Going Out of Tune?

Use of Mobile Phone TV among Japanese Youth

This paper examines how the youth in Japan uses mobile TV (on-seg TV service) in comparison to other functions and mobile data services. A survey of 310 randomly selected youth in Tokyo and focus groups were used to collect the data. The findings show that use of mobile TV is not related to use of other functions or mobile data services. Viewing TV on the mobile phone is rare, suggesting that the active and constant uses of one-seg TV services in Japan cannot be warranted despite the diffusion of the mobile phone among Japanese youth.

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Japan is one of the Asian societies that in recent decades have experienced dramatic changes brought about by the technological progress in mobile telephony. The mid 1990s was a pivotal period in the history of the mobile phone in Japan, when a business-oriented technology transformed into a personalised medium. *Keitai* is an abbreviation of the Japanese word *keitai* (mobile) *denwa* (phone). This new medium enables users to engage in various communication activities (Matsuda, 2005:20; Daliot-Bul, 2007). The potential that *keitai* has as a new medium is captured by the concept of multimedia, which means that the medium has the capability to interact fluently with various modes of communication, such as text, sounds and images (Okada, 2005).

The capability of *keitai* as multimedia was embraced by Japanese youth. The proportion of young mobile phone users has been outpacing that of older users since 2001. Compared to the national average of penetration rate of 75.4 per cent, about 83.6 per cent of the 13–19 year olds and 97.3 per cent of 20–29-year-olds owned a mobile phone in 2008. In addition to making voice calls and messaging, the young use mobiles for taking pictures, downloading music or images and accessing online novels. Thus, the gamut of activities based around the mobile phone and its use by youth forms the unique *keitai* culture.

The mobile phone assumed a new function as it evolved as a television set in Japan in April 2006. Watching TV broadcasts on a mobile phone was expected to be one of the activities that would renew the Japanese *keitai* culture. The digital terrestrial broadcasting service for mobile phones was called "one-seg". There is little

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evidence that the youth actively watched one-seg TV in 2008, although the penetration rate of mobile handset for one-seg increased to 42.2 per cent in Japan (Ministry of Public Management, Home Affairs, Posts and Telecommunications, 2009).

Focusing on how the Japanese youth uses mobile TV, this paper analyses the process of social construction in relation to common mobile phone uses that constituted the youth *keitai* culture. Theoretically, this paper is informed by the theory of social construction of technology, which views that "technologies and technological practices are built in a process of social construction" (Bijker and Law, 2000:13).

Mobile TV phone and service in Japan

Digital terrestrial broadcasting started in three metropolitan areas in Japan in 2003, and the ground-based broadcasting technology expanded to the rest of the country in 2006. In March 2009, the national coverage reached 97 per cent. The one-seg digital terrestrial broadcasting service for mobile phones and other mobile devices also commenced in April 2006. The term "one-seg" comes from the terrestrial broadcasting system that assigns one segment of each of the 13 segments to one channel for exclusive mobile reception.

Subscription to one-seg is free; little official data about the actual number of users are available. But according to the Communication Use Trend Survey by the Ministry of Public Management, Home Affairs, Posts and Telecommunications, the household adoption rate has increased from 6.0 per cent in 2006 and 26.5 per cent in 2007 to 42.2 per cent in 2008. The domestic shipments of mobile TV devices have risen from 22.2 million in 2008 to 26.7 million in March 2009, and the total amounts to about 50 per cent of all the number of overall mobile phones subscribers (JEITA, 2008).

According to a 2008 survey of 2,659 Japanese aged 16 and over conducted by the NHK Broadcasting Culture

Research Institute, 29 per cent respondents owned one-seg devices including mobile phones and 16 per cent of them already used one-seg broadcasting services. Compared with the Digital Mobile Broadcast (DMB) service started in Korea in 2005, use of one-seg service as well as that of DMB service in Japan is male-dominated. The one-seg service has more users aged over 30 than DMB service. However, secondary data suggests that the adoption of mobile among users under 30 is low.

To empirically investigate the use of one-seg service among the youth, we focus on three aspects of user characteristics that are associated with the frequency of one-seg usage: (a) demographic characteristics, (b) viewing situations and (c) other activities using a mobile phone.

Method

Data collected by the Broadcasting Ethics and Programme Improvement Organization (BPO) in November 2008 were analysed in this paper. The data were collected using a combination of random sampling based on the basic resident register and location sampling method. The sample (N = 750) consisted of men and women between the ages of 16 and 24.

