The Transformation of Regional Systems in an Information-oriented Society

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In this paper, the authors consider spatial problems pertaining to the transmission of information in the increasingly information-oriented society of contemporary Japan. The appearance of what is now referred to as the 'new media' resulted from the development of computer technology and the digitalization of communications contingent on the second institutional liberalization of telecommunications that took place in 1982. The authors examine a new local system in the share of the experiments involving the INS model carried out by NTT in the Musashino and Mitaka districts. The experiments made it clear that numerous problems had yet to be solved before this system could be fully implemented.

To begin with, CATV in Japan was intended merely as a countermeasure to cope with the difficulties met with in areas where airwave transmission reception, involving television, was poor; but, at present, it is in the process of becoming important in its own right, as one of the new media. With the increasing number of channels available to independent CATV programs, the latter have become an important means of communication between the administrative authorities and the inhabitants of the areas concerned. Moreover, CATV contributes to the formation of community organizations, providing various services for the use of the inhabitants, and thus plays a part in the improvement of living conditions in both rural and urban areas in the provinces, and also in suburban districts.

At one time, it was thought that the diffusion of the new information transmission media would bring about the decentralization of private enterprises but, in actual fact, the result has been the concentration of managerial functions in the Tokyo district, in particular in the three Inner City wards of Tokyo. This has to be due to the locational behavior of enterprises seeking ever more accessibility to the information necessary to management activities. The growing importance of Tokyo as a financial market on a global scale has also stimulated the location of enterprises backed by foreign capital in central Tokyo. In order to answer the ensuing demand for office space in central Tokyo, the construction of office buildings is very active and the business areas within Inner Tokyo are expanding, but there still exists a shortage of office space, a fact which constitutes one of the main reasons for the land price hike in central Tokyo.

The authors conclude that the information gap among regions is widening, along with the decrease in the relative importance of local cities, including Osaka and other metropolises due to the concentration of information in the Tokyo Metropolitan area. The transformation into an intensely information-oriented society is stimulated not only by private but also by governmental initiative in the development of information-related services and activities, such as the 'Teletopia Project' of the Ministry of Posts and Telecommunications and the 'New Media Community Project' of MITI. The realization of these governmental projects will probably bring about considerable changes in the situation of local communities and the lives of the local inhabitants. The authors remark that, in the light of this new perspective, geographical studies in Japan are far behind in comparison with studies in other fields of geography.

I. Introduction

Contemporary society has now come to be referred to as an information-oriented society.

This is indicative of the fact that, where society as a whole is concerned, the term 'information' has gradually acquired a depth of meaning that it did not, hitherto, possess. In this paper, the authors have undertaken an examination of the spatial

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function of the transmission of information from a geographical standpoint. It should be noted that, here, it is not their intention to pursue an inquiry into the theoretical framework of information geography¹⁾. Rather, in view of the rapid transformation of Japan into an information-oriented society which, along with the development of technology, has been responsible for the formation of a new information 'network' involving the diminishing of time and space and the restructuring of the spatial organization, and in view, also, or what sort of impact this transformation has had on regional systems, the authors have chosen to restrict themselves to an examination of the following points:

- 1) The evolution of 'new media' which was promoted by the liberalization of telecommunication circuits.
- 2) The diffusion of CATV and its impact on local communities.
- 3) The concentration of central administrative functions in Tokyo, instigating the transformation into an information-oriented society.
- 4) The estimation of regional disparities in an information-oriented society.

II. The Liberalization of Communication Circuits and the Evolution of New Media

Mass media methods of transmitting information, such as newspapers, magazines, radio and television, have long been familiar features on the social scene, as have certain types of personal communication media, including the telephone and the mails. 'New media', on the other hand, is a term referring generally to new methods of disseminating information, such as the computerized disposition of data, telecommunications, satellite transmission and so on, all of which evolved from a background consisting of the earlier automation of telephones, the diffusion of telephones and television in private homes and the extreme speed with which these developments occurred, in concomitance with the rapid economic growth of the 1960s. New media have, at present, permeated society not only at the industrial but also at the individual level.

To take things in order of occurrence, in the year 1972, with the introduction of the first phase of the liberalization of telecommunication circuits,

a public circuit was made available for general use, with the aid of the data processing system. The result was the mass utilization of information, characterized by speed of dissemination and regional diffusion. Specific examples of these developments were the establishment of the on-line system for the purchasing of train ticket reservations at the Japan National Railways (JNR, now the Japan Railways [JR], a privatized company) the 'green window' from 1964, or the mechanization of banks, incorporating CD (Cash Dispenser) (from 1969) and ATM (Automated Teller Machine) system (from 1971). In this way, the linking of computer systems with telecommunications circuits was a process that became an inseparable part of the daily life of the people.

In the year 1982, the second phase of the liberalization of the telecommunications circuits took place and, at the same time, the emergence of the digital system opened up a new field in communications. The subsequent regionalization of the information network accelerated the trend towards the centralization of administrative functions in Tokyo.

