Chapter 2

Response to Emerging Challenges

Looking forward, how will ICT change Japanese people's lifestyles, and what kind of challenges do we face in trying to achieve an abundant and user-centered information society as ICT utilization becomes ever more intertwined with daily life? This section examines our "response to emerging challenges," focusing on three main areas: "safety and security," "the digital divide," and "local areas."

Section 1

Allaying Concerns about Safety and Security

1. ICT application and anxiety

On the question of whether they experienced anxiety related to Internet use, approximately half (46.0%) responded that they experienced either "anxiety" or "slight anxiety" (Figure 2-2-1-1). In terms of specific anxieties, "Concerns about protection of personal information" were the most prevalent at 71.6%, followed by "Fear of infection by viruses" (69.6%) and "Uncertainty about what kind of security measures to take" (61.9%), indicating that information security is a particular source of

anxiety (Figure 2-2-1-2).

#### (1) Anxieties surrounding ICT utilization

In this survey on Japanese people's attitudes toward ICT, we focused on ability to utilize information, in a broad sense encompassing both proficiency in handling ICT equipment and understanding of ICT security issues[11].

For the purposes of the survey, degree of ability to utilize information was ranked in three levels, and the correlation between these levels and the level of anxiety occasioned by ICT utilization was analyzed (Figure 2-2-1-3). The results indicated a general tendency for anxiety levels to fall as ability to utilize information rises.

However, this correlation does not necessarily hold true in the case of "disruption of communications due to damage from natural disasters, etc." "automatic recording by security cameras, etc.," "protection of intellectual property," and "Internet systems and practices." These particular concerns cannot be allayed merely by increasing one's ability to utilize information, and indeed it is possible that these only become pressing concerns once one has a certain level of proficiency with ICT.

Examination of "anxiety among Net users overall" with reference to degree of understanding of Internet security issues[12] revealed that anxiety levels fall as de-

Figure 2-2-1-1 Degree of anxiety occasioned by Internet use (by household) (2010 year-end)
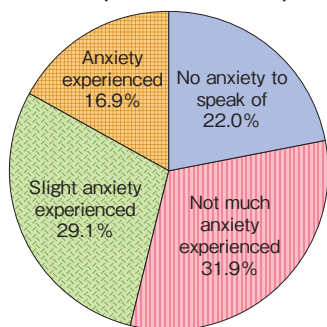
As of Dec. 31, 2010 (n=15,160)
(Survey target: Degree of anxiety experienced by Internet-using households. Blank responses excluded)

(Source) Ministry of Internal Affairs and Communications "2010 Communications Usage Trend Survey"

Figure 2-2-1-2 Specific anxieties occasioned by Internet use (multiple response) (2010 year-end)
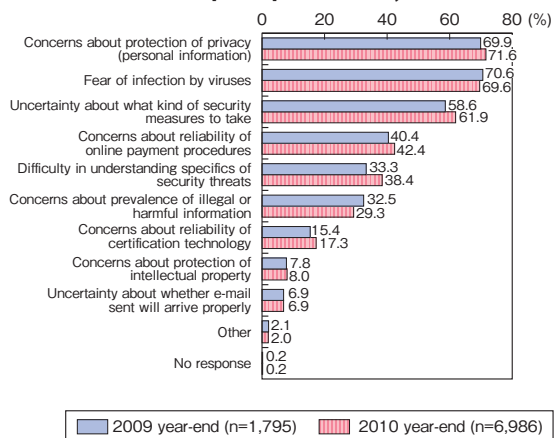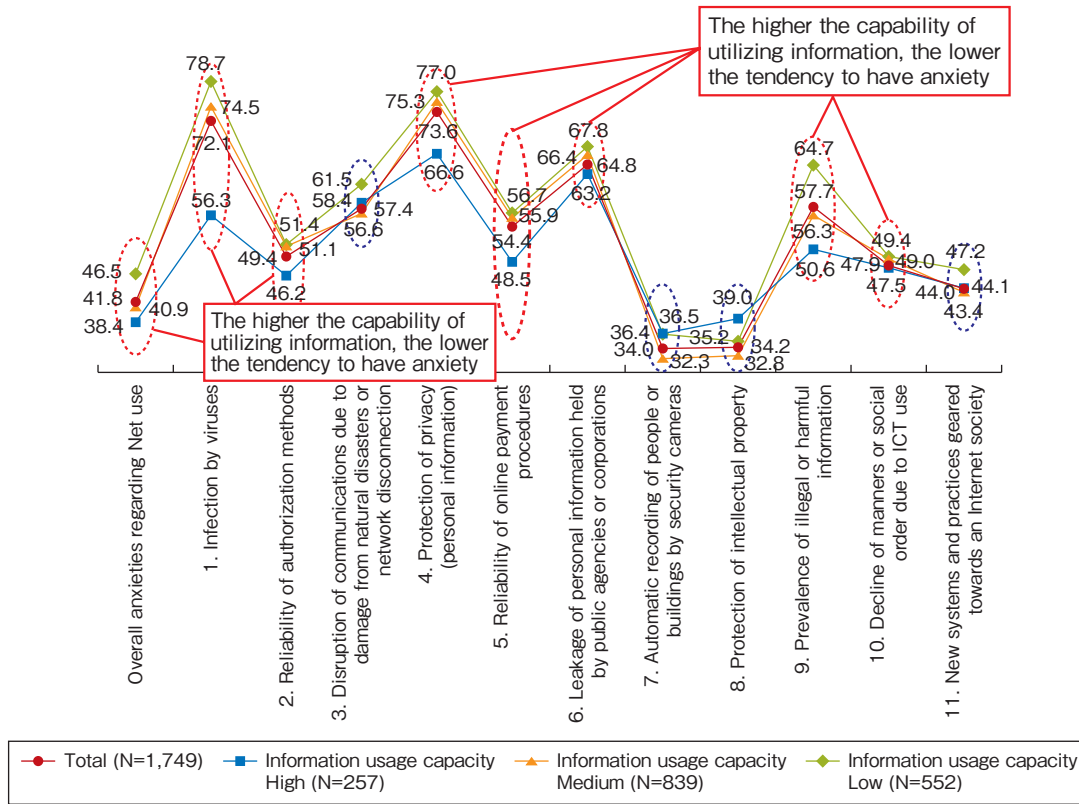
2009 year-end (n=1,795)   2010 year-end (n=6,986)

(Source) Ministry of Internal Affairs and Communications "2010 Communications Usage Trend Survey"

---

11 An online survey of Internet users in Japan was conducted, and responses were obtained from 1,800 people, who were classified by age group.
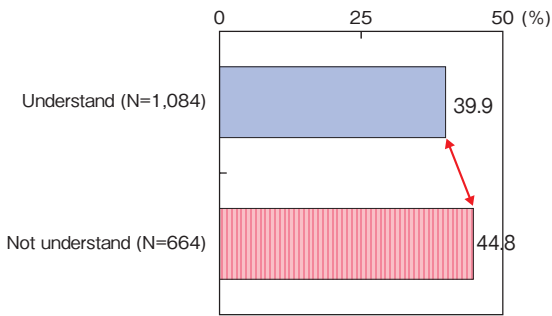
12 Respondents were placed in four ranks according to degree of understanding of online security issues (trouble prevention methods, troubleshooting): (1) Understands well, (2) Understands somewhat, (3) Does not understand very well, (4) Does not understand. Those in ranks (1) and (2) were classified as "understanding," while those in (3) and (4) were classified as "not understanding".

Figure 2-2-1-3 Anxieties surrounding ICT utilization

The higher the capability of utilizing information, the lower the tendency to have anxiety

The higher the capability of utilizing information, the lower the tendency to have anxiety

- Total (N=1,749)
- Information usage capacity High (N=257)
- Information usage capacity Medium (N=839)
- Information usage capacity Low (N=552)

(Source) Ministry of Internal Affairs and Communications "Survey on Safety and Security in an ICT Utilization Society" (2011)

Figure 2-2-1-4 Levels of anxiety and understanding of security issues (among Net users overall)

Understand (N=1,084) 39.9

Not understand (N=664) 44.8

(Source) Ministry of Internal Affairs and Communications "Survey on Safety and Security in an ICT Utilization Society" (2011)
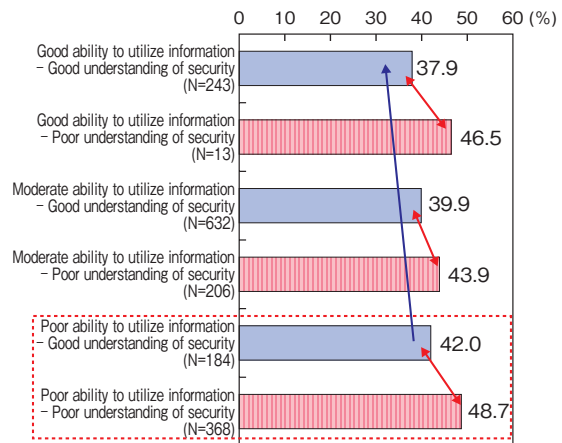
Figure 2-2-1-5 Levels of anxiety and understanding of security issues by degree of ability to utilize information (among Net users overall)

Good ability to utilize information – Good understanding of security (N=243) 37.9

Good ability to utilize information – Poor understanding of security (N=13) 46.5

Moderate ability to utilize information – Good understanding of security (N=632) 39.9

Moderate ability to utilize information – Poor understanding of security (N=206) 43.9

Poor ability to utilize information – Good understanding of security (N=184) 42.0

Poor ability to utilize information – Poor understanding of security (N=368) 48.7

(Source) Ministry of Internal Affairs and Communications "Survey on Safety and Security in an ICT Utilization Society" (2011)

gree of understanding rises (Figure 2-2-1-4). In particular, looking at the correlation between "anxiety among Net users overall" and "degree of understanding of Internet security issues" for each level of ability to utilize information, we find that the lower the level of ability to utilize information, the higher the level of anxiety (Figure 2-2-1-5). In addition, regardless of the level of ability to utilize information, people with poor understanding of security issues have a higher degree of anxiety than people with good security understanding[13]. It follows

that in the future, boosting both ability to utilize information and understanding of security issues will be essential to allaying anxieties about Internet use.

---

13 It should be noted that among those with "high" ability to utilize information, there were very few who did not understand security issues (N=13).

(2) Analysis of the correlation between anxiety and ability to utilize information

Figure 2-2-1-6 is a mapping of the three factors "ability to utilize information," "degree of understanding of Internet security issues," and "overall level of anxiety regarding Internet use" by age group. In this mapping, the horizontal axis indicates "degree of understanding of Internet security issues," the vertical axis "ability to utilize information," and the size of the circles represents overall level of anxiety regarding Internet use, with the bigger circles indicating higher levels of anxiety. Overall, higher ability to utilize information and understanding of Internet security issues are correlated with lower anxiety levels. In particular, people aged 60 and above have low ability to utilize information and understanding of Internet security issues compared with other age groups, and correspondingly high levels of anxiety.

It is clear that levels of anxiety regarding ICT utilization can be lowered by boosting individuals' ability to utilize information. Also, even among people with low levels of ability to utilize information, ICT-related anxieties can be allayed by raising levels of understanding of security issues. It can be inferred that boosting both ability to utilize information and understanding of security issues is an effective means of allaying anxieties about Internet use.