The under-20 age group amounted to approximately 50 per cent of the sample. The largest group of respondents consisted of high school students (37 per cent), followed by college students (25.1 per cent) and employees (18.6 per cent). It was found that 99.9 per cent of the respondents had their own mobile phones.

In addition, we conducted three focus group interviews to gather qualitative data. Each group comprised of 10 participants between the age of 16 and 24, including five high school students. Thus, the participant groups consisted of 15 men and 14 women, including 15 high school students, six college students and eight full-time workers. Nineteen participants owned mobile phones with one-seg function.

Results

About 49.8 per cent of the sample owned a one-seg mobile phone. On average, the time of watching regular TV among one-seg mobile phone owners was 1 hour and 58 minutes on a weekday and 2 hours and 17 minutes on a holiday; it was not associated with the ownership of a one-seg mobile phone.

Table 1 shows the demographics of one-seg TV users. The result indicates that almost half of all respondents "hardly watch" one-seg TV despite owning a one-seg mobile phone. No gender difference in the frequency of watching one-seg TV was found. A considerable gap in age and status was detected, indicating that teens and high-school students did not watch one-seg TV on their mobile phone as much as respondents in their twenties (chi-square = 8.331, df = 2, p < 0.05) and non-students (chi-square = 11.041, df = 4, p < 0.05). That is, teens and high-school students, active users of mobile phones in Japan, are significantly less likely to use one-seg TV. No difference in the duration of one-seg TV viewing was found among any demographic segments.

Location of one-seg TV use and viewing situations

To examine the weak effect of demographic characteristics on one-seg TV usage, we conducted further analyses to test the association between frequency of use and other variables related to viewing situations. As seen in Table 2, a high rate of users watched one-seg TV at home despite the popular belief that locations outside home were where users would use a mobile TV phone. This finding is consistent with existing studies (Shim et al., 2008). For example, the survey by the NHK Broadcasting Culture Research Institute in September 2008 reported that 41 per cent of respondents under the age of 30 watched one-seg TV in their own rooms (Aramaki, Miyamoto and Yoshifuji, 2009).

TABLE 1
One-seg usage by age, gender and status

	Full sample	Gender		Age		Status		
		Male	Female	10's	20's	High school	College	Non-students
Frequency of viewing								
Every day to a few times a week (%)	23.2	26.5	19.4	13.8	33.3	10.5	26.9	33.3
Once a week to once a month (%)	25.8	26.5	25.0	28.8	22.7	36.8	23.1	15.6
Hardly watch (%)	51.0	47.0	55.6	57.5	44.0	52.6	50	51.1
Sample size (n)	155	83	72	80	75	57	52	45
Viewing duration (at a time)								
20 minutes to 4 hours (%)	35.8	40.0	31.0	33.8	38.0	36.8	38.8	29.6
5 to 20 minutes (%)	34.4	28.8	40.9	32.5	36.6	35.1	30.6	38.6
Less than 5 minutes (%)	29.8	31.3	28.2	33.8	25.4	28.1	30.6	31.8
Sample size (n)	151	80	71	80	71	57	49	44

TABLE 2
Location of viewing and frequency of one-seg TV use
(Conditional on one-seg mobile phone ownership)

| | Full sample | Frequency of viewing | | |
| | | Frequent viewers | Non-frequent viewers | |
	% of users (n = 155)	% of users (n = 76)	% of users (n = 79)	
One's own room	47.7	59.2	36.7	**
Living room	21.9	21.1	22.8	n.s
Office/school (break)	25.8	18.4	32.9	*
On the way back home	18.1	21.1	15.2	n.s
On the way to office/school	14.8	18.4	11.4	n.s

Note: More than one answer was possible. Statistically significant differences indicated by * $p < .05$, ** $p < .01$

In addition, frequent viewers who watch one-seg TV more than once a month are statistically more likely to watch it at home (chi-square = 7.861, df = 2, $p < 0.01$). In contrast, non-frequent viewers are likely to watch it in office or school when they have a break (chi-square = 4.247, df = 2, $p < 0.05$). The association between viewing frequency and location of use is also indicated by a significant correlation between the frequency of viewing and the amount of spare time at home ($r = 0.176$, $n = 154$, $p < .05$). As indicated in Table 3, frequent viewers are more likely to receive stable digital broadcasting transmission and frequent viewing is reinforced by the stability of receiving the transmission at home (chi-square = 12.427, df = 3, $p < 0.01$).