From September 1984 to March 1987, the Nippon Telegraph and Telephone Corporation (NTT) carried out an experiment involving a model INS (Information Network System) in the Mitaka and Musashino areas of metropolitan Tokyo.²⁾ New machines having digital communication capability and equipped with optical fiber cables making possible the high-speed transmission of visual patterns were installed in industrial enterprises, municipal offices and private homes. Mitaka, one of the subject areas of the experiments, is located about twenty kilometers west of central Tokyo and is a representative suburban residential area. It also contains a large number of offices of manufacturing industries. The Mitaka municipal office is located at the southern extremity of the city limits and is responsible for dealing with problems of administrative services for the inhabitants of the city. Hence it cooperated in the project with aim of the improvement of services by means of the new machines and tools introduced as part of the experiments. The Kichijoji area in the center of Musashino city, the second subject area of experimentation, forms an important suburban shopping center on the Chuo Line of the Japan Railways. The participants in the experiments

totaled some 2,000 citizens, with the information being processed through about 250 enterprises.

The above model system consisted of two separate networks, one of which was a 640 kb/s type of digital communications network and the other a regional communications network for the purpose of transmitting visual patterns. These were hooked at already existing communications networks with the purpose of experimentation in new types of services, such as digital telephones, visual communications (telephone calls and conferences conducted by means of television), facsimile communications, video-tech communications, data processing and so on.

The various ways in which the experiments were utilized are summarized under the following five headings:

- 1) Video images in various fields of communication. These included TV conferences among enterprises located in different areas, the provision of information pertaining to administration such as the live transmissions of the city council in session, the supervision of buildings and so on.

- 2) The increase of different types of information networks set up within a single enterprise, between different enterprises, and between enterprises and individuals, and also networks providing facilities for the mutual exchange of information between individuals. Moreover, there were networks for television conferences, the LAN (Local Area Network) system, facsimile systems and the CAPTAIN (Character and Pattern Telephone Access Information Network) system.

- 3) The creation of new forms of communication. Experiments in these new forms were carried out with the aid of TV telephones and the CAPTAIN system.

- 4) The execution of new service systems. These included experiments in computer shopping with the customer ordering goods from home, and in conducting office work at home with the aid of a computer linked to the office system.

- 5) The distribution of various types of media information. This consisted of experimentation with the various possibilities in and methods of distribution of information within an information-oriented society.

Further subjects for future research and experimentation selected on the basis of results obtained from the above experiments are summarized

by NTT as follows:

- 1) The development of information networks on a national scale. Experiments were carried out in limited local areas and little monitoring was done. It is, therefore, necessary to enlarge the scale of experimentation to one on a nationwide level, and thus raise the efficiency of the networks.

- 2) Widespread utilization. INS is capable of being utilized over a broad area, but it is necessary to develop methods of use in a variety of different fields.

- 3) Communications rules pertaining to the new media. Descriptions of and directions for the use of facsimile equipment, TV telephones, calls supplemented by the transmission of visual patterns (drawings or sketches) and other new machines need to be standardized.

- 4) The situation regarding the provision of information. Since systems such as CAPTAIN and VRS (Video Response System) and so on, depend on the interaction between the sender and the receiver of the communications, there is a need for a type of information provision different from the one-way system of communication that has hitherto prevailed.

- 5) New machines for domestic use. For the purposes of the experiment, machines having a large variety of functions were developed, but in order to disseminate such facilities for use among households in general, it is necessary to develop machines of a size suitable to the limited space available in the houses concerned.

- 6) Transformation to the pay system. Under the new systems, information that was generally been accessible free of charge to individual members of the public will now, in certain cases, have to be paid for. Hence it is necessary to endeavor to reduce the resistance on the part of the public towards having to pay for information.

- 7) The diffusion of new machines and equipment and of services. Conditions for success in the diffusing of new media machines and equipment are that the contents of the services offered be attractive to potential users and utilization costs low.

- 8) Other points for consideration. There is a need for careful consideration of the relationship that will inevitably emerge between the already existing laws and systems on the one hand and

the new types of services, problems involving royalty rights and the preservation of privacy on the other.

It will be clear from the above that a great deal of thought remains to be given to a number of things including, also, the methods adopted by national and local governments, NTT Corporation and other enterprises in order to deal with the new media, the costs involved and so on, all of which have yet to undergo some form of institutionalization. From the technological viewpoint, there are still problems to be resolved in order to adjust the transmission systems adopted in this experiment to the worldwide standard system. While the experimental model discussed above has proved to be potentially effective in bringing about positive changes at the individual, corporation and regional level, it has also become obvious that a considerable length of time, as well as enormous sums of money, will be required in order to bring about the expansion of the new type of services at the nationwide level.

III. The Diffusion of CATV and Its Impact on Local Communities

In Japan, as in the United States, CATV was at first initiated as a system to be utilized in local areas where television broadcasting reception via airwave transmission was poor. The system promoted an increase in the number of accessible channels in local areas and, from the point of view of information consumption, greatly contributed to the amelioration of local handicaps in the field of telecommunications. At the present time, however, when independent broadcasting, consisting of the CATV system as well as two-way communication systems, is the subject of various forms of experimentation, the role of CATV no longer consists merely of the correction of regional disparities from the point of view of information provision/consumption; rather, it is now regarded with great expectations as a vehicle for the integration of the local communities and the advancement of local areas. In the present section, after we have outlined the process of the diffusion of CATV in Japan, we will next turn our attention to the facilities out of which CATV operates, producing original programs, and introduce some examples of its effects on local communities. Moreover, we

should like to present a conspectus of the role of CATV in its capacity of one of the new media and its future prospects.³⁾

