THE 'COMMUNICATIONS REVOLUTION' AND THE HOUSEHOLD: SOME THOUGHTS FROM THE JAPANESE EXPERIENCE

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In recent years there has been much debate on the likely impact of new communications media on the household. In Japan, where progress in the development and application of communications technology has been rapid, a large-scale experiment was conducted between 1984 and 1987 to test public acceptance of these media. This article examines some of the major findings of the experiment. It concludes that household use of the new media in the immediate future is likely to be very limited. In the longer run such use may expand, but a number of important technological and social changes will be necessary before large-scale expansion can occur.

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There can be little doubt that 1988 will be remembered by historians of technology as a milestone in the development of communications. The much-heralded Integrated Services Digital Network (ISDN) began commercial operations in a number of advanced industrial countries including the United States, West Germany, Japan and Australia.[1] ISDN, which will integrate and increase the efficiency of a wide range of new communications media — including digital telephones, videotex, and video conferencing — has been seen by many writers as the cornerstone of the contemporary 'communications revolution' and therefore as having profound implications for the future development of the economy and society.[2]

Perhaps the most widely-debated prediction of the impact of new communications technology on the household has been the notion of the 'electronic cottage', a phrase popularised by Alvin Toffler's best seller *Third Wave*.[3] This notion implies that the new communications media will have profound effects on the nature of home and family. On the one hand, traditional household work — the production and maintenance of labour power — will be drastically reduced by the automating effects of the new communications media. Home shopping, home banking etc. will reduce the amount of time devoted to household tasks, leaving more time for paid employment or for fulfilling creative leisure. As the Japanese futurologist Yoneji Masuda put it:

> . . . more and more people will spend their free time studying systems sciences and computers in order to adapt themselves to the information epoch, or taking lessons in cultural accomplishments, hobbies, arts and crafts.[4]

Even more radically the 'electronic cottage' implies that new communications networks will encourage 'telecommuting', making it possible for a growing number of people to perform paid work at home. This is seen by some as leading to a dispersal of population away from big cities and to a revival of the sense of community cooperation which was lost in the process of industrialisation.[5]

A further possible change in the nature of the household has been emphasised particularly by writers such as Gershuny. Rather than speaking of increased leisure or increased opportunities for paid work within the home, Gershuny suggests that a growing range of services which are currently purchased from private enterprises, or received from the state, will come to be provided by households themselves: a situation which Gershuny describes as the emergence of a 'self-service society'. This development he suggests, will be brought about both by new information technologies and by the rising cost of conventional, labour-intensive services.[6]

After an initial wave of enthusiasm for the revolutionary effects of new communications technology, however, there has recently been an increasing mood of scepticism towards prophecies of the 'electronic cottage' type. Writers such as Reinecke have argued that integrated communications systems are being developed primarily to meet the demands of business, and that they may therefore have little relevance to the needs of private individuals or households.[7] Golding and Murdock's research also suggests that the cost of new telecommunications services may place them beyond the reach of most ordinary families.[8] From that perspective, it seems likely that the communications revolution will pass the household by, so increasing the gap in technological sophistication between business and government on the one hand, and individuals or households on the other. Other writers have questioned utopian predictions on the joys of telecommuting, and on the potential of communications technology to revolutionise patterns of residential settlement.[9]

JAPANESE EXPERIMENTS IN NEW COMMUNICATIONS TECHNOLOGY

The work of historians like Aronson has highlighted the dangers of predicting the future use of communications technology. No-one would wish to be placed in the situation of the leading businessman who dismissed the newly-invented telephone as a useless 'electrical toy', nor of the writer who, in 1876, predicted that the fashionable parties of the future would be accompanied by music transmitted over the phone.[10]

But in spite of these risks it is still important that we should observe early trends in the use of the new communications media and watch for signs which may help us to choose between, and refine, existing predictions on the 'information revolution'.