2. Perceptions of ICT application by children and parents

A survey was conducted examining parent-child interactions pertaining to ICT safety and security, as well as potential discrepancies between parents' and children's perceptions of ICT issues[14].
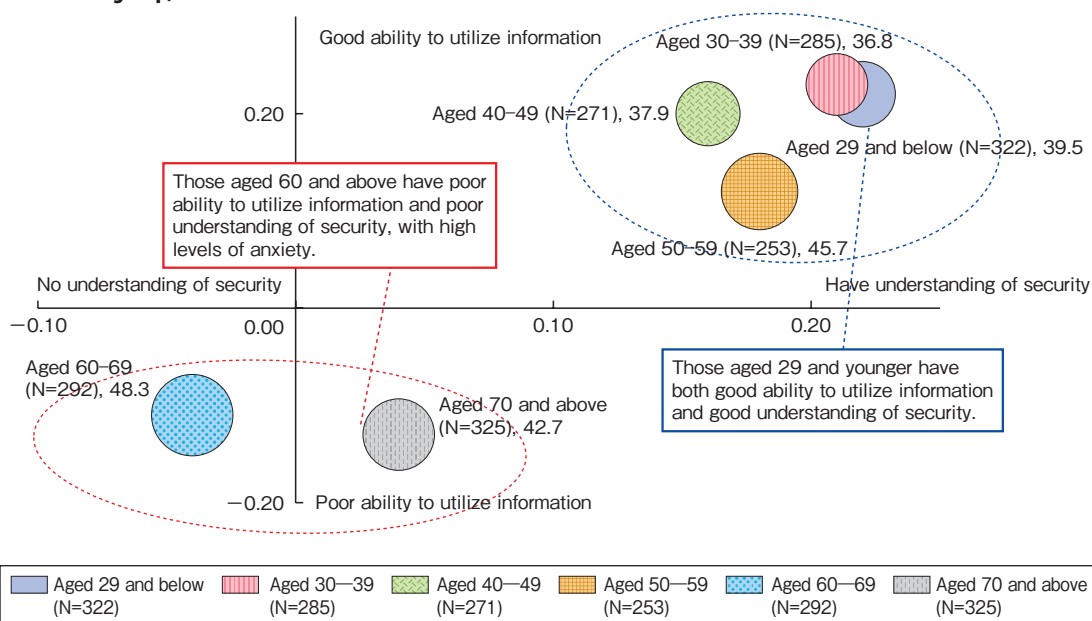
(1) Children's ICT utilization

A survey of children's ICT utilization by type of use and age group (elementary, junior high school, high school) shows that overall, the most common type of use is "viewing of websites" (68.8%), with higher age groups correlated to higher rates of utilization. The second most common type of use was "listening to music and viewing videos," at 49.0%, with a similar correlation between increasing age and rising rate of use seen. Online games were played by around 30% of children in all age groups. Overall ICT use, encompassing the aforementioned categories and others, shows a tendency to diversify with increase in age.

Looking at children's ICT use overall, it was found that as age increases, ability to utilize information rises and types of use diversify. All in all, it can be said that among elementary, junior high and high school students, increasing age is correlated with growing ICT proficiency.

In terms of children's anxieties regarding ICT use,

Figure 2-2-1-6   Analysis of ability to utilize information, understanding of security issues, and anxieties by user segment (by age group)

(Source) Ministry of Internal Affairs and Communications "Survey on Safety and Security in an ICT Utilization Society" (2011)

14 An online survey was conducted of parents and children in Japan who use the Internet, separated into groups by age of child (elementary, junior high, and high school), with 300 parents and children each responding.

their anxiety levels as a whole are 10% - 40% lower than those of their parents. It should be noted that junior high and high school students show increasing levels of anxiety as they grow older. However, even high school students, with the highest levels of anxiety among children, were still less anxious than their parents.

The overall picture is one of children having lower levels of anxiety than their parents as a general rule, though as they grow older, their degree of anxiety approaches that of their parents' generation.

(2) Children's and parents' perceptions of ICT utilization

While an increasing number of children feel anxiety related to the Internet as they grow older, parents who allow their children to use the Internet, on the contrary, feel less anxious about this use as their children grow older. The vast majority of parents responded that they either "pay considerable attention" (41.3%) or "pay attention" (52.3%) to online children's manners, with only 6.4% admitting that they "pay little attention" (5.7%) or "pay no attention" (0.7%). On the other hand, 32.0% of children say they "pay little attention" and 17.0% say they "pay no attention," meaning a full 49.0% of children have little or no awareness of online manners (Figure 2-2-1-7). There is a gap between parents' perceptions and children's perceptions, and children are notably less conscious of online manners, etc. than their parents.

When it comes to "concerns about others' online manners," both parents and children named "online slander and character assassination" as the most threatening, and there are other parallel trends overall, but in all categories a smaller percentage of children described themselves as being "concerned" (Figure 2-2-1-8). Here too we see children being less concerned with others' online manners.

When asked about household rules for Internet use

agreed upon by parents and children, 58.0% of parents and 51.8% of children said they had either "firm rules established" or "rules established to an extent," indicating that a majority of households had some sort of arrangements in place regarding Internet use (Figure 2-2-1-9). However, when parents' and children's perceptions of such rules were compared, in 27.2% of cases where parents said they "had talked together and agreed on rules," the children said they had not. Conversely, in 18.8% of cases where parents said they "had not talked together and agreed on rules," the children said they had, illustrating the discrepancies between parents' and children's perceptions in many households (Figure 2-2-1-10).

Before examining the influence of parents on children's anxiety levels, let us look at the correlations between parents' and children's ability to utilize information and understanding of security issues, shown in Figure 2-2-1-11 and 2-2-1-12. It is evident that the higher parents' levels of ability to utilize information and understanding of security issues, the more likely they are to have children with relatively high levels of ability and understanding. It follows that parents' use of ICT and acquisition of skills and knowledge give children an important advantage in using ICT and acquiring the necessary basic skills and knowledge.

It should be noted that when it comes to perceived level of understanding of security issues, even when parents responded that they did not understand such issues, 72.7% of their children said their parents "understood security issues."

As to the question of whether children's levels of anxiety are affected by their parents' level of understanding of security issues, there is a tendency for children of parents with poor understanding of security issues to have higher levels of anxiety. This indicates that parents' understanding of security issues exerts an influence on

Figure 2-2-1-7 Comparison of parents' and children's perceptions of online manners
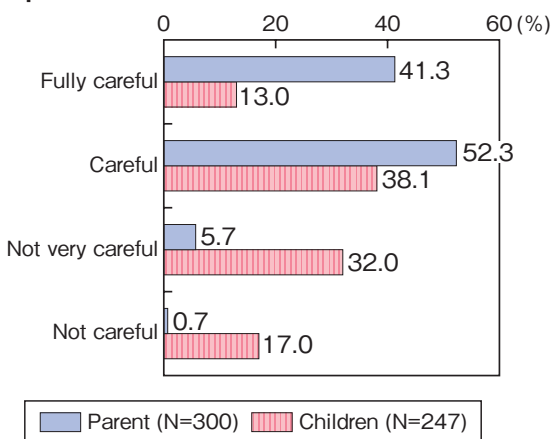
(Source) Ministry of Internal Affairs and Communications "Survey on Safety and Security in an ICT Utilization Society" (2011)

Figure 2-2-1-8 Comparison of parents' and children's concerns about others' online manners
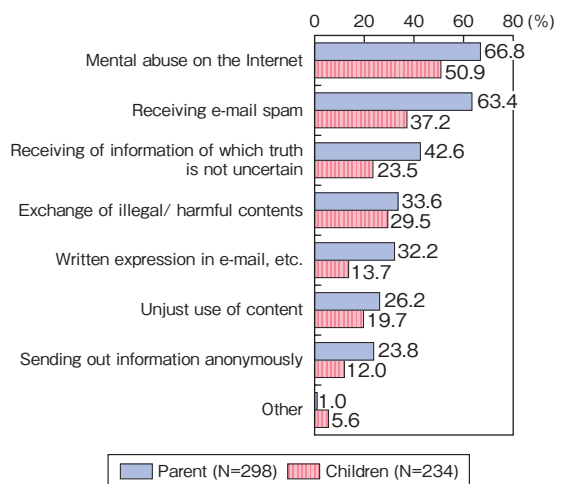
(Source) Ministry of Internal Affairs and Communications "Survey on Safety and Security in an ICT Utilization Society" (2011)

Figure 2-2-1-9 "Talking together and agreeing on rules for Internet use"

Parent (N=300): 10.0 | 48.0 | 30.3 | 11.7
Children (N=247): 8.9 | 42.9 | 33.2 | 15.0

- ☐ Firm rules established
- ☒ Rules established to an extent
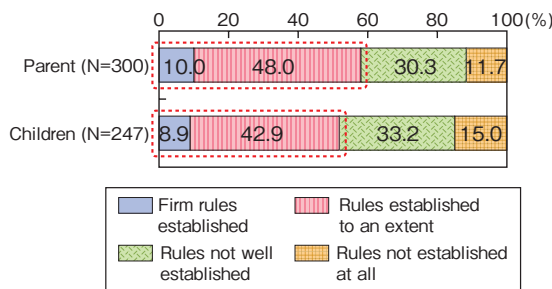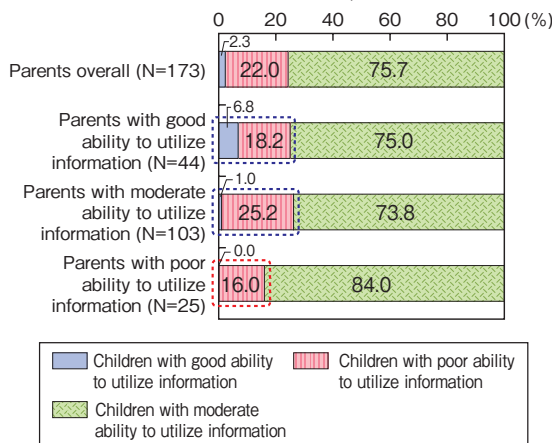- ☒ Rules not well established
- ☐ Rules not established at all

(Source) Ministry of Internal Affairs and Communications "Survey on Safety and Security in an ICT Utilization Society" (2011)

Figure 2-2-1-10 Perception gap between parents and children regarding "talking together and agreeing on rules for Internet use"

Parents' perception of "communication with children and establishment of rules"

Yes, we communicate and set rules (N=151): 72.8 | 27.2
No, we don't communicate or set rules (N=96): 18.8 | 81.3

Children's perception of "communication with parents and establishment of rules"
- ☐ Yes, we communicate and set rules
- ☒ No, we don't communicate or set rules

(Source) Ministry of Internal Affairs and Communications "Survey on Safety and Security in an ICT Utilization Society" (2011)

Figure 2-2-1-11 Children's and parents' ability to utilize information effectively

Parents overall (N=173): 2.3 | 22.0 | 75.7
Parents with good ability to utilize information (N=44): 6.8 | 18.2 | 75.0
Parents with moderate ability to utilize information (N=103): 1.0 | 25.2 | 73.8
Parents with poor ability to utilize information (N=25): 0.0 | 16.0 | 84.0

- ☐ Children with good ability to utilize information
- ☒ Children with poor ability to utilize information
- ☒ Children with moderate ability to utilize information

(Source) Ministry of Internal Affairs and Communications "Survey on Safety and Security in an ICT Utilization Society" (2011)

Figure 2-2-1-12 Parents' and children's understanding of online safety

Parents overall (N=273): 86.5 | 13.5
Parents with good understanding (N=193): 89.6 | 10.4
Parents with poor understanding (N=44): 72.7 | 27.3

- ☐ Children who think their parents understand safety
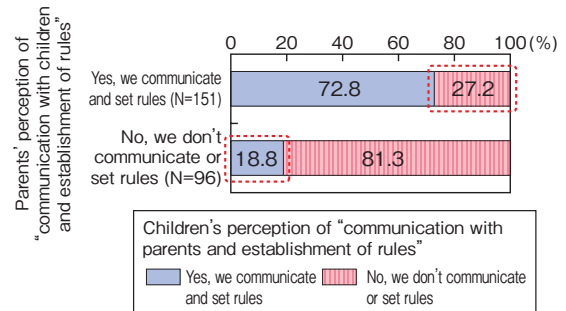- ☒ Children who do not think their parents understand safety

(Source) Ministry of Internal Affairs and Communications "Survey on Safety and Security in an ICT Utilization Society" (2011)

children's level of anxiety.