1. The process of the diffusion of CATV in Japan

A CATV center, in the capacity of common receiving facility in an area where TV reception was weak, was first established in the mountainous districts of Gunma Prefecture in 1955, just two years after television was inaugurated in Japan for the first time. Subsequently, during the period 1960–1968, NHK (Nihon Hoso Kyokai) subsidized the installation of CATV in remote area as a countermeasure to deal with difficulties in broadcasting reception in those areas, thus defining the early role of CATV. In particular, the holding of the Olympics in Tokyo in 1964 served as a springboard for further efforts towards the increase of CATV facilities which, consequently, expanded in parallel with the diffusion of television. However, unlike the United States where, CATV constituted a profit-making enterprise and developed as a new industry, early CATV in Japan operated for the most part as a non-profit system set up by the organizations of CATV users (Kyodo Jushin Kumiai). Around 1965, with the intensive efforts on the part of the associations to make the most efficient use of CATV and its potentially large multi-channel capacity, cable broadcasting utilizing channels accessible at that time, got properly under way. However, CATV systems producing programs of local origin were small in scale and very few of them remain in existence today.

The 1970s ushered in the transformation on a large scale of the CATV system. Private enterprises now stepped in and, at the same time, the setting up of CATV facilities as countermeasures to combat the obstruction of airwaves caused by high-rise buildings rapidly increased. At this juncture, in order to regularize CATV enterprises from the institutional point of view, the government established the Act for CATV (Yusen Terebizon Hosoho) in 1973. According to this law, it became mandatory for CATV centers having over 500 terminals to apply for a license from the Ministry of Posts and Telecommunications, while others having from 51–500 terminals were obliged to notify the Ministry of this fact; at the

same time, commercial use of two-way communications was virtually banned, resulting in a setback to independent, multi-purpose CATV operations.

In spite of this, however, since the enactment of the above law, CATV centers have continued to increase by approximately 10 per cent each year, as a corollary to the increasing numbers of high-rise buildings and the increase of cable broadcasting stations. Consequently, by 1985, CATV centers numbered 40,403, and participating households numbered some 4,580,000, corresponding to 14.5 per cent of subscribers to NHK. A breakdown of these totals reveals that licensed CATV centers, that is, those having over 501 terminals, comprised as few as 1.3 per cent and that, therefore, the greater number of the centers consisted of comparatively small-scale common receiving facilities having less than 500 terminals. It should also be noted that while licensed CATV centers numbered no more than ninety-eight in 1985, this was still five times the number existing in 1975 (Fig. 1).

The changing distribution of licensed independent broadcasting facilities is shown in Figure 1. In 1975, only twenty facilities for independent or community broadcasting existed; moreover, it will be seen that these were chiefly limited to the areas adjacent to metropolitan areas, where it was possible to rely on the increased number of channels made accessible due to the inauguration of CATV

in those areas. However, it should also be noted that, in local areas such as Ikeda-cho in Hokkaido, the municipal governments operated CATV facilities having for their prime purpose the promotion of agricultural villages; or private developers furnished CATV facilities in housing estates in the cities of Tokorozawa and Chiba, which were located on the outskirts of the Tokyo metropolitan area. In Tokyo itself, innovative CATV facilities, such as English language cable television, were to be found in hotels and luxury apartments. The point being made here is that all of these developments took place during the first half of the 1970s.

By the year 1980, the number of existing broadcasting stations had just about doubled, with new facilities concentrated around already-existing stations in the three prefectures of Nagano, Yamanashi and Shizuoka. With the coming of the new decade of the 80s, governmental measures designed to cope with the new media went into operation; and in 1983, the revision of the law relating to the promotion of two-way communications based on the CATV system was undertaken by the Ministry of Posts and Telecommunications. Thus it will be seen that there was an increase of facilities operating under the direction of the administrative authorities. Along with all this, new stations were to be found in places such as the Tohoku, Chugoku, or Shikoku Districts, where there had previously been almost no broadcasting stations utilizing the CATV system. One

Figure 1. Distribution of CATV stations which transmit locally originated programs

Source: Ministry of Posts and Telecommunications. (List of CATV stations)

example was the MPIS (Multi-purpose Information System) facility established by the Ministry of Agriculture, Forestry and Fisheries as a measure for the advancement of agricultural areas. Besides this, in 1981, under a set of new laws governing electric generation, certain areas such as Ohi-cho and Takahama-cho in Fukui Prefecture, where nuclear power stations were constructed, received grants-in-aid for the purpose of installing CATV. A further example is Tsukuba Scientific City in Ibaraki Prefecture, which is conducting research into the multi-purpose utilization of CATV.

Typical types of future plans for the construction of CATV stations after 1986 involve 'Teletopia regions'⁴⁾ where formerly very few stations were to be found, and Tokyo and its environs, where the construction of large-scale, multi-channel 'urban-type' CATV stations are envisaged. Changes of this sort in distribution trends reflect the transformation of the function of CATV, which hitherto was of an incidental or supplementary nature, into a new, urban-type medium, with emphasis on a multi-channel, two-way communication system.