For this purpose, Japan provides some particularly fascinating case studies. Japan is of interest, not only because of its recent rapid advances in communications technology, but also because Japanese organisations (both public and private) have shown a particular enthusiasm for conducting large-scale social experiments to assess the implications of that technology. An early and relatively well-known example is the Hi-OVIS interactive cable television experiment, which provides households in the regional city of Ikoma with *(inter alia)* community information, educational services and a video request system.[11]

An even more ambitious project was the INS model system which operated in the Tokyo suburbs of Mitaka and Musashino from September 1984 to March 1987. This experiment involved the creation of a small-scale local version of the Information Network System (INS), the integrated services digital network operated by the Nippon Telegraph and Telephone Co. (NTT). Some 2,000 individual monitors participated in the scheme, which gave them the opportunity to try out one or more pieces of equipment such as digital facsimile, videotex terminals, videophones and sketchphones, usually for a period of six months each. (See Table 1).

The Mitaka model system was aimed principally at household users, (although some private companies also acted as monitors), but in December 1986 NTT initiated a second more modest experimental system aimed at business users in the urban areas of Tokyo, Nagoya, Osaka and Tsukuba. This includes nineteen companies, most of whom are experimenting with the use of various forms of video conferencing system.[12]

Further experimental projects in the use of new communications technology are being carried out under the umbrella of the Teletopia Scheme. Teletopias (the name itself is an unmistakably Japanese neologism) are communications projects set up in 63 areas of Japan from Sapporo in the far north to Okinawa in the extreme south. The projects are funded through a fairly complex arrangement including the Ministry of Posts and Telecommunications, NTT, public financial institutions, local government and local private enterprises. Each offers a distinctive mixture of services directed at local interests: in rural areaas such as the Yonezawa and Maebashi regions, for example, the Teletopia uses facsimile or videotex to provide agricultural information services, while in Okinawa it also offers a medical information network linking clinics on outlying islands.[13]

Creation of the first 34 Teletopias began in mid-1986, and the results of the scheme will take some years to assess, though in time the Teletopia projects should yield interesting evidence on the impact of the new media in a wide range of social environments. In the meanwhile, however, it

TABLE 1
Main Services Provided by the Mitaka-Musashino INS Model System

	Digital telephone	Displays information on cost of calls and the telephone number of the caller. Three-way calls are possible.
	Digital public telephone	Displays time remaining for each call. Free re-dialling is possible if a wrong number is called.
	Digital sketchphone	Simultaneous transmission of speech and handwritten messages or pictures.
	Digital facsimile	High-speed precision facsimile.
64 Kb/S digital service	Digital CAPTAIN	Digital version of the Japanese character videotex system. Includes audial communication and colour graphics.
	Voice Storage Service	Stores and transmits spoken messages on request.
	Message Communication	Acts as 'mail box' for messages and converts information from one medium to another (e.g. Telex to facsimile).
	Multimedia Database Access Service	Provides character, diagramatic and voice information from database centre.
	Composite Office Telephone	New telephone service for office buildings, providing high level multiple services (telephone and non-telephone).
	Videophone/Video Conferencing	Transmission of colour moving pictures and voice between two or more places.
	Video Response Service	Provides (on request) video or still pictures stored in information centre.
broad-band service	Ultra-High Speed Facsimile	Facsimile service offering extra high speed and resolution (transmits A4 page in 2 seconds).
	Colour Facsimile	High speed transmission of colour documents.
	Distributed Image Transmission	Transmits VRS or CATV film simultaneously to several destinations at requested time.
	High Resolution Television	Transmits pictures with resolution about 4.6 times higher than normal T.V.
	Home Banking	Deposits, transfers, enquiries on bank statements, loans etc. can be made from home using digital telephone, digital CAPTAIN and digital facsimile.
Other Services	Home Shopping	Enables purchases to be made from information providers (department stores etc.) using equipment (digital 'phone, facsimile, CAPTAIN, VRS) installed in home.
	CAPTAIN (analogue)	Videotex service using analogue telephone network.

Source: NTT (ed.) *Yutaka na Kōdo Shakai o Motomete* p. 22.

may be helpful to examine the information which the Mitaka experiment revealed as to the use of new communications media by individuals and households.