The separate responses of elementary, junior high and high school students all indicated that "parents and family" are the most effective means of allaying children's anxiety. Parents' understanding of security issues influences children's level of anxiety because it is on parents that children depend most. However, for junior high school students and above, while "parents and family" was the most common response, the percentage giving this response fell in comparison to that of the younger age group. Also, elementary, junior high and high school students differ widely in the ways they utilize ICT, with use diversifying as children grow older. Integrating the above findings, we may conclude that while parents have the greatest capability to allay their children's ICT anxiety, the older children become, the stronger the influence of other factors besides parents becomes.
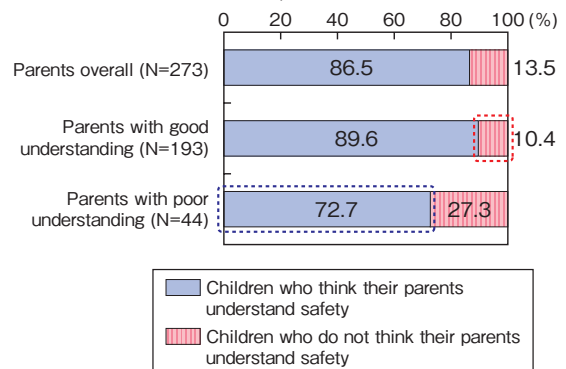
On the issue of whether it is necessary to provide children with knowledge about Internet security issues, 94.4% of parents responded that it was "necessary" or "somewhat necessary," indicating that the necessity of

teaching children about Internet security issues is felt by the vast majority of parents.

As to the question of who ought to provide children with such knowledge, the most common response was "parents and guardians" (78.6%). In second place was "their school" (46.1%), and in third place "they ought to learn by themselves" (32.9%). It appears that while most parents recognize themselves as primarily responsible for providing children with Internet security knowledge, a great many see the need to supplement this with efforts by schools and the children themselves.

As they grow older, children increasingly rely on others besides parents for advice, and parents as well expect their children to have other opportunities for learning about security issues besides those provided by "parents and guardians." This illustrates the importance of providing a variety of opportunities for children to learn about security issues outside the home, such as in school, etc.

The survey findings showed that children's levels of anxiety regarding ICT are lower than those of their par-

ents, although they tend to grow as children grow older. They also indicated that ICT utilization is not widespread among elementary school students, but increases dramatically from junior high school onward. It appears that rising levels of anxiety among older children accompany the increase in ICT utilization. In addition, it became clear that parents' understanding of security issues is the single greatest factor influencing children's levels of anxiety. This is borne out by the tendency for children of parents with good understanding of security issues to have lower levels of anxiety. We may conclude that parents' understanding of security issues is of primary importance in allaying children's anxiety.

In addition, in terms of children's means of allaying their own anxiety, consulting with "parents and family" was the most common response, evidence of the central role of parents and family in this regard. However, this role decreases as children grow older, with junior high and high school students increasingly citing "friends and acquaintances" and others as sources of advice, indicating that there is also a need for people and organizations besides parents to play a role in allaying children's anxiety. The survey findings also showed that while parents saw themselves as primarily responsible for providing ICT knowledge, a great many also see it as essential for schools and children themselves to take the initiative in this regard.

3. Impact of the Internet on the social development of children and youth

Changes in the media environment of children and youth are not all positive. There are some negative aspects which are becoming increasingly evident.

The Ministry of Internal Affairs and Communications and the Council on Promotion of a Safer Internet have conducted joint research on the relation between use of the Internet and bullying and addictive behavior traits among children and youth. Here, we will introduce some of the findings.

(1) The Internet and bullying

Children of each year of age were given a questionnaire on whether they had perpetrated or been a victim of cyber-bullying, or perpetrated or been a victim of bullying at school, in the past month[15].

Among elementary school children, only a very small number responded that they had been involved in cyber-bullying as an aggressor in the past month. The most common form of cyber-bullying among elementary school students, "sending e-mail to all classmates except one person," had been done by only 0.5%, compared to the most common form of bullying at school ("making fun of a classmate") at 18.7%. Meanwhile, in terms of being on the receiving end, the most commonly experienced form of cyber-bullying was "being the only one to post a comment online to which nobody responded," experienced by 1.3% of respondents, in comparison to 34.5% who had experienced "having things said to them by a large number of people which made them angry."

Among junior high school students, the most common form of cyber-bullying perpetrated was "sending a hurtful e-mail or text message to a classmate" at 2.5%, while the most common form of actual bullying at school was "making fun of a classmate" at 28.4%.

Surveys of high school students found that the most common form of cyber-bullying was "making fun of a classmate online" with 4.7%, whereas 27.6% had engaged in "making fun of a classmate" at school.

The above findings indicate that at all ages, few students had engaged in cyber-bullying, and a much greater number had been perpetrators or victims of bullying at school. It is also evident that the percentage of children engaging in or victimized by cyber-bullying grows larger with increasing age.

(2) The Internet and dependency

Young users of a mobile phone SNS service were surveyed with regards to the correlation between the Internet and dependency[16]. When the responses to multiple questions were evaluated for dependent tendencies, 11.0% by the broad standard (the Young standard) and 3.8% by the narrow standard (the Baird standard) were found to be dependent. By gender, women showed stronger dependent tendencies than men in both cases.

The effects of dependency were not limited to negative ones, such as "my lifestyle has become nocturnal" (62.1%) and "my vision has declined" (51.9%), but also included positive effects such as "I've begun to enjoy life every day" (79.9%) and "I've gained the ability to be nice to people" (38.1%).

The primary findings of these surveys on the Internet's impact on young people were that cyber-bullying was considerably less prevalent than conventional bullying at school, and that the rate of dependency was not high when a narrow standard was applied, with the effects of dependency being positive as well as negative.

We may conclude that while perpetrators and victims of cyber-bullying and people who met the narrow definition of Internet addiction were not common, there is still a need to imbue young people with information and communications morals as the Internet is a medium much used by children and youth.

---

15 There were two separate questionnaires, one asking about perpetration of bullying and one about being victimized, which were distributed to separate schools. Questionnaires were given to 38 elementary schools, 56 junior high schools, and 19 high schools throughout Japan.

16 A survey of users of a major SNS was conducted via mobile phone website, and responses were obtained from 56,272 people.

Section 2

Bridging the Digital Divide

1. The digital divide and the need for its elimination

The "digital divide" refers to the gap between people who can access and use information and communications technology (ICT) such as the Internet and computers, and those who cannot[17]. Here we will analyze the digital divide from two standpoints, the digital divide in Japan and that overseas.

2. Toward elimination of the digital divide in Japan

(1) Current status of the digital divide in Japan

A. Status of the digital divide between individuals and between organizations: status of Internet utilization

The Internet is rapidly becoming an essential part of the infrastructure for Japanese citizens, with a utilization rate of 78.2% (out of the entire population aged 6 and over) as of the end of 2010. Considering the fact that Japanese people's lifestyles are increasingly dependent on the Internet, there is a danger that those without Internet access or proficiency (the "have-nots" of the digital divide) will be unable to access basic services, thus becoming trapped in a vicious cycle.

Utilization rates for the 60 and over age group, while they have increased dramatically in recent years, are still lower than those of the 13-59 age group. Also, among those aged 60 and above, we find the utilization rate diminishing in accordance with increasing age (Figure 2-2-2-1, top graph). There is also a significant income-based disparity, with rate of use falling in accordance with income, and only 63.1% of those with annual incomes of under ¥2 million utilizing the Internet (Figure 2-2-2-1, bottom graph).

A comparative analysis of Internet utilization rates by gender, age group, annual income, and rural vs. urban area was performed[18]. At the end of 2010, the most significant factor impacting Internet utilization or lack thereof was age group. In particular, among those aged 60 and above, the utilization rate was found to diminish in accordance with increasing age. The second most

Figure 2-2-2-1   Internet utilization rates
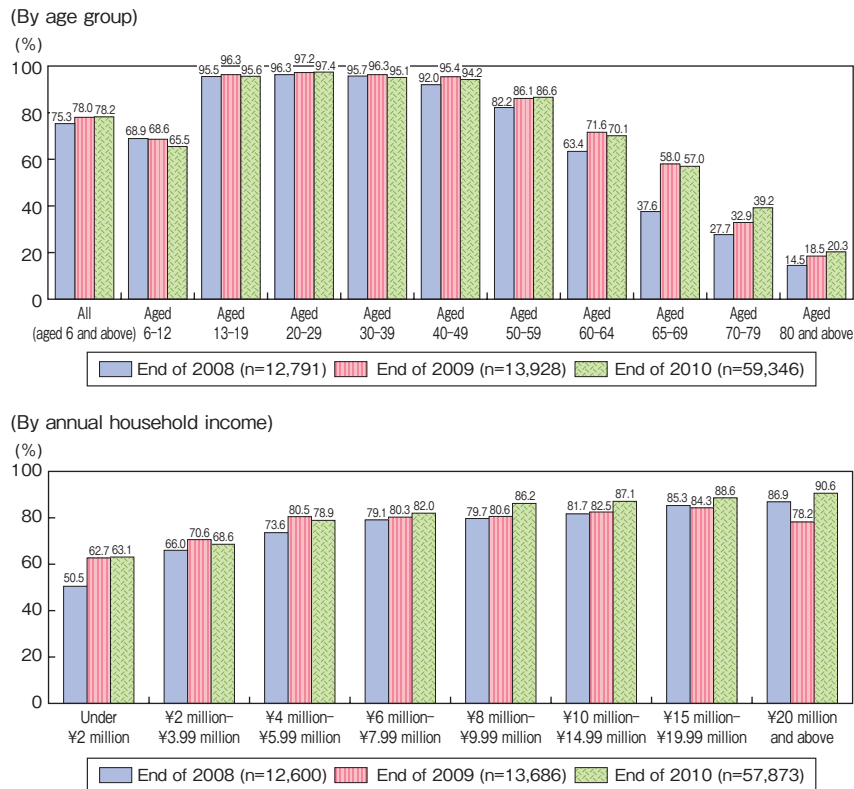
(Source) Ministry of Internal Affairs and Communications "2010 Communications Usage Trend Survey"

---

17 2004 White Paper on Information and Communications in Japan

18 To analyze each factor in use or non-use of the Internet by a unified standard, Internet use or non-use was set as an explained variable (external criterion), and the five factors "gender," "age group," "household income," "region" and "size of municipality of residence" as explanatory variables, and type II quantification analysis performed.

strongly correlated factor was annual income. Among those with annual household incomes of ¥2 million or less, lower income was directly correlated with lower rate of Internet use.