These results indicate that the location of use has a significant effect on the usage of a mobile TV phone and that the location of home promotes user's acceptance of one-seg TV, which is an effect called, "domestication of technology". This term indicates that technologies that have been used in the public domain are redefined to fit into home and its conditions and conventions (Silverstone and Haddon, 1996; Dobashi, 2000).

From the social construction of technology perspective, all new technologies, including TV for mobile phones, do not exert equal influence on all users in the same conditions. Users are affected by technology in different ways, depending on their social positions and the specific contexts of use for each technology. In the context of

mobile TV, the conditions created through one-seg TV use were not brought about by technology alone. The results concerning the irregular use of one-seg TV by teens and high school students suggest that teenage users who have hitherto developed *keitai* culture are not affected by the new function of *keitai*; they have not yet made their mark on one-seg TV.

Therefore, to investigate one-seg TV use on mobile phones, we need to shift the analysis to the contexts of use. For example, examining other mobile phone uses and activities or the relationships established between such uses and viewing one-seg TV use.

One-seg usage and other activities on *keitai*

A factor analysis of eight mobile phone use activities, including one-seg TV viewing was performed using Varimax rotation to identify common factors that constitute the context of current mobile phone use. The results are reported in Table 4, which shows four factors. Each reveals the cluster of related mobile phone uses. Voice calls, accessing news sites and accessing Social Networking Sites (SNS) constitute Factor 1. Factor 2 consists of e-mail and accessing websites. Factor 3 consists of accessing video sharing sites and gaming via the mobile phone. The use of a news clipping service, which sends the latest news directly to a mobile phone, constitutes Factor 4.

TABLE 3
Stability of receiving digital terrestrial broadcasting at home

| | Full sample | Frequency of viewing | |
	% of users (n = 155)	Frequent viewers % of users (n = 76)	Non-frequent viewers % of users (n = 79)
Extremely stable	40.0	46.1	34.2
Fairly stable	40.0	43.4	36.7
Unstable	13.6	10.5	16.5
Never tried at home	6.5	0.0	12.7

TABLE 4
Factors of loadings of mobile phone use
(Conditional on one-seg mobile phone ownership)

| Activities | Rotated factor pattern | | | |
	Factor 1	Factor 2	Factor 3	Factor 4
Voice calls	.428	−.058	.158	.379
News clipping service	−.146	.062	−.126	.857
E-mail	.303	.456	−.045	.051
Accessing video sites	.086	.528	.687	−.123
Accessing news sites	.679	.203	.129	−.069
Accessing SNS	.429	.061	.185	−.102
Accessing other sites	−.001	.690	.137	.011
Watching one-seg TV	.249	.001	.359	.058
Gaming	.092	.022	.454	−.045
Variance accounted (%)	25.8	14.5	13.8	11.8

The relatively large number of factors implies that the current patterns of mobile phone usage among Japanese teenagers are complicated and that users are diverse in their usage depending on specific circumstances and contexts. This trend is accelerated by the appearance of mobile Internet. As shown in the factor loadings in Table 4, watching one-seg service on the mobile phone does not constitute a factor on its own. This result suggests that watching one-seg TV is independent of all other activities via the mobile phone. Thus, we suggest that frequent use of one-seg TV is not derived from the frequent use of other mobile functions; the heavy use of a mobile phone does not necessarily lead to heavy use of one-seg TV service.

Predictors of owning one-seg TV mobile phone

To predict the ownership of one-seg TV mobile in the future, we conducted a regression analysis on the current ownership of one-seg mobile phones. After conducting a factor analysis of seven mobile phone uses, excluding one-seg TV viewing, we regressed mobile phone use on one-seg mobile phone ownership. From factor analysis, we find four factors of mobile phone use. Factor 1 consists of activities related to obtaining news: using a news clipping service and accessing news websites (33.8 per cent of variance accounted). Factor 2 consists of website access: accessing SNS and other sites, excluding news and video sharing sites (16.3 per cent of variance accounted). Factor 3 consists of conventional uses: e-mail and voice calls (11.8 per cent of variance accounted). Gaming independently constitutes Factor 4 (11.3 per cent of variance accounted).