THE MITAKA EXPERIMENT

It is probably fair to say that the Mitaka INS Model System proved a disappointment to those with ambitious visions of a communications revolution. Many of the monitors had a lukewarm response to the equipment which they tested, and one later wrote a rather scathing article in which she described the spread of an 'INS neurosis' among those who participated in the experiment.[14] Nevertheless it would be quite wrong to dismiss the Mitaka experiment as a 'failure'. In the first place, evidence of user resistance to some aspects of the system was in itself an important result, which will guide future decisions in the development of new communications media. At the same time, other aspects of the project suggested interesting possibilities, and problems, for the future use of ISDN. Here I shall focus upon four areas which have been the topic of particularly heated debate in recent years: home shopping, home medical care, telecommuting, and the use of videophones for person-to-person communication. (It should be emphasised that these formed only part of the Mitaka experiment, which also included home banking, educational, welfare and other projects).

Home Shopping

Home shopping has been presented by some commentators as a significant means of automating a relatively time-consuming element of housework, and thus formed an important part of the Mitaka INS model system. Fifteen specialised shops and department stores participated in the experiment, providing information on their wares through four media: digital telephone, facsimile, videotex and a video response system (VRS). The home shopping service started in March 1985, and during the two years in which it was in operation 12,510 orders were placed. This works out at around only 18 orders per day, and means that each monitor on average used the home shopping service a little over once a month, by far the largest number choosing to place their orders through the videotex system.[15]

These figures make it plain that, in the course of this experiment at least, INS services did not replace the daily trip to the shops for food and household necessities. Instead, they were used, as mail-order shopping has been used for many decades, to buy gifts, novelties and specialities.[16] Some INS monitors themselves also proposed other uses which they would like to see developed. They suggested, for example, that the VRS might be used by estate agents to offer information on

houses for sale, and by schools to help parents when 'shopping' for their children's education (a time-consuming task for many Japanese families).[17]

All this implies that home shopping, although it may expand under the influence of new technology, is likely to remain what it has always been: a method of making certain types of irregular and specialised purchases, but not of buying the daily meat and vegetables. It would also seem to indicate that the main scope for the growth of home shopping may be in more isolated towns or villages, rather than in suburbs like Mitaka which are within reach of a vast selection of shops in the consumer metropolis of Tokyo.

Home Medical Services

Medicine is one area in which we might expect to find signs of the emergence of Gershuny's 'self-service society'. In Japan, a rapidly ageing population and rapidly rising medical expenses are having a substantial impact on the economy. Expenditure on medical care accounted for over 5 per cent of the Japanese GNP in the 1970s and is expected, according to one estimate, to rise to 15-20 per cent of GNP by the year 2000.[18] One aim of the Mitaka experiment was therefore to assess whether new communications systems might help to ease this burden.

The Mitaka City Doctors' Association introduced three major types of home-based medical services using the INS Model System. First, they tried using the videophone as a link between surgery and home. Elderly patients who had difficulty visiting the doctor's surgery would be examined at home over the videophone, and receive advice on treatment. Secondly, the Doctors' Association produced a number of self-education programs on health issues for use on the videotex and VRS. And thirdly, the digital network was used to transmit still pictures taken by a health visitor in the patient's home to a medical centre for use in diagnosis. The doctors also used the INS to help in the supervision of hospital wards, to transmit x-ray photographs, and to provide in-service medical education for health workers themselves.[19]

The results of these experiments revealed some technical difficulties. The videophone, for example, provided insufficient clarity and resolution to enable doctors to examine housebound patients 'over the phone'. But although the system was judged to be unsuitable for diagnosing serious problems, it was seen as providing a useful means of checking up on elderly invalids with no acute health problems, so providing reassurance both for doctor and patient.[20] Some of the regional Teletopia schemes are also experimenting with and developing this use of the new communications media.[21]

Home consultations using videophones or the transmission of still pictures would do little, of course, to reduce medical costs, since they still involve a one-to-one encounter between patient and health

professional. As far as cost reduction is concerned, the main emphasis in the future is likely to be placed on self-education services giving patients direct access to medical information. In this respect the videotex services offered by the Mitaka Doctors' Association achieved some successes, although it is significant that one of the most popular services was a guide to the addresses, locations and consultancy hours of local doctors.[22] The system was used, in other words, to reinforce rather than to replace the traditional relationship between doctor and patient. Clearly the growth of self-service medicine requires, not only the development of communications technology, but also changes in the attitudes both of doctors and of patients towards the nature of medical care.