(2) The need for a universally inclusive social framework incorporating ICT

Increasingly prevalent "isolation" is a growing social issue in Japan, bringing new risks to our society. The segments of the population most often cited as susceptible to isolation are single-person households, elderly people living alone, and single-parent households. To combat increasing rates of isolation, we must build a society which excludes no-one from the network of mutual support[19], in other words a "universally inclusive social framework." The formation of networks through ICT is expected to play a key role in this effort.

(3) Analysis of challenges related to ICT utilization

We examined the digital divide between individuals and between groups based on the results of a survey of challenges of everyday living, social relations and attitudes toward ICT utilization among low-income people and the elderly, known as digital "have-nots," as well as single parents and single-person households[20], and analyze challenges that face the promotion of ICT.

A. Lifestyle and social challenges

Here we will analyze the issue facing each segment of society and the characteristics of each segment's forma-

tion of social ties, as a precursor to analysis of Internet utilization trends. We will also give an overview of the connections between social relations as a whole, and online communities. First of all, we note that the number of both personal friends and acquaintances in the local area is lowest among the low-income segment. Meanwhile, single parents have a small number of personal friends, while those in single-person households have a small number of acquaintances in the local area. As for participation in communities, a high percentage of low-income people had zero participation in communities, and were less social overall. Single parents, as well, as a group have a somewhat low rate of participation. Those in single-person households had a comparatively high rate of participation in groups based around shared hobbies or socializing, but a large number also had zero community participation. The elderly also had a comparatively high rate of participation in groups based around shared hobbies or socializing, but those who do not use the Internet had a relatively high rate of zero community participation.

When it comes to online communities, however, single-person households and low-income people had relatively high rates of participation, as shown in Figure 2-2-2-2, and around half of single parents also took part, but the elderly had a low rate at 29.8%. Comparing the status of revitalization of "ties"[21] through the Internet among online community participants and non-participants (Figure 2-2-2-3), participants had a much higher rate of revitalized ties than non-participants, and around 70% of

Figure 2-2-2-2　Participation in online communities
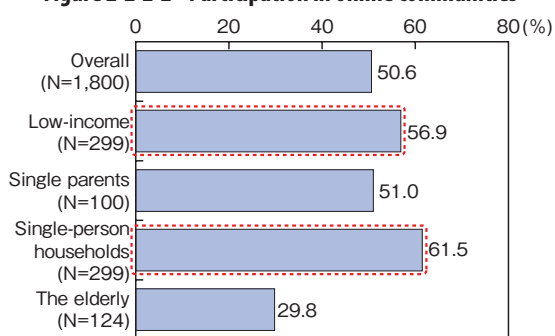
(Source) Ministry of Internal Affairs and Communications "Survey on Safety and Security in an ICT Utilization Society" (2011)

Figure 2-2-2-3　Revitalization of "ties" through the Internet
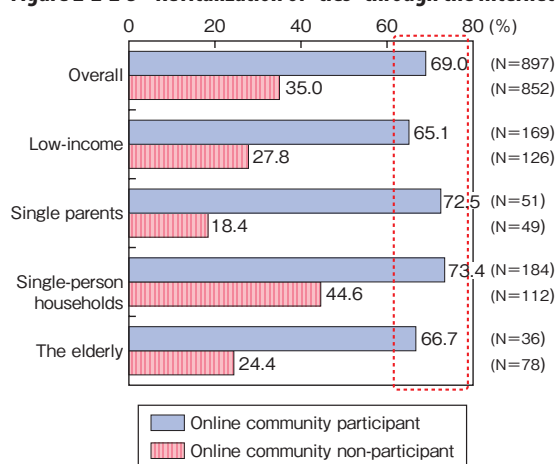
Online community participant
Online community non-participant

(Source) Ministry of Internal Affairs and Communications "Survey on Safety and Security in an ICT Utilization Society" (2011)

19 From Prime Minister Naoto Kan's policy speech to the 174th session of the Diet on Friday, June 11, 2010 (Bringing About "A Society Inclusive of Every Single Person").

20 An online survey of Internet users in Japan and a general mail-in survey of Japanese citizens were conducted, and the respondents classified in categories, with 299 low-income people, 100 single parents, 299 residents of single-person households, and 200 elderly people.

21 People who used the Internet to accomplish one or more of the following: "Deepening communications with faraway family, friends, or acquaintances" "Regaining contact with family, friends or acquaintances I had lost touch with" "Gaining opportunities for communication with acquaintances, etc. in the real (non-Internet) world" "Presenting my own information or creations and obtaining feedback" "Finding people with similar hobbies or interests" "Finding people unlike those around me".

participants had achieved revitalization of ties. These findings indicate that participation in online communities plays a considerable role in supplementing social relationships.

B. Analysis of the status of Internet utilization

A survey of people's perceptions of the necessity or lack thereof of the Internet found that more than 60% of single parents and people in single-person households considered it "an indispensable part of their lives," as well as more than half of low-income people, a percentage close to the overall average. Meanwhile, although the percentage of elderly people who considered the Internet "indispensable" was low overall, it still exceeded one third.

In terms of monthly computer-related fees, the low-income, single-parent, and single-person household segments paid below-average fees at ¥4,000/month or less. However, a relatively large percentage of single parents in particular used plans priced higher than the average, at ¥6,000/month or more, indicating a polarization among this segment. A large number of elderly people, as well, paid relatively high fees of ¥5,000 to ¥7,000 a month.

C. Means of acquiring Internet utilization skills

With regard to means of acquiring Internet utilization skills, "websites, etc." was the most common response among the low-income and single-parent segments, while the single-person household segment most often cited "friends and acquaintances." Among the elderly, as well, a large number cited "family" or "friends and acquaintances," but a great many also said they had "no opportunity to acquire skills." Among elderly Internet non-users in particular, a large number said they had "no interest in learning," but there were many claiming they had "no interest in learning" as well.

D. Challenges of everyday life resolved by the Internet

As to challenges of everyday life resolved by the Internet, for all segments "health" was the most often cited issue. Health is the issue most often cited as a cause of concern, and it is evident that the Internet is playing an important role in assuaging such concerns. Among the elderly, in particular, 48.8% had resolved health issues using the Internet.

E. Challenges related to Internet utilization

The Internet itself poses challenges to people, the most commonly cited of which is "high Internet connection fees," while for the low-income, single-parent, and single-person household segments, this was followed in second place by "high cost of Internet-capable devices" (computers, etc.), indicating that economic factors present key obstacles for these segments (Figure 2-2-2-4).

For the elderly, on the other hand, the most often cited issue was "difficulty in keeping up with new technologies, products and services," and there was a comparatively high rate of similar technology-related responses such as "inability to use Internet-capable devices" and "inability to adapt to the general shift of services to the Internet." In particular, elderly non-Internet users often claimed "inability to use Internet-capable devices" and "inability to adapt to the general shift of services to the Internet."

F. What is need in order to overcome challenges related to Internet utilization

Reflecting the content of issues facing Internet utilization, the program or service most needed for resolution of said issues is "further lowering of Internet connection fees." Among the low-income, single-parent and single-person household segments, this was followed by "a subsidy program for purchase of computers or other Internet-capable devices" in second place, indicating that economic support measures are the most sought-after overall.

Among the elderly, however, the most common response was "development of user-friendly devices." This response was also relatively common among the single-parent segment. Among elderly non-Internet users, in addition to "development of user-friendly devices," "establishment of local help desks" was relatively often cited.

G. Elimination of the digital divide between individuals and between organizations

To sum up the current analysis, there are issues common to all segments surveyed, as well as issues particular to certain segments. Specifically, among the low-income, single-parent, and single-person household segments, there is strong concern over economic issues such as "high Internet connection fees," and calls for economic measures to address them.

Meanwhile, among the elderly, there is concern over technological literacy-related issues and calls for "development of user-friendly devices," etc., not seen in other segments. A large proportion of elderly non-Internet users claim to have no interest in learning the necessary skills, but many of them also cited a lack of opportunities to learn such skills. Currently, over 70% of Japanese use the Internet, and there is a threat of growing disparity between those who can access it and those who cannot. This is borne out by the high proportion of elderly non-Internet users who cited "inability to adapt to the general shift of services to the Internet" as an issue of concern.

Moving forward, there is a need for initiatives that make ICT more approachable and easier to use in order to realize a user-friendly, user-centered ICT environment.

For many in the low-income, single-parent, and single-person household segments, cost is a key issue, and

Figure 2-2-2-4　Challenges related to Internet utilization

Out of the entire non-Internet using population, the most frequent response was "Internet connection fees were too expensive"

Among the elderly, highest frequency is "difficult to catch up with technology". Relatively high is, "I do not understand how to use terminal" and "Ever since the world became Internet oriented society, I cannot catch up with it."

Among elderly non-Net users, "I do not understand how to use terminal" and "Ever since the world became Internet oriented society, I cannot catch up with it" was most frequent.

—●— Overall　—■— Low income　—▲— Single parent　—◆— Singles　—▼— Elderly　—○— Elderly (non-Internet user)

(Source) Ministry of Internal Affairs and Communications "Survey on Safety and Security in an ICT Utilization Society" (2011)

while Internet use is fairly widespread among these populations, they face challenges from an economic standpoint. These segments are prone to isolation and at risk of becoming "have-nots" in what could be called the "social divide," due to a relative paucity of social interaction, but it is evident that online communities help to generate social connections and go some way toward providing a solution.

In the past, the digital divide was usually discussed in terms of infrastructure, but this survey revealed that there are also a wide variety of needs from a utilization standpoint. Henceforth, user-centric and carefully tailored responses to diverse needs will play an important role in bridging the digital divide.

(4) Examples of initiatives aimed at eliminating the digital divide between individuals and between organizations

What kind of initiatives, aimed at bridging the digital divide between individuals and between groups, are already underway? There are a wide variety of initiatives targeting a wide variety of population segments and aiming to bridge the digital divide through support for ICT users, such as IT training sessions and computer classes. Below, we will describe some initiatives targeting the elderly and single parents, two groups identified in the analysis in (3) as having particular needs.

For some time, there have been a large number of measures taken to assist the elderly with ICT utilization. For this report, we analyzed long-running initiatives im-

plemented by groups with considerable experience in assisting the elderly with ICT use. In terms of ICT utilization initiatives that support single parents, the need to balance work and child-rearing is a major challenge for this group, and for this reason we chose to analyze an initiative that seeks to address this challenge through ICT.

A. Support for utilization of ICT by the elderly
(A) The Mellow Club

The Mellow Club is a group for seniors, by seniors, launched in the pre-World Wide Web "online service provider" era and later adapted to the Internet. A nationwide network of seniors, the group conducts both online and offline activities, but all of its administrative meetings and paperwork procedures are done online, in line with the group's motto, "Full enjoyment of the benefits of membership, even if in a wheelchair."