Comparing these characteristics of CATV in Japan with their counterparts in the United States, the difference between the two countries becomes apparent as follows: 1) As indicated by the lower rate of CATV subscriptions, diffusion of CATV in Japan is at an earlier stage of development compared with that of the United States, where CATV subscriber comprise over 40 per cent of the total number of households. 2) Industries associated with CATV, such as program suppliers or multiple-system operators, are not fully developed in Japan; most of them remain on a non-profit basis. As a result, the CATV system in Japan is smaller in scale and poorer in services than in the United States. 3) The major part of the development of CATV in Japan has been promoted by public sectors, such as NHK or the Ministry of Posts and Telecommunications, whereas private enterprises have played an important role in developing CATV in the United States. All these aspects may be due to the highly developed broadcasting networks and to the dilatoriness of governmental policies in Japan, with regard to the new systems (INOUE and TAKI, 1984) that will be touched upon in the last part of this chapter.

2. The impact of CATV on local communities

The programs comparing CATV independent broadcasting and the impact the latter has had on local communities may be said to differ according to the character of the region in which the CATV broadcasting station is located. Accordingly, we have divided the transmission receiving areas for CATV centers into the following four types, with reference to the classification by YANAI (1975); with the aid of this material, we will present some concrete descriptions of the differences in the character and functions of CATV as found, respectively, in each of the different categories of receiving stations.

1) **Local cities** Most of the independent CATV stations in local cities, which comprise about half the total number of existing independent CATV stations, are actually facilities whose role is to supplement conventional centers in measures to assist areas which have difficulty in receiving airwave transmissions. On the occasion of the installing of a new CATV center, local VIPs, electrical appliance shops and other volunteers play important parts. In most cases, the form of management of the broadcasting centers involved generally consisted of profit-making corporations, except for those managed by cooperative organizations, such as in the cases found in the cities of Karatsu and Imari in Saga Prefecture. The scale of management greatly varied, ranging from CATV centers having little more than 500 terminals to large-scale enterprises such as that in Kofu city Yamanashi Prefecture, where the number of terminals is some 50,000, making this the largest in the country.

CATV programs consist of local news, live broadcasts of community events and other matters closely related to the community. Moreover, the relaying of information issuing from the municipal offices and the live broadcasting of the local assembly in session or election activities serve as a pipeline bringing the municipal government and the citizens closer together. Furthermore, the rapid transmission of information of which CATV is capable is made the most of; hence, at times of possible or actual emergencies involving fire or other sudden disasters, CATV is able to contribute towards the preven-

tion or amelioration of those disasters by providing reports on the situation. At the time of the earthquake off the coast of Izu Peninsula in 1978, CATV broadcasts were extremely useful in keeping the inhabitants of Higashiizu-cho (Shizuoka Prefecture) informed by means of day and night broadcasts, thus enabling them to do their part in the recovery activities. Again, in Karatsu city, Saga Prefecture, while on normal days considerably less attention is paid to CATV broadcasts in comparison to the high audience rating for ordinary broadcasts, it is reported that the audience rating for CATV is extremely high at times of emergency reports having to do with fire.

CATV broadcasting in local cities is also important in connection with the conception of integrated residence areas formed under the Third National Comprehensive Development Plan in 1978. Ways and means were considered for the improvement of conditions in integrated residences, apropos of which, attention was focused on CATV as a desirable communications medium for the purpose of resuscitating regional activities (Radio Regulatory Bureau, 1981).

2) **Rural areas.** Since 1977, when many of the CATV centers located in rural areas formed part of the 'Model for a Comprehensive and Consolidated Agricultural Village Enterprise' project subsidized by the Ministry of Agriculture, Forestry and Fisheries, these same CATV centers have been designated MPIS centers, a specific feature of which was that they had for their chief purpose the promotion of farming areas. As well, they were capable of performing a variety of other functions, including 1) the resolving of problems in areas having difficulties in airwave transmission reception and the increasing of accessible channels, 2) the furnishing of information on production and daily life activities by means of CATV broadcasting and 3) automation of productive enterprises of a hook-up to a computer system.

The MPIS was established not simple as an information medium, but as one kind of infrastructure necessary to the consolidation of the bases of rural areas. Accordingly, the supervision of MPIS centers is carried out by the regional municipal office of the area involved. The costs of establishing a CATV center in a rural area are very high in comparison with metropolitan areas, and the securing of an independent source of

revenue, on a private basis for example, is difficult; hence the establishment of CATV in rural areas, is, for the most part, subsidized from municipal or national government sources. Here, as in local cities, CATV programs consist of local news, besides which there are instruction and advice programs relating to agricultural matters, and information on markets for agricultural products. In this way, broadcasting stations are able to shoulder some of the responsibilities accruing from the promotion of production activities in farming areas, and the training of young farmers.

3) **Housing estates and new towns.** A number of housing developers have installed supplementary facilities consisting of common receiving systems for independent broadcasting or CATV in newly built housing estates and condominiums. The circumstances leading up to the commencement of independent broadcasting differ according to area; for example, in the case of Rakusei New Town in Kyoto, the financing was provided by the municipal government and a regional newspaper company, while in Chiba Garden Town (Chiba Prefecture), CATV facilities were provided by volunteer supporters among the inhabitants. A number of these broadcasting facilities carried programs produced also on a volunteer basis by some of the residents. By thus furnishing local information in areas where inhabitants of newly established residential estates tend to suffer from a lack of links with the already established community and a lack of opportunities of communication with the latter, CATV serves to stimulate the interest of the newcomers in local affairs, and assists in the formation of a community composed of both the established and the newly arrived residents.