Some of the most successful applications of the INS to medicine appeared in fact to be those which improved communications between medical professionals themselves. Services which speed and enhance the transmission of data from one hospital or specialist to another require little change in the structure of health care, and this may help to explain why such systems have proved easier to introduce than new home-based services, and are being successfully developed in countries such as Canada and the United States as well as in Japan.

Telecommuting

In Japan, as elsewhere, early utopian predictions on the possibility of widespread telecommuting have tended to give way to a more cautious approach which recognises a limited future role for home-based computer work. Cramped housing conditions are often quoted as a factor which is likely to reduce the appeal of this type of work for Japanese employees. A study by the Japanese subsidiary of the U.S. computer company DEC, for example, found that a majority of those surveyed would prefer to commute to work even if opportunities for home-based work were available.[23]

This view was generally borne out by the results of the Mitaka experiment. The Hitachi group, for example, used the experiment to test the feasibility of shifting part of their advertising design work into the workers' homes. It was found, however, that the types of equipment involved were too bulky to fit conveniently into the average suburban house or apartment.[24]

A somewhat more successful aspect of the project involved the creation by NEC of a 'satellite office'. This is a small office located in the suburbs and linked by the INS to the company's factories and headquarters in other parts of Tokyo. The advantage of the satellite office, from the point of view of the company, is the scope which it offers for tapping the supply of well-trained female workers whose family commitments make it difficult for them to commute long distances to work. Although this experiment encountered certain problems in terms

of cost and technical troubles, NEC concluded that it had potential for future use.[25] The concept of the satellite office clearly raises important issues for the future relationship between home and workplace. On the one hand, it may provide scope for reducing the hours of commuting which are common in Japanese cities, and for developing more flexible patterns of working hours. On the other, there is a risk that the satellite office could prove to be a mechanism for locking working women more firmly than ever into the double burden of paid and unpaid work. Developments in this direction are therefore an important topic for future study.

The Mitaka experiment, however, also draws attention to an aspect of telecommuting which has generally been neglected by the literature on the subject.[26] In the discussions of a small group of participants in the experiment, I was struck by the fact that the monitors who were most enthusiastic about the new communications media were those who were already involved in relatively traditional forms of home-based work such as private tuition, translation and proof-reading, and who could use these media in their work. In Japan, as in other industrialised countries, there are already many people, most of them married women, engaged on work of this type, often on a casual (and statistically unrecorded) basis, in addition to the large number of women employed in manual outwork. Media such as facsimile and videotex may well prove to be important, not so much in moving work out of offices and into the home, as in affecting the work patterns of the invisible host of women already involved in various forms of white-collar home-based work.

The Videophone

As a concept, the videophone was the oldest of all the new media introduced in the INS Model System. The first 'picturephone', combining television and telephone, was demonstrated in the US as early as 1927, and experimentation to overcome technical and cost problems has continued ever since.[27] Yet despite the familiarity of the concept, the videophone proved to be a piece of equipment which met with considerable resistance from INS monitors.

In part, this clearly reflects the social processes involved in acceptance of new communications technology. As was the case with the telephone itself, use of the videophone requires the establishment of a set of social rules which are yet to be clearly defined. (Interestingly enough, some of the Mitaka INS monitors were old enough to remember the introduction of the telephone to remoter parts of Japan, and to recall the fear and suspicion with which that gadget, too, was greeted in the early days).

