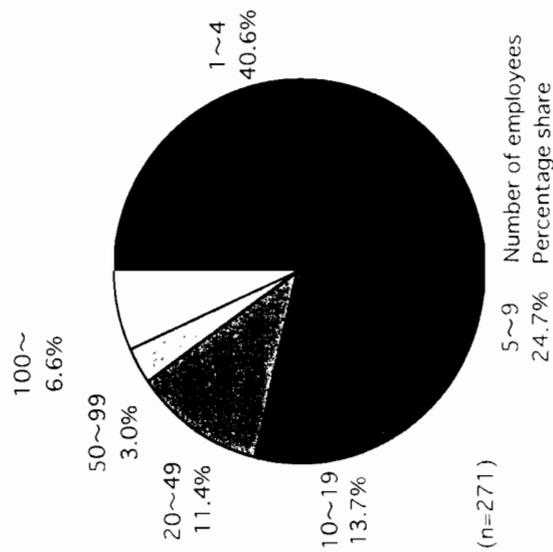


Figure 5.11 Size distribution of information technology service firms established April–September 2001, Japan

infrastructure is part of planning information systems and networks. Physical support includes consulting, manpower dispatching and educational training. Most of the establishments conduct several different activities, and the proportion of surrogate business is larger than that of software infrastructure.

As 79.1 per cent of respondent establishments are headquarters offices, it is clear that this kind of business is performed independently. Regional offices account for only 9.5 per cent, and branch offices, 8.8 per cent. Small scale and degree of independence of establishments is related with the narrowness of their activities. Most of these activities are carried out in the small rooms of office buildings. The establishments with office space below 50m<sup>2</sup> occupy about half, and 73.3 per cent of the establishments have office space below 70m<sup>2</sup>. Around 85 per cent of establishments use rental properties, and 40.5 per cent of them pay 10,000 yen as rental expense for unit area (3.3m<sup>2</sup>) and 31.1 per cent, 15,000 to 20,000 yen. Good accessibility to the Internet environment is very important for ITS. The most popular way for connecting with the Internet is ADSL (Asymmetric Digital Subscriber Line), which is used by 38.3 per cent of firms. ISDN (Integrated Services Digital Network) at 29.4 per cent is the next in the list followed by dial-up service (ISDN and analogue) (17.8 per cent) and business track (17.5 per cent). Business track and dial-up services have declined in popularity as access to the Internet by using CATV (9.3 per cent) and optical fibre (4.5 per cent) have become popular.

### Location Factors for Information Technology Services

As for other types of business establishment, the minimization of production costs and the maximization of sales volume are important factors to be considered when exploring the location of information technology services. To minimize production costs, some caution over labor cost, rental charges for floor space, procurement costs, and transportation and communications cost is needed. On the other hand, optimizing accessibility to clients, innovation in the services provided, and reasonable prices/fees are necessary to achieve an increase in the volume of sales. As the difference between the sales amount and the cost is profit, the greater the difference, the more successful the business.

In the survey conducted by the MLIT, 35 location factors were included. Respondents were asked to indicate for each factor whether it was a special consideration, a consideration, or not a consideration. Whether the factors were a special consideration or a consideration, are focused on here. It is possible to classify the 35 factors into seven groups: the availability of office space, the accessibility of transportation, the convenience of access to the activities, proximity to work place and residence, the quality of environment, the ease of acquiring human resources and technologies, and others. These can be regrouped into just two categories: the minimization of cost and the maximization of sales.

For ITS the factors associated with proximity are regarded as important; accessibility to their clients (80.9 per cent), accessibility to the nearest station

(77.6 per cent), accessibility by train (73.0 per cent), proximity to the residence of corporate managers (56.1 per cent), proximity of to the residence of employees (55.8 per cent), and accessibility to subcontract companies (55.2 per cent). The proximity to shareholders and headquarters gain 39.5 per cent and 35.9 per cent, respectively. Accessibility to highway (53.5 per cent) is lower than that of railroads, but is higher than airports. Commuting costs, travel expenses, and selling expenditure, which are measured by transportation and communication cost, are related with either the control of production cost or the expansion of sales volume. In any event, it is evident that accessibility and proximity are regarded as especially important for the location of ITS establishments.

The level of rent for leased space was regarded as the most essential condition, 93.3 per cent chose this item. Facilities and equipments are indispensable conditions, and adequate building (70.8 per cent), good environment for telecommunication (69.5 per cent), regional infrastructure for telecommunication (68.5 per cent) are included in this category. The familiarity of the city and region (62.9 per cent) and the regional image (58.5 per cent) are related with the reputation of location, and may contribute to the increase of sales amount with the credit and public image. The existence of many nearby client firms (53.0 per cent), the substantial provision of business assistance close to the office (40.0 per cent), and the affluent subcontract firms at a short distance (36.8 per cent) again indicate the importance of proximity. Summing up, it is clear that establishments place greater emphasis on not only facilities and equipment but also on the environmental conditions for their location.