4) **Metropolitan areas.** In metropolitan areas, some of the CATV systems comprised measures to cope with the obstruction of airwaves caused by high-rise buildings. However, most of them consist of 'urban-type CATV' systems that are being installed in accordance with a program that has been in force since 1986. Urban-type CATV, as stipulated by the Ministry of Posts and Telecommunications, is a large-scale, multi-functional system incorporating over 10,000 terminals, more than five CATV broadcasting channels and a two-way communication capability. Current projects involve the laying of cables alongside railway

routes by big private railway companies and, in another case, the utilization by commercial organizations of already existing facilities, the original purpose of which was to counteract airwave obstruction. It should here be pointed out that the reason very few CATV services started operating before 1986 was the difficulty of obtaining concessions from the authorities for road space for the laying of cables and the utilization of telegraph poles erected by electric companies for their own use. Without these concessions, new cables required for CATV purposes could not be installed. The question, forthwith, is the influence of urban-type CATV on local areas. If the problem is viewed from the angle of programs scheduled for production or of organizations in charge of operations, the prognostication is that a form very close to that of the pay-television system found in the United States of America will very likely emerge, in order that a type of program conforming to the multifarious information demands on the part of the inhabitants of the metropolitan areas may be provided.

3. CATV's role and problems in its capacity of new media

What is called 'new media' is roughly divided into three classes, i.e., the wireless system, the cable system and the 'package' system. Among the cable system types of new media, CATV has to a large transmission capacity and is potentially capable of two-way communications; along with INS, it is an important infrastructure in areas where the transformation to an information-oriented society is rapidly taking place. Because of this, where the 'Teletopia Project' of the Ministry of Posts and Telecommunications is concerned, almost all the areas designated as participants are, in one form or another, incorporating CATV into their plans. The Teletopia Project is a vital link in the chain of governmental policies regarding the new media. CATV projects of this kind are scheduled to have a variety of uses such as two-way communications or the furnishing of visual information. The Ministry of Posts and Telecommunications has already carried out experiments with the purpose of concretizing the projects in Tama New Town in Tokyo, where they have installed the CCIS (Coaxial Cable Information System) while the Ministry of Inter-

national Trade and Industry has set up the Hi-OVIS (Highly Interactive Optical Visual Information System) in Higashiikoma, Nara Prefecture; the latter experiment has already been reported on by DUTTON, *et al.* (1987).

However, in the case of the operation of CATV broadcasting on a purely private basis, the following needs to be taken into consideration: 1) Law-related problems of the two-way communication system, according to cable TV law (however, at the time of the 1983 revision of the law, the above regulation was modified); 2) the retardation of policies regarding matters of finance, safeguards in taxation and training in the use of new techniques; and 3) the question of costs. Since this particular problem yet remains to be solved (MAENO and KANEKO, 1982, Institute of Journalism, University of Tokyo, 1981), if CATV is to undergo diffusion in its capacity of one of the new media, we are confronted with the fact that it is urban-type CATV, depending on big capital or associated with large-scale projects under governmental aegis, that will have an important role to play.

IV. The Concentration of Central Administrative Functions Accompanying the Development of the Transformation to an Information-oriented Society

1. Office locations and the demand for information in Inner Tokyo

Where the location of enterprises is concerned, the rapid growth of information diffusion techniques has reduced the resistance to long distances from the center, and it was thought that this would constitute a control factor over the concentration of enterprises in large cities. On the contrary, however, in recent years in Tokyo proper, particularly within the three wards (Chiyoda, Chuô, Minato) of Inner Tokyo, the increase in the locating of new offices has reached a high pitch of intensity. In 1969, 56.5 per cent of the head offices of enterprises listed on the Major Market of the Stock Exchange were located in Tokyo, while 20.3 per cent were located in Osaka; but, by 1981, the percentage of head offices located in Tokyo had risen to 62.3 per cent and, in Osaka, had decreased to 13.5 per cent. Moreover, in 1981, the Estab-

lishment Census of Japan showed that the share of offices located in Tokyo out of the total number of offices was 23.1 per cent; but if we consider the ratios from the point of view of the size of capital, we find that the larger the scale of the enterprises, the more likely it would be located in Tokyo. Hence 56.8 per cent of enterprises with a capital of over five billion yen were located in Tokyo, while for enterprises having a capital of between 100 million–5 billion and 100 million–1 billion, the shares were 52.6 per cent and 38.2 per cent, respectively.

According to the survey carried out by the National Land Agency (1984), each enterprise locating its headquarters in Tokyo cited the following advantages to be derived from doing so, as follows: Convenience in transactions involving stocking and marketing (42.4 per cent); convenience in maintaining contact with administrative agencies (19.9 per cent); convenience in financial transactions (7.3 per cent); convenience as a command post from which to oversee branch offices and factories belonging to the company concerned (6.6 per cent); improvement of the company image (5.3 per cent) and so on. Furthermore, a list of multiple choice questions pertaining to the functions of and roles played by head offices in Tokyo was issued to a certain number of companies, with the following results: Fund-raising and financial investments (56.3 per cent); overseeing of branch offices and factories (45.0 per cent); transactions dealing with the stocking and marketing of goods (41.7 per cent); the gathering of information from business organizations (36.4 per cent); the gathering of information from administrative agencies (31.8 per cent) and so on. In this way, in spite of the rapid growth of information gathering and information diffusion techniques that might seem to preclude difficulties caused by non-centralization, distance from the center and so on, a concentration of offices in Tokyo continues to take place. Lurking behind all this is a behavioral mode whereby companies locate in Tokyo in order to seek information in aid of management and, especially, information obtained by means of face-to-face contact. Consequently, according to the National Land Agency, in 1980, the share of trip generation and attraction of commodities in Tokyo was no more than 17.9 per cent of the national total which counted as 200 per

cent, while the share of trip generation and attraction of telecommunications was 57.0 per cent and the movement of persons 53.4 per cent.