The main difficulty with the videophone was its intrusiveness, aggravated by the fact that it was impossible to turn off the video camera during conversation. Many users resented the fact that this enabled

strangers to see, not only their faces, but also the insides of their houses.[28] This difficulty is perhaps a particularly sensitive one in the context of urban Japan, where it is relatively uncommon to invite even colleagues and acquaintances into the family home. The users of the Mitaka system however, proved to be highly inventive in solving the problems of videophone etiquette. Some placed a poster or photograph in the line of vision of the videophone camera, and removed it only when they had established that the caller was a friend, while another group of INS monitors reached an agreement that they would always call each other on the conventional telephone first to provide a few minutes warning before putting through a call on the videophone.[29]

An additional obstacle to the use of the videophone in the Mitaka experiment stemmed from the geographical limits of INS Model System. Some users commented that they would like to use videophones to call distant relatives whom they can rarely meet face to face, but had little interest in using the equipment to contact neighbours or other local residents. Indeed, despite the emphasis of many writers in the role of new communications media in developing local community spirit, it seems clear that the main role of instruments like the videophone will be to break down barriers of distance and so to promote communications with people and institutions outside the local community. After all, as many studies have emphasised,[30] the lack of community feeling in suburbia is a result of social structures, not of physical or technological hindrances to contact between individuals. It would be unrealistic to expect new communications technology by itself to alter such structures. What this technology is more likely to do is to strengthen existing social networks which transcend the geographical boundaries of the community, the region, or even the nation.

CONCLUSIONS

Japanese people are often said to "have a positive attitude towards modern technology and its achievements and . . . admire the 'latest' sophisticated products and fashions."[31] In the case of the new communications media, however, enthusiasm for innovations has been cautious — a fact which is revealed not only by experiments like the Mitaka INS Model System, but also by the findings of public opinion surveys. A study undertaken in 1985, for example, revealed that only 13.2 per cent of respondents had heard of the INS, and just 51.1 per cent had heard of the best-known of the new communications media, satellite broadcasting. Less than 50 per cent of those questioned expressed any interest in using the new media.[32]

In the short run, the Mitaka experiment certainly suggests that the new services offered through ISDN are likely to find readier acceptance amongst business, institutional and professional users (including, for example, doctors, educational institutions etc.) than among household

users. This is not to say, however, that we can dismiss the significance of the current 'communications revolution' for the household. Although we may reject the more extreme predictions of a world in which most paid work, as well as shopping, banking and education, will soon be performed from home via the computer network, we cannot ignore the possibility that new communications media will, in the longer run, have substantial effects on the household. Here it may be instructive to reflect on the case of earlier innovations such as the telephone or the motor car. The car was still a toy for the very rich twenty years after its invention. This was not simply because of cost, but also because it required a revolution in transport networks and in patterns of human settlement before the car became highly desirable, and eventually (for many people) a necessity. Similarly "the early history of telephone usage . . . is largely the story of how commercial and professional communities adopted the new means of communication."[33] It was only from about the 1890s, as costs fell and nationwide networks expanded, that the telephone began to make major inroads into the household.

Technology today appears to be developed and diffused far more quickly than it was in the 19th century, and we may therefore expect the spread of new communications media among households to be less protracted than was the spread of the telephone or the car. The results of the Mitaka experiment do suggest, however, that several developments will be necessary before household use becomes really widespread:

(i) Large scale networks will need to be established, so that users have access to other users and information providers, not only in their own locality, but also nationally and internationally.
(ii) Costs will have to fall to levels within reach of a large group of consumers.
(iii) The social norms and rules of media use will need to be refined.
(iv) A great expansion will have to occur in the software, as well as the hardware of the new communications systems. This does not simply mean the preparation of programs for videotex, VRS, etc. As we saw in the case of home medical services, it also involves fundamental changes in the organisation of social systems: a willingness, for example, by doctors to entrust more information and decision-making to patients and, among patients, the knowledge and confidence to use that information successfully. Provision of educational and social services through the new communications media would require similar changes in the relationship between providers and users.

This last point raises important issues for future study. As the Mitaka experiment revealed, new communications networks offer possible alternative means, not only of interpersonal communication but also for the organisation of work and the delivery of services. In assessing the uses which we might make of these alternatives, it will be necessary to consider the institutional and social changes which they involve. In the cases of services such as health, welfare and education, as in the

case of telecommuting on satellite offices, the issues are not only ones of cost and efficiency but also of equity, of privacy, and of the relationship between service provider and consumer, employer and employed. Careful observation of the use of the new communications services around the world will be essential if we are to reach informed judgements on the future benefits which they may bring, and the problems which they may raise, for household users.

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