B. ICT-based support for working parents
(A) NTT Com CHEO Co., Ltd. (Minato City, Tokyo)

NTT Com CHEO is a company providing technical support over the phone or through home visits for those with inquiries about Internet connection, settings, etc. The telephone support service is staffed by approximately 1,000 people working at their own homes throughout Japan, the majority of whom are women in their 30s and 40s. It is the only call center of this scale in Japan in which staff work at home.

(5) Realization of barrier-free ICT

For persons with disabilities, ICT has considerable potential to encourage participation in society and make life easier by helping them lead independent lives, work at home, train in preparation for a job, and obtain information on day-to-day living and employment. Below, we outline the status of Internet utilization by the disabled, and present an example of an initiative aimed at encouraging participation in society, and one of an effort to assist the disabled with applications for the rapidly growing smartphone market, with analysis of the factors that make them a success.

A. Status of Internet utilization by the disabled

A survey conducted by the Cabinet Office of Japan in FY2009 placed the percentage of disabled persons who use the Internet at 52.2%. Compared to the 78.0%[22] of the general population who use the Internet, as of the end of 2009, this is a low figure, and it is evident that there are obstacles to Internet use by persons with disabilities.

When disabled persons were surveyed as to the difficulties and anxieties they faced when using the Internet, the most common response was "fear of leakage of personal information" at 40.0%, followed by 30.0% who feared "falling victim to scams or fraud" and 28.4% who were concerned about "the high cost of equipment and telecommunications services." It is evident that promoting ICT literacy and affordability of equipment and services is essential to bridging the digital divide for this segment.

There were also issues cited that could be resolved with simplification or universal design, such as "on-screen displays and designs are difficult to see" (13.7%), "information is difficult to understand" (15.7%), "keyboards, software or peripherals are hard to operate" (15.3%), "audio voice recordings are difficult to hear or understand" (10.3%), and "insufficient development, availability, or user-friendliness of Braille displays, joysticks, voice-activated software, or other auxiliary equipment or software" (9.5%). Also, there is a need for a support network to assist disabled persons with the Internet, as 17.8% stated that "there is nobody to teach me how to use the technology" (17.8%).

As described above, there are obstacles facing disabled persons who seek to use the Internet. However, when asked about what support they were receiving for their Internet use, 72.2% responded that they received "none." Moving forward, it is necessary to create an environment in which disabled persons can easily avail themselves of ICT, and to make maximum use of ICT to encourage participation in society by people with disabilities.
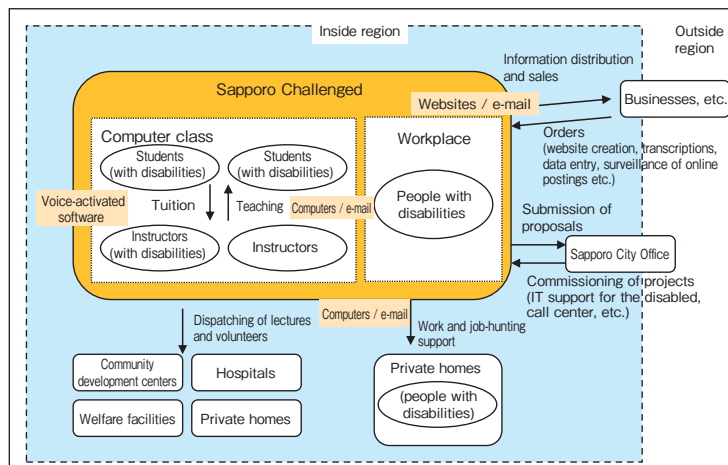
B. Example of initiatives aimed at promoting disabled people's participation in society through ICT

(A) Sapporo Challenged (Specified Nonprofit Corporation)

Sapporo Challenged is a Specified Nonprofit Corporation launched in 2000 which aims to promote participation in society and work opportunities for people with disabilities (Figure 2-2-2-5).

ICT training is conducted in three learning zones on

Figure 2-2-2-5 Sapporo Challenged (Specified Nonprofit Corporation) (Sapporo, Hokkaido)

ICT used	Application / Role	Features
Computers / Broadband	Communication, work applications. Tools allowing the disabled to participate in society	—
Voice-activated software	Used by visually impaired people in computer classes	A specialized tool to assist the visually impaired
Mailing list	Reporting on NPO activities and disseminating job information for the disabled	—
Websites, blogs (Sapporo Challenge Diary)	Disseminating information on activities and maintaining contact. Active efforts are also made to publicize activities through other means, such as newspaper coverage	Disclosure and dissemination of information is a vital part of activities. Blog is updated by office and administrative staff

【Website】

【Computer class】

(source) http://s-challenged.jp/?page_id=5

[Example of material covered in computer class]
【Visually impaired】 Listening to Radiko (2 sessions)
【Visually impaired】 Searching MySupport
【Visually impaired】 Intro to Windows 7 (2 sessions)
【Visually impaired】 Intro to AOK Menu (1 session)
【Visually impaired】 Using Sapie (4 sessions)
Fun with Labelyasan.com
Upgrading to Microsoft Office 2007 (6 sessions)
Intro to Excel 2007 (second half) (5 sessions)
Intro to Word 2007 (second half) (5 sessions)
Maintenance of your PC (2 sessions)
Classes labeled 【Visually impaired】 can be taken by visually impaired persons.

(Source) Ministry of Internal Affairs and Communications "Survey on Safety and Security in an ICT Utilization Society" (2011)

22 2009 Communications Usage Trend Survey

the premises, one of which is reserved for the visually impaired. Morning and afternoon computer classes are held every day, and a total of 3,000 people take them each year. Attendees are taught the basics of ICT, with a focus on the operation of applications useful in day-to-day life. Recently there have also been classes aimed at boosting communicative ability. Classes are conducted at a leisurely pace so that disabled persons can learn easily. Some of the disabled students who stick to their ICT training eventually become instructors themselves and begin the work of training others.

C. Example of initiatives aimed at supporting disabled people using smartphones

Smartphones, and other devices reflecting new ICT trends, are a sector that has been growing remarkably in recent years, and these devices and their increasingly advanced applications are seen as having potential for use by the disabled. Here we will focus on smartphones and have a look at one effort to assist the disabled using them.

(A) "Tinted Glasses (Iro no megane)" smartphone app using augmented reality to assist those with color vision deficiencies

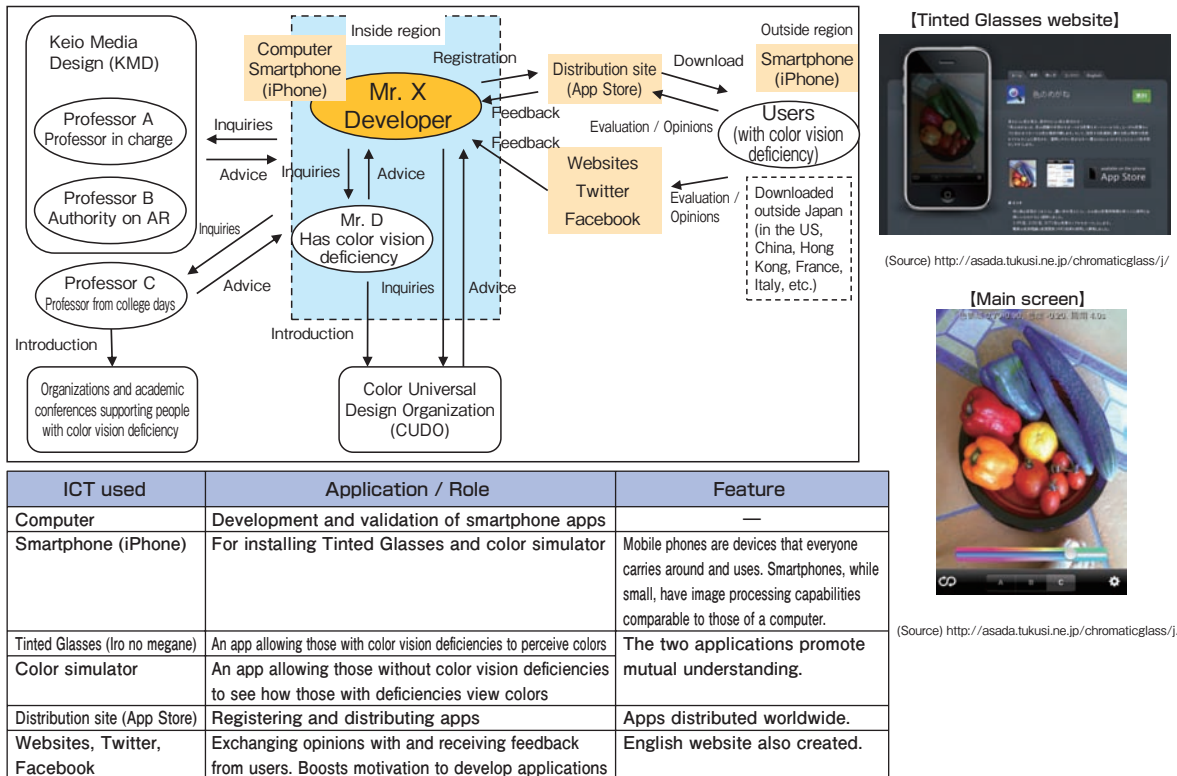Mr. X, former head of an ICT start-up residing in Sap-

poro, Hokkaido, designed smartphone applications (apps) allowing people with color vision deficiencies to distinguish colors ("Tinted Glasses") and allowing those without deficiencies to see how those with them experience the world ("Color Simulator") (Figure 2-2-2-6). These apps are distributed worldwide for free via an app distribution site, and thus far a total of 12,100 have been downloaded[23].

3. Efforts to Bridge the International Digital Divide

(1) Factors contributing to the international digital divide and importance of eliminating it

The digital divide leads to disparities between individuals, regions, and all kinds of groups. In international terms, it leads to delayed development of countries' and regions' technology, education, labor, politics, tourism and other sectors, and is seen as posing an increasing threat to the global economy and international society. Bridging of the international digital divide will lead to the elimination of information-related inequality, as well as bolstering economic development and fostering mutual cultural understanding, contributing to creation of a more prosperous international community. For this rea-

Figure 2-2-2-6 "Tinted Glasses" smartphone app using augmented reality to assist those with color vision deficiencies

【Tinted Glasses website】

(Source) http://asada.tukusi.ne.jp/chromaticglass/j/

【Main screen】

(Source) http://asada.tukusi.ne.jp/chromaticglass/j/

ICT used	Application / Role	Feature
Computer	Development and validation of smartphone apps	—
Smartphone (iPhone)	For installing Tinted Glasses and color simulator	Mobile phones are devices that everyone carries around and uses. Smartphones, while small, have image processing capabilities comparable to those of a computer.
Tinted Glasses (Iro no megane)	An app allowing those with color vision deficiencies to perceive colors	The two applications promote mutual understanding.
Color simulator	An app allowing those without color vision deficiencies to see how those with deficiencies view colors	
Distribution site (App Store)	Registering and distributing apps	Apps distributed worldwide.
Websites, Twitter, Facebook	Exchanging opinions with and receiving feedback from users. Boosts motivation to develop applications	English website also created.

(Source) Ministry of Internal Affairs and Communications "Survey on Safety and Security in an ICT Utilization Society" (2011)

23 Number of downloads as of March 14, 2011

son, nations including Japan and international organizations are making every effort to overcome this international challenge.