2. Increase of foreign enterprises located in Tokyo

In addition to seeing to the developments in the rapid transformation into an information-oriented society, Tokyo is also in the process of overseeing the consolidation of its function as an international finance market. Due to this fact, an increasing number of foreign enterprises are at present busily locating their offices in Tokyo. According to Ministry of Finance sources, in 1974, foreign establishments that opened new offices located in Tokyo numbered 279 (of which 150 were non-manufacturing companies) and, in 1975, the number of newly-opened offices was 254 (of which 192 were non-manufacturing companies); subsequently, the numbers increased year by year until, in 1982, the number reached 412 (292). In

Figure 2. Distribution of foreign main financial institutions (1984)

Source: List of foreign enterprises in Japan

1983, 548 (408) new offices were established and, in 1984, the number was 490 (340). The greater number of these enterprises had offices located in Inner Tokyo (Fig. 2). In 1984, of the 2,256 foreign companies in Japan, 1,406 (62.3 per cent) were located in Inner Tokyo, and 497 (22 per cent) were located in other areas of Tokyo proper (the twenty-three wards of Tokyo); while 353 (15.6 per cent) were located in areas other than Tokyo. Thus it is clear that an overwhelmingly large concentration of foreign establishments was to be found in Tokyo. Moreover, the locating of foreign financial organizations in the center of Tokyo is particularly marked (Fig. 3). In comparison with London or New York, as an international market of finance, Tokyo lags behind in the variety of markets and the openness of the market, and is also deficient in manpower skilled in interna-

tional finance affairs. However, in other aspects such as political stability, the scale of the market or the development of the information network, Japan is on a par with both London and New York. Accordingly, along with the rapid transformation into an information-oriented society, the current movement towards the internationalization of Tokyo businesses, for which this transformation is a prerequisite, will further intensify the concentration of offices in Tokyo.

3. Changes in the supply market of office buildings in Tokyo

In spite of the demand for office space, new office building in Tokyo increased very little during 1974–83, though after 1984, a slight increase was observable. More recently, however, within the period of a single year, offices occupying some 90–100 ha of floor space have been built in the three central wards of Tokyo (Chuo, Chiyoda and Minato wards). The accumulation of offices in 1986 in the six central wards (the three mentioned above plus Shinjuku, Bunkyo and Taito wards) is shown in Figure 4. The general tendencies in increase of offices during 1981–86 is indicated in Figure 5. During this period, in the three central wards, the floor space of office buildings, including banks, increased by 321 ha. A remarkable increase in the number of office buildings is to be found particularly in Marunouchi (Chiyoda ward), long known as a business district, in Kasumigaseki where government offices are

Figure 3. Distribution of foreign financial institutions in the six central wards of Tokyo

Note: No. of enterprises, even in cases where more than one agency is the representative of more than one company
bank/branch/liaison office
security co./branch/liaison office
insurance/life insurance/indemnity

Source: Annals of the International Finance Bureau, Ministry of Finance, 1985; Financial Affairs; Annals of Insurance, 1985

Figure 4. Distribution of office acreage in the six central wards (January, 1986)

Source: City Planning Bureau, Tokyo Metropolitan Government

Figure 5. Changes in office acreage in the six central wards (1981–86)

mainly located, and the newly expanded areas in the vicinity of these two areas. In addition to these central areas, the secondary urban center of Shinjuku has also seen notable increases.

However, as stated previously, the demand for offices continues to outstrip the supply. The strong demand for office space in Tokyo results from the fact that information-oriented domestic enterprises aim at locating in Tokyo, the fact that foreign enterprises with a perspective on the internationalization of financial activities aim at locating in central Tokyo; and the fact that an increase is taking place of the floor space per company employee in an automated office environment, contingent on the transformation to an information-oriented society.

To enlarge a little on the latter point, in 1975, the per capita effective floor space of an office was 11.3 m², but by 1985, this had increased to 13.5 m². As a result of this increase in demand, the percentage of available rooms in office buildings, which was at its peak at 2.1 per cent in 1976, by 1984 decreased to 0.4 per cent and is currently continuing to decline. At the same time, office rental fees are rising sharply; in 1985, the average rent for a newly constructed building in Marunouchi, the most expensive district, was 10,500 yen/m² a month and in other parts of central Tokyo, it was 6,000–7,000 yen/m² a month; however, with the steep increase in rental fees since 1980, there are some districts that have gone up by more than 25 per cent in a single year.

A certain number of reports, estimating future

demands for office space in Tokyo, are available. According to the National Land Agency (1980), it is hypothesized that the desirable dimensions for a per capita effective floor space will have increased to 17 m² by the year 2000. Hence, in Tokyo proper, that is, the area comprising the twenty-three wards of Tokyo, it is predicted that new demands over the period 1981–2000 will reach some 5,000 ha. In 1985, the Mitsui Real Estate Company (Mitsui Fudosan), a private developing company, estimated the following: Future demands for effective floor space per capita are calculated at 20 m²; hence, during the period 1986–2000, there will be a demand for a total of some 3,876 ha of floor space in Tokyo's three central wards alone. If the available supply of office space during this period adds up to the estimated 2,741 ha, it is evident that a shortage to the amount of 1,135 ha must occur.