The results of regression analysis are reported in Table 5. As indicated in model 1, the coefficients for Factor 2 and Factor 4 are significantly positive. However, coefficient for Factor 3 is significantly negative to the ownership of the one-seg mobile phone. The results thus suggest that novel uses such as accessing SNS

are positively associated with ownership and that conventional uses of mobile phones such as voice calls and e-mail are negatively associated. It is not only because conventional users are conservative about the ownership of one-seg TV but also because the use of one-seg TV may not be compatible with the conventional use of mobile phones, as discussed below.

In addition, the results in model 2 indicated that demographic factors have nothing to do with the ownership of one-seg mobile phones, as noted above.

TABLE 5
The effects of mobile phone use and demographic characteristics on ownership of one-seg mobile: Regression results

| | Ownership of one-seg mobile phone Model 1 | Ownership of one-seg mobile phone Model 2 |
	beta	beta
Factor 1: News	.029	.028
Factor 2: Website	.189**	.195***
Factor 3: Conventional	−.168**	−.165**
Factor 4: Gaming	.173**	.161**
Gender		.027
Age		−.021
Adjusted R^2	.100	.095

Statistical significance indicated by * $p < .05$, ** $p < .01$, *** $p < .001$.

According to the diffusion of innovation theory (Rogers, 1995), people who are categorised as innovators

have a positive attitude toward trying and using new ideas and devices. These "technological innovators" are more likely to use any type of mobile phone functions and be more willing to try new functions than other "late majorities", who are late in adopting innovations. Some researchers have argued that such "technological readiness" plays an important role in Internet's diffusion and they have attributed digital inequality to people's abilities to manage technologies (Akiyoshi and Ono, 2008).

However, it is also argued that Internet access via the mobile phone has eliminated such inequality because mobile internet access has been adopted by a wide range of users, regardless of their level of technological competence. Therefore, our findings that website access and gaming through the use of mobile phones are associated with the ownership of the one-seg mobile phone cannot be explained in terms of the ability to manage technologies. Thus, we underscore the theoretical necessity to consider the context of the use of one-seg mobile: What makes the use of the one-seg mobile phone independent from other types of mobile phone usage? Are there any contextual differences between the use of one-seg mobile and the use of other mobile functions, especially conventional functions such as voice calls and e-mail? We address these questions by means of focus group interviews.

Results of focus group interviews

The focus group interviews conducted in March 2009, included 29 individuals who participated in the interviews. Three focus groups were formed based on the amount of media use as follows: Group 1 (G1), Recording TV programmes on an HDD recorder more than once a week, Group 2 (G2), Watching video sites daily and Group 3 (G3), Watching one-seg TV more than twice a week. In addition to nine members of G3, another 10 members from G1 and G2 have their own one-seg mobile phones. Among the 19 one-seg owners, five are female and 15 are male. The amount of one-seg TV viewing by the members of G3 ranges from 180 to 600 minutes per week.

With regard to one-seg TV usage on the mobile phone, the majority of G3 participants watched one-seg TV in their own rooms, the same pattern as found in the survey data. The reason why they watched it in their rooms is mainly because other family members used the home TV in the living room. A 17-year-old girl in her third-year of high school explained, "When my sister and I watch the same drama at 9:00 or 10:00 in the evening, we share the TV set in the living room, but if we watch different shows, I go to my room to watch my own show on one-seg TV."

Another reason that some participants stressed was that they wanted to multitask while watching TV. In their rooms, they could engage in their favourite activities leisurely. An 18-year-old boy in his third year of high school put it this way, "I watch it (one-seg TV) when I am relaxing in my room at 11:00 or 12:00. I often stay in my room to do something, so I want to watch TV there."

Related to this, we found that some participants watched one-seg TV while performing other activities. A 20-year-old boy in his third-year of college was accustomed to watching one-seg TV "while doing exercises to kill time". Furthermore, these participants literally "use" one-seg TV simultaneously with other media. According to a 16-year-old boy in his first-year of high school, "On weekdays, I shut myself up in my room to watch dramas on one-seg TV, because my parents and I watch different programmes. My sister watches one-seg TV in her room as well." When asked about the way in which he manages the situation, he said, "I wear earphones to listen to one-seg TV while gaming, it's Nintendo DS (a portable video game), lying on the carpet." Similarly, an 18-year-old girl in her third-year of high school said, "I usually watch sports programmes, so the sound doesn't matter. I often watch one-seg TV while listening to my iPod. I use a PC while watching TV as well; I am accustomed to doing such things."