(2) Current status of the international digital divide

A variety of efforts are being made to bridge the international digital divide, but there is still a considerable disparity between high-income nations and in low-income nations in terms of the penetration rates of ICT services. Under these circumstances, policies aimed at elimination of the digital divide take a different form in developing countries than in developed countries, and approaches to the issue are diversifying. With this in mind, we will examine the issue of the international digital divide from multiple viewpoints.

A. Digital divide by region and income level

Grouping nations according to income level[24], and looking at the change in the Internet-using population relative to total population over time, we find that in mid-income and lower-income countries, a growing user population signifies that Internet-using population is growing relative to the total population. A major disparity remains, however, with high-income nations that make up only 15.5% of the world's population accounting for 59.7% of the Internet-using population.

B. Transformation of ICT infrastructure environments in other countries

The international digital divide is often explained in terms of the income levels and economic scale of the countries and regions in question. For example, there remains a huge gap between the penetration rates of fixed phone lines, cellular phones and the Internet in high-income and low-income nations.

C. Change in ICT infrastructure penetration

The change in penetration rates over the last 10 years points to a shift of telephone networks toward mobile and Internet toward broadband, with growth particularly dramatic in developing countries, indicating the speed with which ICT infrastructure is developing in these countries. Sophistication and diversification of the ICT infrastructure are seen as contributes to differing methods and approaches to bridging the digital divide in developed and developing nations.

Figure 2-2-2-7 shows the change in penetration rates of fixed phone lines and mobile phones (number of subscriptions divided by total population). Fixed phone lines, one of the first elements of ICT infrastructure to develop, have reached a high level of penetration, particularly in developed countries, over several decades. It is primarily in high-income nations that fixed-line phones have reached penetration rates of 40% or more since 2000. The mobile phone penetration rate, on the other hand, has skyrocketed across the board since around 2005, and it is notable that growth has been dramatic in developing countries as well where the fixed-line phone penetration rate remains low.

Figure 2-2-2-8 shows the penetration rates of fixed phone lines and mobile phones at five-year intervals since 1985, with each nation's data averaged and classified according to income level. The dominant pattern in developed countries is for development and penetration of the fixed-line phone network to be followed by development and penetration of the mobile phone network, whereas in developing countries the tendency is for mobile phone network development and penetration to progress rapidly even while the fixed-line phone development and penetration rate remains low. This trend

Figure 2-2-2-7 Penetration rates of fixed phone lines and mobile phones
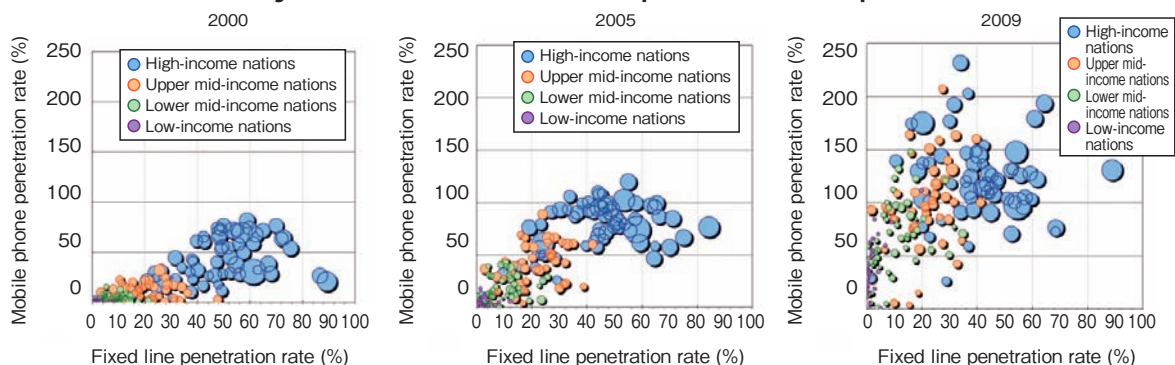
(Source) Ministry of Internal Affairs and Communications "Survey on Elimination of the International Digital Divide" (2011)
(Prepared on the basis of ITU "World Telecommunication/ICT Indicators Database 2010 (15th Edition)")

---

24 The following criteria were used to classify countries by income level for the purposes of this survey (205 countries)
   High-income countries: Per capita GNI (gross national income) of $11,906 or above: 43 countries
   High mid-income countries: Per capita GNI (gross national income) between $3,856 and $11,905: 53 countries
   Low mid-income countries: Per capita GNI (gross national income) between $976 and $3,855: 46 countries
   Low-income countries: Per capita GNI (gross national income) of $975 or below: 63 countries
   *Criteria are those established by the World Bank (announced July 2009)

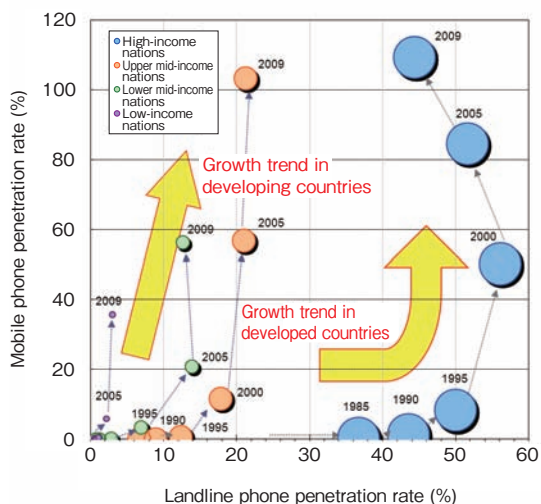**Figure 2-2-2-8 Correlation between penetration rates of fixed phone lines and mobile phones (change since 1985)**

(Source) Ministry of Internal Affairs and Communications "Survey on Elimination of the International Digital Divide" (2011)
(ITU "World Telecommunication/ICT Indicators Database 2010 (15th Edition)" Prepared on the basis of)

points to a key difference between the path of telephone infrastructure progress in developed and developing nations, with mobile phones constituting a particularly vital part of the ICT infrastructure in the latter.

D. Speed of ICT infrastructure penetration

Examination of the speed of ICT infrastructure penetration, and specifically the number of years it takes a type of infrastructure to reach 10% penetration[25], reveals that in terms of fixed-line phones there is a major gap between national income-level groups, with low-income nations lagging considerably. This gap is smaller, however, when it comes to mobile phones and the Internet. In fact, for mobile phones the number of years required for penetration grows shorter in accordance with declining income. It can be inferred that mobile phones are rapidly becoming commonplace in developing countries due to the lower development cost and reduced time required for network construction compared to conventional fixed-line phone networks. This phenomenon of "leap-frogging," in which new technologies jump ahead of older technologies, contributes to the rapid development of ICT infrastructure in developing countries and in turn to the bridging of the international digital divide.

(3) Analysis of factors contributing to the international digital divide

Paths toward elimination of the international digital divide are seen as diverging widely on the basis of coun-

tries' and regions' cultures and customs, or the economic and social challenges that they face, as well as the policy goals (development of broadband, strengthening of international competitiveness, etc.) they have established. Here we will analyze the contributing factors, focusing on development of ICT infrastructure and utilization, with the overall status of the international digital divide in mind.

A. Promotion of ICT infrastructure development

Looking at the amounts invested in the information and communications sector (particularly in infrastructure projects which may feature participation by private enterprises) in other countries, we find that information and communications-related infrastructure investment is growing in South America, Africa, India, Eastern Europe and the Middle East. In particular, investment in information and communications has been increasing in low-income nations since 2004. This proactive investment is seen as helping to widen infrastructure coverage and raise the level of penetration overall.

In addition to a high level of proactive private investment, users in these regions benefit from the market participation of a large number of enterprises, leading to a larger market, availability of innovative services, and more affordable rates. Encouraging more businesses to enter the market is seen as one effective approach to bridging the digital divide.

B. Penetration and utilization of ICT

(A) Cost to users of accessing the Internet

Fees charged to users for Internet access are a major factor influencing ICT penetration and utilization. In the case of fees for fixed broadband services, countries with low penetration rates have higher fees relative to gross national income (GNI) than countries with high penetration rates. In particular, in most low mid-income to low-income nations, fees remain high and act as an obstacle to broader penetration and utilization. In order for ICT infrastructure to penetrate and bring benefits to a greater number of users, it is essential to lower fees through proactive investment and policy measures aimed at fostering a competitive business environment.

(B) ICT penetration, utilization and literacy

Here we will analyze the correlation between ICT literacy and ICT utilization. ICT literacy is seen as depending to some extent on the general educational level of each country. With this in mind, we have analyzed the correlation between the Internet utilization rate and the senior high school enrollment rate, one index of national educational level. Generally speaking, countries with high Internet utilization rates are those with 90% or high-

---

25 Statistics are from 1960 onward, with the number of years taken to progress from 0% infrastructure penetration (initial introduction) to 10% penetration, for those countries for which data could be obtained, averaged (countries that have not yet reached 10% not included).

er rates of senior high school enrollment. However, there are also countries with high Internet utilization rates despite a low rate of senior high school enrollment.

(C) Applications that encourage ICT utilization: Social Network

Let us examine the digital divide in terms of social media, a type of ICT application which is skyrocketing in popularity worldwide. Looking at the correlation between Internet utilization rate and rate of participation in social networks[26], we see that even among non-high-income nations with low Internet utilization rates, there are some nations where the rate of participation in social networks has risen dramatically (Figure 2-2-2-9). It is evident that this is driven by the prevalence of Internet cafes and mobile phones in these countries. Considering the fact that social networks can be accessed using mobile phones as well, there is possibility for developing countries to close the ICT utilization gap with developed countries through such applications and services accessible via mobile phone, as mobile phones are rapidly becoming commonplace in the developing world.

C. Promotion of ICT policies

Countries with proactive ICT policies have set targets and established ICT strategies suited to their particular national circumstances. Looking at the top five countries for each income group as ranked by a World Economic Forum report on "policy prioritization of ICT"[27], we see that the top-ranked countries in each income group are Singapore, Malaysia, Tunisia and Vietnam respectively.

Figure 2-2-2-9　Internet utilization rate and rate of participation in social networks
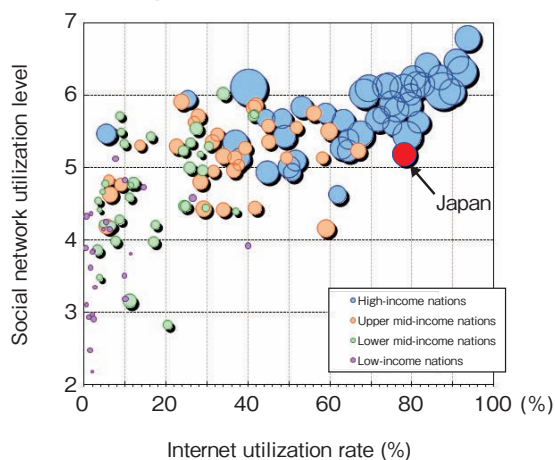
(Source) Ministry of Internal Affairs and Communications "Survey on Elimination of the International Digital Divide" (2011)

These countries have widely varying ICT policy methods and aims. It is clear that elimination of the international digital divide should be driven by policy approaches tailored to the circumstances of each country.

(4) Toward bridging of the international digital divide

It is vital to eliminate the digital divide in order to bestow the benefits of ICT on all people equally and build the ICT society of the future. Bridging the digital divide is expected to alleviate information-related inequality, bolster economic productivity, foster mutual cultural understanding, and enable the creation of a more prosperous international society.