In the midst of the transformation to an information-oriented and internationalized society, CBD expansion is thus currently taking place. Moreover, the urban structure of Tokyo is a strengthening factor in the concentration of central managerial functions in the Inner City.

V. Regional Disparities in the Diffusion of Information

In this section, an outline of regional disparities in the diffusion of information is to be presented, on the basis of a large variety of indexes and reference works pertaining to information.⁵⁾ In order to make this presentation, we shall first consider regional comparisons of the number of telephones, telex facilities and computers according to region, compared to the numbers for the country as a whole (Table 1).

The first point to be made is that, while in a number of regions, including those containing large cities such as Metropolitan Tokyo and Osaka Prefecture, the percentage of telephones is declining, the percentage for telexes and computers are on the rise. In the year 1960, in general, the diffusion of telephones in offices was on the increase, but was much less so in the case of private homes. The high percentage of diffusion in Metropolitan Tokyo and Osaka Prefecture was due to the fact that the city functions of both cities, that is, the high degree of accumulation of

Table 1. Distribution of telephones, telexes, computers and population (in per cent)

	(A) Telephones (1984)	(B) Telexes (1984)	(C) Computers (1982)	(D) Population (1985)
Hokkaido	4.9	3.0	3.5	4.7
Tohoku	7.0	3.6	4.5	8.0
Kanto	33.4	46.1	43.7	31.1
(Metropolitan Tokyo)	(14.0)	(36.4)	(33.3)	(9.8)
Shin'etsu	3.5	2.4	2.3	3.8
Hokuriku	2.3	1.9	2.2	2.6
Tokai	10.6	9.4	9.7	11.4
Kinki	17.4	21.5	20.3	16.6
(Osaka Prefecture)	(9.4)	(—)	(14.9)	(7.2)
Chugoku	6.2	4.4	4.6	6.4
Shikoku	3.4	1.5	2.2	3.5
Kyushu	11.3	6.2	7.0	11.9

Sources: A & B: NTT C: Nihon Almanac, Kyoiku-sha D: Population Census, 1985

Notes: The Kanto District includes Yamanashi Prefecture.

The Shin'etsu District consist of Nagano and Niigata Prefectures

The Tokai District consists of Aichi, Gifu, Mie, and Shizuoka Prefectures.

offices and, hence, the need for more telephones, and the diffusion of telephones among households as well, took place more rapidly than in other areas. However, telephones gradually came into general use among households in all parts of the country, and the rate of diffusion no longer always clearly indicated the relationship between city functions and the rise in the number of telephones. This fact is illustrated by the decline in the number of telephones in both the above-mentioned cities, in 1984.

Telexes and computers are generally utilized in offices as compared to the telephone which now serves the home as much as the office. While it is true that the increasing use of personal computers in the home as opposed to the office has recently been the subject of a great deal of discussion, an overall survey indicates that the number in general use is still limited. The above-noted indexes for telexes and computers, respectively, indicate that these two systems are basically retained for the purpose of serving business functions; thus they are characterized by the fact that the percentages for their utilization in Metropolitan Tokyo and Osaka Prefecture are, in direct contrast to the telephone, considerably high. Moreover, most important of all is the fact that while the rates of both indexes for Metropolitan Tokyo are on the rise, the index rates for the Kinki District, which includes Osaka Prefecture,

indicate a decline. The fact that, for a variety of reasons, the index rates for Osaka Prefecture, which contains the second most important city in Japan, are declining, serves to emphasize the growing concentration, and that at an increasingly rapid pace, of city functions and information functions in Tokyo.

Next, let us take a look at the mass media. The tendency of information activities to concentrate in large cities, starting first of all with Tokyo, is clearly evident in aspects as familiar, for instance, as the number of accessible television channels. Outside of the large cities, though the number of accessible channels has somewhat increased due to the diffusion of UHF channels, there are still regions having less than four channels available to them. The national television network is organized with Tokyo as its center and the production of programs is markedly concentrated in Tokyo. This situation ties in with the growing concentration of advertizing businesses in Tokyo.

With regard to newspapers in the large cities, where the publishing of national newspapers takes place, it is easy to buy or choose from a number of different daily papers; contrarily, in non-metropolitan areas, it is possible to find only local newspapers. Moreover, in contrast to large cities where a morning and evening paper are considered a 'set', whereby a morning paper delivery is automatically followed by the delivery of

the evening paper later on in the day, other regions are provided with the morning paper only.

As will have been gathered up to this point, the diffusion of telephones, television, newspapers and computers has been considerably remarkable, attesting to the coming of age of information-related activities. Nonetheless, regional imbalances are still to be found. The tendency towards concentration in large cities, especially in the capital city environs having Tokyo as their center, is conspicuous and in direct correlation to the decline of the relative importance of other cities and regions. On this point, the Keihanshin District and its environs, including Osaka, is no exception. Each of the various means for the transmission of information were widely diffused at the time of the rapid economic growth of the 1960s; but already, by that time, the concentration of information-related activities in Tokyo was under way. There is no doubt that these developments, where Tokyo is concerned, will continue on into the future for some time to come, becoming further intensified in the process.