As the members of G3 are frequent users of one-seg TV, we expected them to often use functions specific to a one-seg mobile phone, such as recordings and data broadcasting. However, use of such functions seems to be concentrated on watching sports programmes, as a 17-year-old boy in his second-year of high school said, "When I use one-seg, I sometimes record a programme (of a soccer game at midnight) to watch on my way to school." A 16-year-old boy in his first-year of high school used data broadcasting not for dramas but for baseball games to understand "how the scores or batting averages stand according to the data superimposed at the bottom of the mobile phone (display)".

Regarding reasons for not using or avoidance of one-sge TV on mobile phones, many refer to some of the technological inferiorities of one-seg TV service as compared to conventional TV sets. A 22-year-old boy in his third-year of college explained, "One-seg is badly tuned and wears out batteries too fast to watch for long. When I want to watch (a programme), I prefer to watch it comfortably on the TV set with beautiful images at home." A 23-year-old man who is a system engineer also prefers to watch "on a big screen .... When I watch on one-seg, I cannot tune in at home and I feel uncomfortable when I am interrupted when I get a call". In addition, a 24-year-old female office worker said, "I cannot tune it in my room. If it wears out the battery, it's inconvenient to miss a call when I'm out. I'd rather listen to music."

Although it was initially assumed that people watched the "mobile" TV phone mainly outdoors (Shim et al., 2008), distrust seems to arise when they find one-seg TV badly tuned at home due to unstable transmission of digital broadcasting. In other words, whether they will tune in one-seg TV depends on the potential to use it at home. In addition, the possibility of using one-seg TV is related to the perceived advantage of conventional TV sets, such as screen size (expressed as a "big screen") or definition (expressed as "beautiful images").

Discussion

From these survey and interview findings , we assume that the "domestication" of one-seg TV is related with its acceptance. One-seg TV is most frequently used at home, especially in one's own room. Although some researchers have found that other types of mobile phone uses, such as voice calls and e-mail happen most frequently at home (Dobashi, 2002), the meaning of using one-seg TV at home seems to differ from, for example, that of e-mail use at home. The critical difference is its meaning as a "mobile" device in the domestic context; i.e. when the mobile phone is used for one-seg TV at home, the user regards it not as a mobile device but as a regular TV. This is consistent with our findings that respondents in G3 used one-seg TV in case they were not able to share TV with other family members, and that respondents in other groups did not want to use one-seg TV due to the inferiority of the device in comparison with the conventional TV at home.

On the other hand, when the mobile phone is used for e-mail at home, the user tends to regard it as a "mobile" device, as the youth makes use of the mobile device to circumvent the regulations and supervision of adults (Ito, 2005). In addition, a mobile phone is useful for housewives as they can use it while simultaneously performing household tasks (Dobashi, 2002). Thus, the meaning of "being mobile" at home seems to play a critical role in keitai culture.

Therefore, due to its lack of meaning as a mobile device, watching one-seg TV at home is out of synch with other activities involving the use of mobile phones, especially voice calls and e-mail that form the dominant keitai culture. This seems to be the reason why the frequent use of mobile phones does not equal the frequent use of one-seg TV. In addition, we assume that the culture of one-seg TV and keitai culture have a few aspects in common, such as the cultures of communication and fashion. For example, there are some respondents in the focus group who said that they used one-seg TV to watch programmes together with other people. However, our survey indicated that this practice was followed by only 14.2 per cent of one-seg TV owners.

We further note the common predictor of the use of one-seg TV and that of mobile phones, i.e. the simultaneous use of multiple media. The transient use of the mobile phone enables "simultaneous use" at home. As shown in Figure 1, several people in Japan employ various media at home while simultaneously using mobile phones. Such a tendency is salient especially among the young people. Above all, e-mail is widely used with other media. A prime example of this is the use of the mobile phone while watching TV or surfing the Internet.

With respect to mobile TV phones, such simultaneous use has been reported not only in our focus groups but also for DMB use in Korea (Park, 2008). We suppose that the transient viewing made possible by mobile TV phones will increase the possibilities of TV viewing. For example, when we notice something on TV while using a mobile phone to read e-mail or browse information on a website, we can catch up with it immediately using one-seg TV. A 24-year-old female receptionist said, "I sometimes receive and also make a call while watching one-seg TV, saying 'An amazing programme is on. Why don't you check it out?'"