However, each country and region takes a different route to development of ICT infrastructure and bridging of the digital divide, with a broad spectrum of approaches to private-sector investment and public involvement. Developing and developed countries should learn from one another's best practices and promote measures suited to their own national and regional circumstances so as to maximize effectiveness. Based on these observations, we conclude that Japan should work to build a more sophisticated ICT infrastructure, as well as reexamining the fundamental nature of Japan's international contributions while paying close attention to the specific ICT needs and challenges of each country.

Section 3
Local Revitalization through ICT

1. Local ICT Utilization

Today's regions, which face numerous challenges including a low birth rate, an aging society, decreasing population, and diminished employment opportunities, call for the maximizing of ICT's potential to address these challenges. In addition, ICT offers regional residents opportunities for interaction and partnership with a wide variety of people and organizations, and serves as an effective means of revitalizing interpersonal ties. Expectations are high for ICT to revitalize regions by helping to overcome challenges, fostering closer ties, creating new business and generating new value.

For this white paper, we built on the survey findings of last year's white paper to conduct wide-ranging surveys of local ICT utilization and conducted an analysis of the challenges facing utilization and the steps that must be taken to revitalize through ICT. We also analyzed the promotion of ICT utilization not only by local govern-

26 Based on responses to questionnaire "The Global Information Technology Report 2010-2011: Use of virtual social networks" (Facebook, Twitter, LinkedIn, etc.) distributed by the World Economic Forum

27 Based on responses to questionnaire "The Global Information Technology Report 2010-2011: Government prioritization of ICT" distributed by the World Economic Forum

ments themselves but also in partnership with NPOs and other organizations.

2. Current status of local ICT utilization

(1) Rate of implementation by local governments of programs employing ICT (2011 survey)

In March 2011, we performed a survey on implementation by local governments of typical programs employing advanced ICT programs in 11 sectors: medicine and nursing care, social welfare, education, disaster preparedness, crime prevention, tourism, traffic and transportation, promotion of agriculture, forestry and fisheries, promotion of industry (other than agriculture, forestry and fisheries), employment, and regions.

The survey showed that while 83.5% of regions had implemented such projects in at least one sector, the average implementation rate across all sectors was only 27.4% (Figure 2-2-3-1) [28].

(2) Status of basic ICT services

This survey of programs employing ICT also included relatively easily implemented services (basic ICT services) such as providing information to the public via websites. The average for all sectors was 61.6%, but it may be inferred that basic ICT services are provided in

at least one sector in nearly all local governments [29].

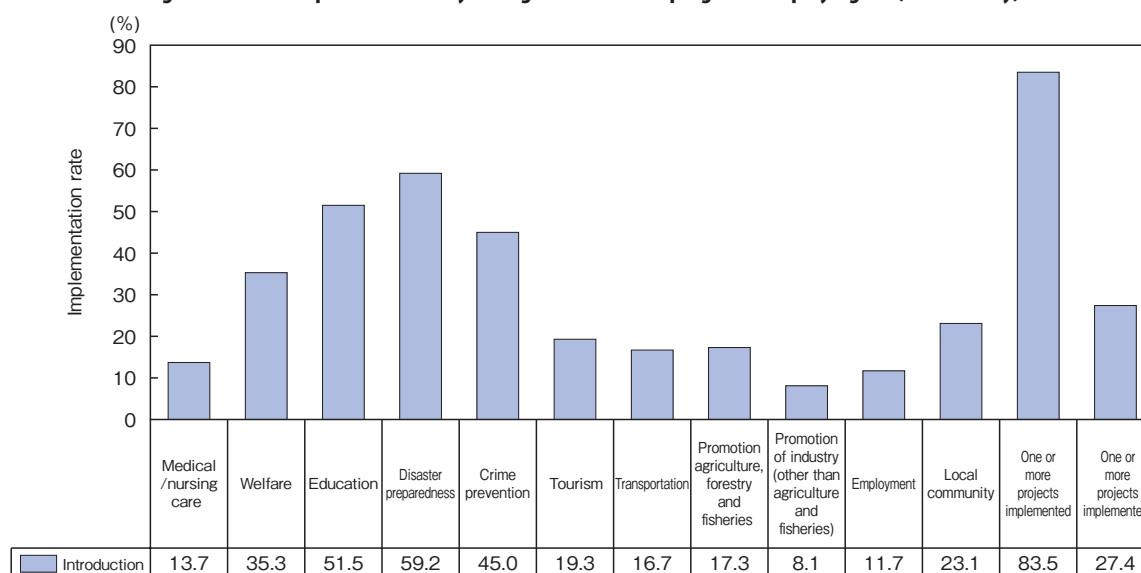### (3) Future plans to introduce programs employing ICT

As to the question of future plans to introduce programs employing ICT, local governments planned to implement or were considering implementing programs in 10.1% of cases (average of all sectors.) On the other hand, 62.5% of local governments had no plans to implement programs in any sector.

3. Challenges facing local ICT utilization

(1) Challenges facing ICT utilization

Among challenges standing in the way of implementing programs employing ICT, cost issues were most often cited, with 55.3% responding that "implementation costs are high", 55.2% stating that "operating costs are high", 47.5% saying that "cost-benefit balance is unclear" (Figure 2-2-3-2). It is evident that cost concerns encompass both the costs themselves and doubts about cost-benefit balance. Following this were personnel-related concerns such as "the local government lacks know-how" (42.0%) and "the local government lacks personnel" (38.2%), followed by infrastructure concerns like "infrastructure is inadequate" (29.4%). Many also expressed concern about the know-how necessary for

Figure 2-2-3-1   Implementation by local governments of programs employing ICT (2011 survey)

	Medical /nursing care	Welfare	Education	Disaster preparedness	Crime prevention	Tourism	Transportation	Promotion agriculture, forestry and fisheries	Promotion of industry (other than agriculture and fisheries)	Employment	Local community	One or more projects implemented	One or more projects implemented
Introduction	13.7	35.3	51.5	59.2	45.0	19.3	16.7	17.3	8.1	11.7	23.1	83.5	27.4

(Source) Ministry of Internal Affairs and Communications "Survey on Penetration and Promotion of Programs Employing ICT" (2011)

28 In the figure, "Implementation in at least one sector": percentage of total responding local governments (606 governments, excluding prefectural governments) that have implemented programs in at least one of the 11 sectors. "Average for all sectors": simple average for the 11 sectors.

29 90.9% of local governments make information available via website in at least one sector, but considering the fact that the remaining 9.1% constitutes those local governments not responding, or giving no response or a negative response for each of the 11 sectors, it is safe to say that nearly all local governments responding to the survey provide information via website.
The results of the 2010 "Survey on Promotion of e-Government in Local Government Administration" showed that nearly 100% of local governments had established websites.

Figure 2-2-3-2　Challenges facing local ICT utilization (average for all sectors)

Category	Challenge	Value
Cost	Operating costs are high	55.2
Cost	Implementation costs are high	55.3
Cost vs. benefits	Cost-benefit balance is unclear	47.5
Cost vs. benefits	Benefits do not justify the costs	15.8
Personnel / Know-how	Local government lacks know-how	42.0
Personnel / Know-how	Local government lacks personnel	38.2
Infrastructure / Systems	Infrastructure is inadequate	29.4
Infrastructure / Systems	Legal or systemic restrictions	6.2
Perceptions and challenges of users and communities	Users lack information or understanding	15.0
Perceptions and challenges of users and communities	Users cannot be expected to cover costs	14.7
Perceptions and challenges of users and communities	Community residents in general lack information or understanding	14.6
Perceptions and challenges of users and communities	Users lack technological literacy	11.8
Perceptions and challenges of users and communities	Local organizations and enterprises cannot be expected to cooperate or participate	5.3
Other	Those within local government lack information or understanding	12.9
Other	Programs already implemented by private sector, etc.	2.3
Other	No challenges in particular	4.2
Other	Other	1.8

(Source) Ministry of Internal Affairs and Communications "Study on Promotion of Programs Employing ICT (2011)"

effective ICT utilization, claiming lack of expertise and lack of understanding of costs vs. benefits. This trend holds true for all 11 sectors, clearly indicating that costs, personnel, know-how, and infrastructure are the key challenges facing implementation of programs employing ICT.

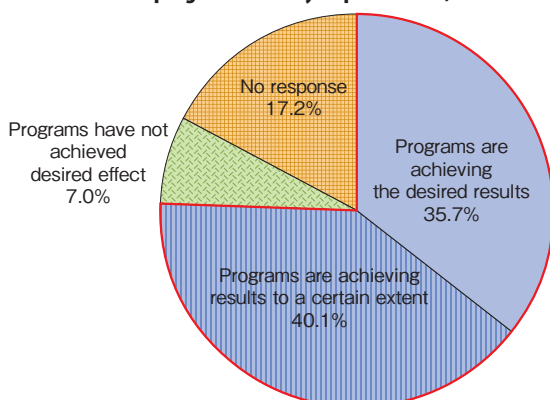**(2) Needs of regions facing ICT utilization challenges**

Among local governments implementing programs employing ICT, 75.8% responded that programs were either "achieving the desired results" (35.7%) or "achieving results to a certain extent" (40.1%) (Figure 2-2-3-3). Only 7.0% responded that programs "have not achieved the desired results," indicating that the majority of local governments implementing programs employing ICT felt they were effective in addressing regional challenges.

46.4% of those not yet implementing programs "could not say" whether or not such programs are effective (Figure 2-2-3-4). However, 30.2% were of the opinion that such programs "are effective, or are likely to be effective," and only 4.8% stated that they "are ineffective, or are unlikely to be effective," indicating that even those

local governments not implementing programs did not necessarily feel that such programs were not valid means of addressing regional challenges. As to the need for implementation, 12.6% stated that there was a "strong need for implementation" and 11.2% that there was "little need for implementation," while 61.9% claimed they "could not say either way." Around half of local governments not yet implementing programs could not judge whether ICT constituted an effective means of addressing regional challenges. It is evident that the possibility ICT holds for resolution of the issues facing regions is not sufficiently recognized.

With regards to local governments that are unclear on their attitudes toward resolution of challenges through ICT utilization, and uncertain about its necessity, particularly those that have yet to implement programs employing ICT, supplying them with know-how and with successful examples of implementation by other local governments, to clarify the specific benefits that ICT utilization can bring regions in terms of overcoming challenges and revitalizing regions is likely to help them make judgments on the desirability of implementing ICT programs.

Figure 2-2-3-3 Assessment of programs employing ICT as a means of overcoming local challenges (ICT programs already implemented)

Programs are achieving the desired results
35.7%

No response
17.2%

Programs have not achieved desired effect
7.0%

Programs are achieving results to a certain extent
40.1%

Figure 2-2-3-4 Assessment of programs employing ICT as a means of overcoming local challenges (programs not yet implemented)

No response
18.7%

Little need for implementation
4.8%

Strong need for implementation
30.2%

Cannot say either way
46.4%

(Source) Ministry of Internal Affairs and Communications "Study on Promotion of Programs Employing ICT" (2011)
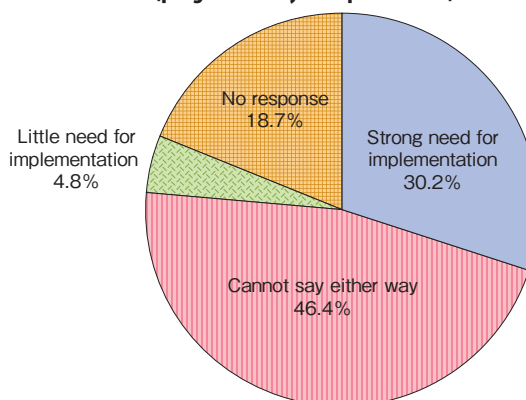
4. Analysis of factors impacting ICT utilization

(1) Overall condition of local government and ICT utilization

We analyzed the correlations between municipal scale and population size, and status of ICT utilization, as they bear on promotion of local ICT utilization.