VI. Conclusion

As we have observed so far in this paper, the progress of the transformation into an information-oriented society has greatly influenced Japan's regional communications systems. In some cases, this influence has taken on the form of the promotion of concentration of information-related activities in local areas; in others, it has consisted of the correction of disparities with regard to local areas, some of which have less access than others to information-providing facilities. At the present time, the tides of information-related activities are deluging not only the industrial scene but the lives of the people as well. Consequently, it would not really be exaggerating to say that today's urban activities are, to a very large extent, based on the information network.

A striking example of this was provided at the time a telecommunications cable caught fire in Setagaya ward, Tokyo, in November, 1984. In this accident, due to the power failure resulting from the breakdown of a single cable, telephones in 89,000 households were cut off and on-line system of banks and other financial organizations totally ceased functioning. By the ninth day after the

accident, the situation had completely returned to normal; but, until then, the confusion in the affected area not only revealed the vulnerability of information-related systems in the face of sudden accidents, but also disclosed the extent to which the telecommunications network had permeated the daily lives of the citizens (TATSUOKA, 1985; NAKABAYASHI *et al*, 1985).

While a number of problems have yet to be solved before new media systems such as INS or urban-type CATV become fully workable, the introducing of the Teletopia Project developed by the Ministry of Posts and Telecommunications, and the New Media Community conception of the Ministry of International Trade and Industry have the potential of inducing enormous transformations in local community and the lives of the populace. We should like to point out that, although we have not been able to discuss them in this paper, other forms of new media are continuing to emerge. For example, in a sector of the money circulation trade, the VAN (Value Added Network) system is utilized in the nationalization of business operations, the POS (Point of Sales) system aids in the supervision of the selling of information, while other forms of new media enable shoppers to do their shopping from their homes, or sellers to sell their goods without having to go through the medium of shops. In addition, the conspicuous development of information service industries exerts an influence on the industrial structure as a whole.

With regard to the changes discussed above that were and are being brought by the transformation to an information-oriented society, we feel that studies by geographers lag far behind the modes of research pursued by scholars in the fields of economics and sociology and so on. Our considerations on the transformation process taking place under regional systems leads us to conclude that the meaning represented by the term 'information' is one of ever-increasing importance. Because of this, it is all the more both desirous and necessary to properly come to grips with the geography of information.

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Notes

- 1) Considerations on the theoretical framework of information geography have been made by TAKEUCHI (1982) and YAMADA (1985).
- 2) The INS experiments have already been introduced and discussed at length by IKUTA (1985).
- 3) For the writing of this section, we referred mainly to MAENO and KANEKO (1982), TAMURA (1983; 1984), and INOUE and TAKI (1984).
- 4) The so-called Teletopia areas consist of cities designated as models of the Teletopia conception advocated by the Ministry of Posts and Telecommunications in 1983. Sixty-three locations were designated as model areas by the Ministry, over the period 1985–86. The Teletopia concept is an overall plan to facilitate the shifting of a regional society to a new level—that of an information-oriented society, under the influence of the new media (Planning Committee Communication Future, for Model Cities, 1985).
- 5) Part of this section is based on KITAMURA and TERASAKA (1979). Further studies on regional differences with regard to information sources in Japan can be found in YORIFUJI (1984).

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高度情報化社会における地域システムの変容

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本論文は、情報の伝達が空間に果たしている役割を、高度情報化社会といわれている現在の日本の状況のなかで捕らえてみることにある。コンピュータ技術の発展と通信のデジタル化による新しいネットワークの形成は、1982年の第2次通信の自由化により、ニューメディアの進展となって現れた。地域的なネットワークの例として、NTTによるINSモデルの実験は東京武蔵野・三鷹地区で1984年から行われたが、これを実用化するまでには解決すべき多くの問題があることが明らかとなった。

CATVは初期の難視聴対策から出発して、ニューメディアとして普及するにまで至った。可視チャンネル数の増加に加えて自主放送を行うことにより、地方都市では地域活動の活性化と自治体と住民をつなぐ役割を果たし、農村地区では地域の振興に、ニュータウンや大都市域では住民への情報の供給やコミュニティの形成に役立つ可能性を開いている。

情報化の進展にともない、企業の分散が予測されたが、東京区部、とくに都心3区への中核管理機能はかえって

集中する傾向が見られる。これはマネージメントのための情報を求める企業の立地行動によるものである。さらに、最近では東京は世界的な規模での金融市場としての重要度を高めてきたことから、外資系企業のオフィスの立地が盛んになってきている。その需要にたいしてオフィス用ビルの建設が進んでいるが、不足ぎみなので値上がり著しい。こうして都心のビジネス地区は拡大している。

このような動向から、日本における情報の地域格差は拡大している。東京を中心とする首都圏への情報の集中は著しく、大阪を初めとする他の大都市や地方都市の比重は相対的に低下している。民間における情報化の進展や情報サービス業の発展のほかにも、郵政省のテレピア計画や通産省のニューメディアコミュニティ構想など、政府は情報化の進展をはかっている。これらが実現すると地域社会や住民の生活を大きく変える可能性がある。このような社会の変化に対して、我が国の地理学からの研究は立ち遅れている。

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