Conclusion

The present study found that the young population is by no means active in watching one-seg TV despite the fact

FIGURE 1
Simultaneous media uses of the mobile phone
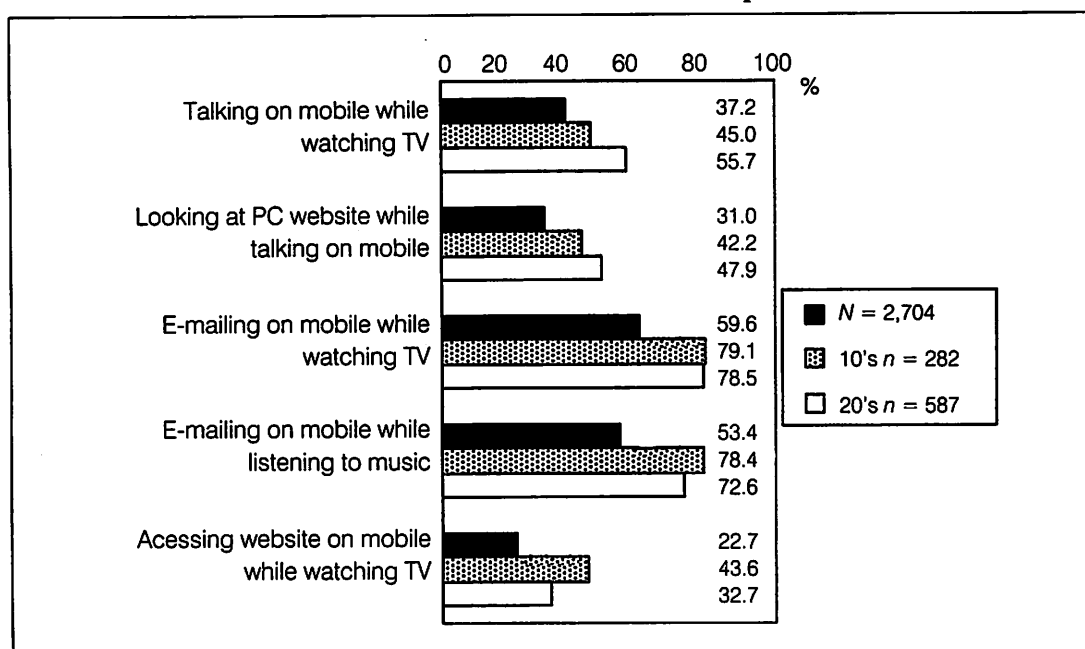
Source: Korenaga (2006)

that it is neither difficult nor expensive to use in Japan. The ownership of a one-seg mobile phone is not associated with any demographic characteristics including household income or user's pocket money. In addition, ownership is not predicted by the frequent use of other functions of mobile phones. We argue that a new technology such as one-seg TV does not exert pressure on all users to adopt it from the social construction viewpoint.

Therefore, we assume that we need to take the conditions, conventions and contexts of the use of one-seg TV into consideration in order to evaluate the prospect of a broadcasting service for mobile phones in Japan. Specifically, Japanese youth have formed the *keitai* culture since the mobile Internet became readily available in the 2000s. However, as shown by the irregular use of one-seg TV by teens and high school students, the elements that constituted the *keitai* culture do not contribute to the increase of one-seg TV use.

At the same time, our study of the domestic contexts of mobile phone use focuses our attention to the use of mobile phones at home. We assume that a study of the "domestication of technology" should not only reveal class and gender differences but also the symbolic differences in media use. Although checking e-mail and watching one-seg TV seem to be superficially the same behaviour-wise, they are symbolically different in terms of the domestic contexts as indicated by the present study.

In addition, the meanings of these technologies vary according to the developments in other technologies related to mobile functions. Further research into the relationship among these technologies should be conducted. For example, there has been much research comparing mobile Internet with the PC Internet from the viewpoint of replacing one with the other; however, there seems to be a lack of studies done in Japan from the viewpoint of combining these related mobile functions, despite the fact that the rate of using both technologies rose from 36.7 per cent in 2003 to 68.2 per cent in 2008. With respect to broadcasting, the number of one-seg TV users will be increasing because the digital transition in Japan will be completed and analogue terrestrial services will cease broadcasting in 2011.

Finally, the change in the meaning of TV viewing for the youth in Japan is worth noting. Recent surveys suggest that the amount of TV viewing for people under 30 is decreasing and that some of them have begun to shift to watching TV on video sharing sites. If such a tendency implies the "fragmentation" of TV viewing brought about by the Internet, the existing model of viewing applied to one-seg TV will be challenged.

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