### Locations of Subcontract Firms and Clients and the Extent of the ITS Labor Market

When information technology services are produced and supplied, proximity is very important at the stage of acquiring information as material as well as selling processed services. But, is it really possible for the firms to be located close to the clients and to their subcontracts? In the survey conducted by the MLIT, the addresses of subcontract or companies and clients were identified. It emerges that the share of subcontract companies in the same local municipality as their ITS partners is the largest (Figure 5.12), at 50.4 per cent, followed by the same prefecture (42.1 per cent), the ward area of Tokyo (40.3 per cent), and the city of Osaka (12.0 per cent). This suggests that firms purchase material input, information and the financial service that they require from the neighborhood.

Correspondingly, the main clients of firms tend to be found in the same municipality (52.6 per cent). The equivalent proportions for the same prefecture are 48.6 per cent, the ward area of Tokyo (41.9 per cent) and the city of Osaka (15.0 per cent). The pattern is almost the same as that for subcontract companies, and it means that interactions occur within a relatively compact area. This somewhat contradicts the image that ITS are exchanged widely, regardless of distance. The emphasis on proximity within a relatively small area helps to explain why information technology

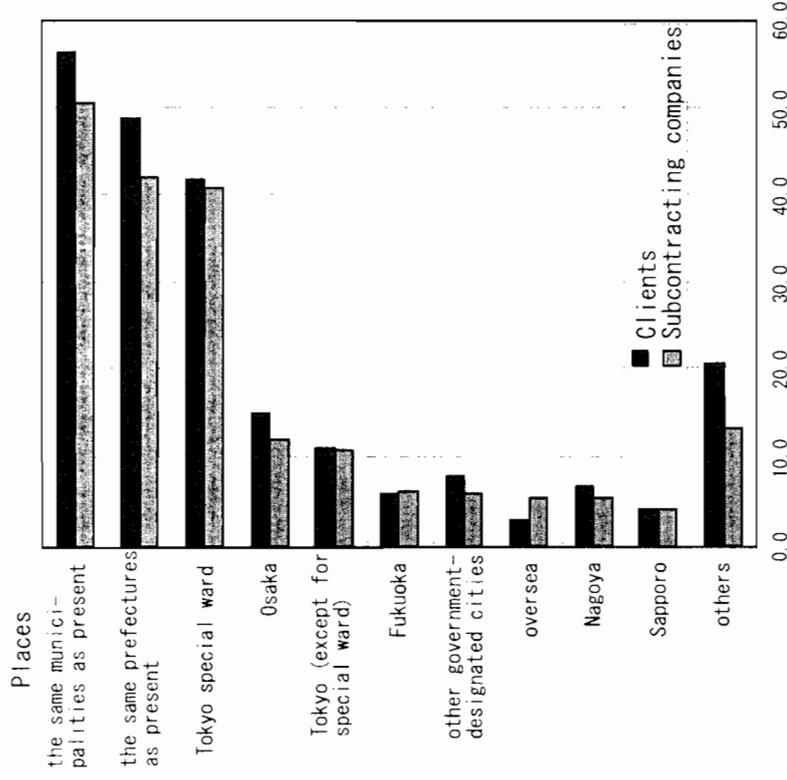


Figure 5.12 Location of subcontracting companies and clients

services tend to occur in agglomerations. While it is now not difficult to conquer time distance, good accessibility to the site of procurement and distribution is still important for location.

It is not only ITS but also other services that need high quality human resources as their indispensable condition of activities. However, as high quality staff are valuable, it is critical to keep a balance between cost and benefits. As to the question as to where staff were mainly recruited, most of the firms indicated that they are hired from within the local area. The main ways of recruitment are as follows: through a personal connection (39.5 per cent), from the employment agency (37.2 per cent), on Internet sites (32.9 per cent) and by recruitment articles in newspapers and magazines. It is interesting to know that the percentage of permanent hiring after part-time working and head hunting from shareholders alike are more than 13 per cent, respectively. The percentages of direct recruitment from the universities and job fairs sponsored by the municipalities are lower, suggesting that institutional ways of recruitment do not work well.

## Conclusion

This chapter shows that the spatial pattern of ITS is similar to that for the agglomeration of companies generally in Japan. This can be explained by the fact that ITS tend to be located close to the concentration of companies that are their main clients. Metropolitan areas such as Tokyo, Osaka and Nagoya have the most significant concentration of these services. Tokyo, especially the downtown area, has a very large share of these services relative to the country as a whole. The day-to-day business activities of the ITS firms located in the metropolitan areas can't be carried out without information technology services.

It is clear that accessibility and proximity are very important factors determining the location of ITS. Most metropolitan areas in Japan have public transportation systems such as railroads and subways, which are frequently used to reach clients or to achieve communications with customers. Office buildings near the main stations are regarded as good and convenient locations. There is potential for ITS to locate in suburban areas but, the dominant locations remain very much in the central areas of Japan's main city.

The rapid development of Internet-related services is another interesting finding in this study. The reduction in data processing services is matched by a shift towards Internet-related business. ITS oriented towards the use of the Internet are in great demand because of their contribution towards building new business styles. Two kinds of trade styles based on Internet use: business to business (B2B) and business to consumer (B2C) will develop on a large scale in the near future, and will change economic interaction styles as well as social and cultural relationships.

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