In terms of the correlation between scale of municipality (city, special ward, town, village) and composite index of ICT utilization, cities and special wards show more advanced ICT utilization. Meanwhile, as to the correlation with population size of the region, ICT utilization is more advanced in regions with larger populations. Also, examining the correlation with financial strength as expressed by the financial capability index[30], we find that composite index of ICT utilization is higher in more financially solid regions.

As to digitization of administrative functions, a correlation was found between online submission and processing of notifications and applications, etc., and high composite index of ICT utilization. In other words, local governments which make proactive efforts to digitize administration also tend to make proactive efforts to promote ICT in their area of jurisdiction.

While large municipalities on solid financial footing are moving forward with ICT, small municipalities with weak finances, which are precisely the ones that could benefit most from ICT utilization, appear not to be making sufficient progress with ICT utilization.

(2) Regional traits and ICT utilization

We analyzed the correlations between regional traits such as population makeup and income level and the status of ICT utilization.

With regard to population makeup, it was found that regions with a higher working-age (age 15-64) population in proportion to the total population were more advanced in terms of ICT utilization. Meanwhile, with regard to income level, higher taxable per capita income was directly correlated to more progress with ICT utilization. ICT utilization was also correlated with a low percentage of the population engaged in primary industry.

(3) Regional challenges and ICT utilization

We analyzed the existing challenges facing regions and the status of ICT utilization, focusing first of all on the social welfare sector.

It would be ideal if a greater number of children and elderly people meant that a region had more ICT programs in place to assist parents and the elderly, etc., but as a matter of fact the higher the percentage of the population composed of children and the elderly, the less likely the region was to be implementing social welfare services employing ICT. We may infer that this is due to financial difficulties or other factors.

Next, we focused on correlation between challenges in the agriculture, forestry and fisheries sector and the status of ICT utilization. Here as well, it is to be hoped that a greater the percentage of the population engaged in primary industry, the more agriculture, forestry and fisheries ICT programs the region would implement. In fact, the opposite is true: no correlation can be found between prevalence of primary industry and implementation of agriculture, forestry and fisheries ICT programs, and the greater the percentage of the population engaged in primary industry, the fewer ICT programs the region implemented overall. This trend mirrors that of the social welfare sector.

---

30 The term "financial capability index" is used to indicate the financial strength of local public bodies, and is calculated as the past three year average of the figures derived from dividing basic financial revenues by basic financial needs. A higher figure for the financial capability index means that the local public body can be said to have a greater margin for revenue sources.

(4) Pottential for ICT utilization-related disparity between regions

As utilization of ICT across all sectors of medicine, education, and industry can effectively boost the efficiency of initiatives and projects, and create new added value, expectations are high for ICT to resolve regional challenges and contribute to the vitalization of regions as well. For this to happen, accurate gauging of the diverse needs of regions is essential, and first and foremost, the regions themselves ought to assess such needs from the perspective of their residents and implement programs autonomously.

In practice, however, many regions lag behind in terms of ICT utilization, and this appears to be influenced by factors separate from the actual challenges facing the community, such as the scale of the municipality and so forth. If such factors are not evaluated accurately and appropriate measures are not taken to assist them, there is a danger of the ICT disparity between regions growing even wider.

5. ICT utilization and costs

(1) Subsidies from the national government

Among local governments implementing programs utilizing ICT, the percentage receiving subsidies from the national government was 16.7% (average across all sectors) (Figure 2-2-3-5)[31]. By sector, the rate was high for education (31.5%), transportation (28.2%), tourism (24.3%) and medicine and nursing care (22.9%). As the rate of implementation for education is high (51.5%)

compared to transportation (16.7%), tourism (19.3%) and medicine and nursing care (13.7%), it is evident that in the education sector, national government subsidization is offered and regions are effectively making use of these subsidies.
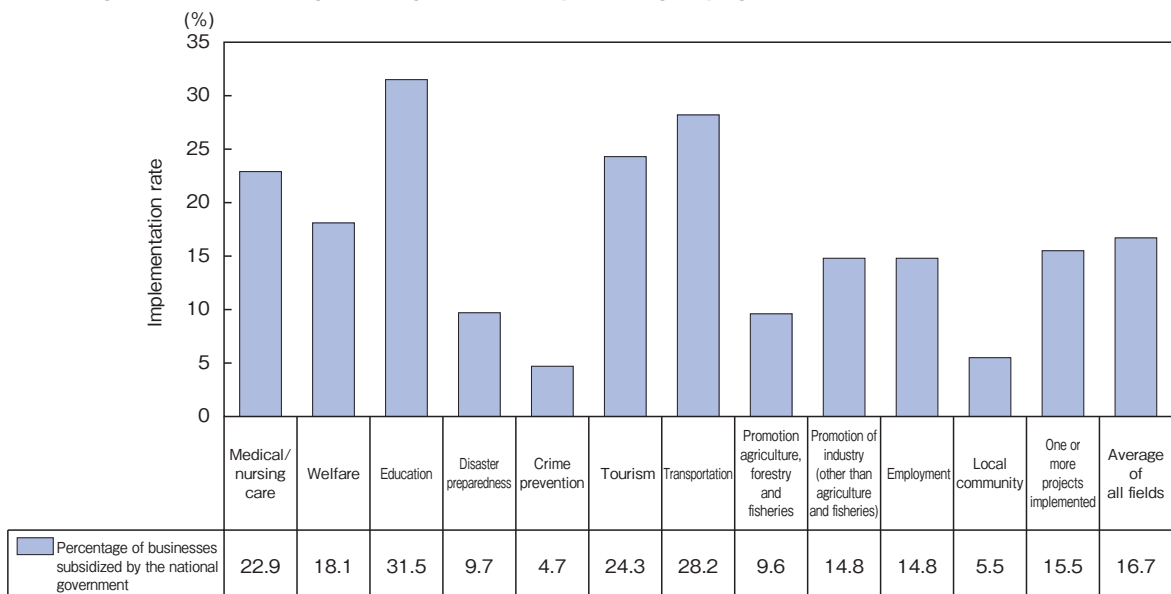
(2) Efforts to lower costs through cloud technology

The rates of ICT program implementation for crime prevention and local communities are 45.0% and 23.1% respectively, as shown in Figure 2-2-3-1 above, but these sectors have low rates of subsidization at 4.7% and 5.5% respectively. However, in terms of utilization of ASP / SaaS cloud technology, for which the average across all sectors is 11.3%, these two sectors had high rates of utilization at 23.6% for crime prevention and 21.1% for local communities (Figure 2-2-3-6).

These two sectors apparently have high rates of ICT program implementation as they deal with issues of great concern to the regions in question, and it appears they are making use of cloud technology which can be introduced at relatively low cost.

6. ICT utilization and human resources

As pointed out in 3.(1), a large number of local governments have stated that lack of qualified personnel is a concern in trying to promote ICT utilization. To achieve revitalization of regions through ICT, there is a need not only for human resources with ICT proficiency, but also
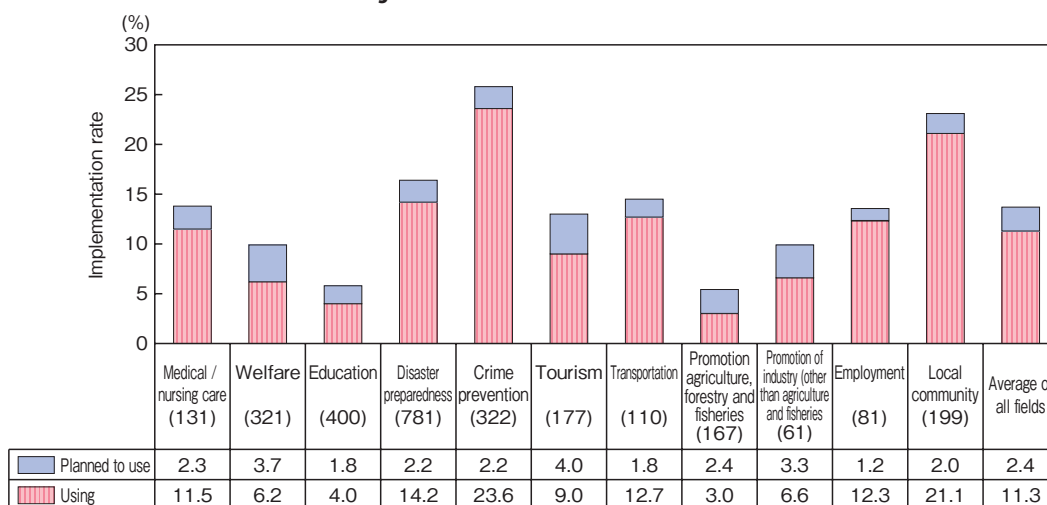
Figure 2-2-3-5 Percentage of local governments implementing ICT programs which receive national subsidies

	Medical/ nursing care	Welfare	Education	Disaster preparedness	Crime prevention	Tourism	Transportation	Promotion agriculture, forestry and fisheries	Promotion of industry (other than agriculture and fisheries)	Employment	Local community	One or more projects implemented	Average of all fields
Percentage of businesses subsidized by the national government	22.9	18.1	31.5	9.7	4.7	24.3	28.2	9.6	14.8	14.8	5.5	15.5	16.7

(Source) Ministry of Internal Affairs and Communications "Study on Promotion of Programs Employing ICT" (2011)

31 Figures 2-2-3-5 and 2-2-3-6 aggregate the programs implemented in all sectors by local governments into a single sample.

Figure 2-2-3-6　Rate of ASP / SaaS use

	Medical / nursing care (131)	Welfare (321)	Education (400)	Disaster preparedness (781)	Crime prevention (322)	Tourism (177)	Transportation (110)	Promotion agriculture, forestry and fisheries (167)	Promotion of industry (other than agriculture and fisheries) (61)	Employment (81)	Local community (199)	Average of all fields
Planned to use	2.3	3.7	1.8	2.2	2.2	4.0	1.8	2.4	3.3	1.2	2.0	2.4
Using	11.5	6.2	4.0	14.2	23.6	9.0	12.7	3.0	6.6	12.3	21.1	11.3

(Source) Ministry of Internal Affairs and Communications "Study on Promotion of Programs Employing ICT" (2011)

for those with the capability to comprehend the specific properties of technologies and the needs of the region, propose programs, coordinate the necessary personnel, and otherwise keep programs running smoothly. Here we have analyzed the human resources aspects of ICT utilization.

(1) Correlation between ICT utilization and ICT personnel in local governments

We analyzed the impact of the availability of ICT human resources in municipalities on the status of ICT utilization, based on the composite index. The analysis found that ICT utilization was more advanced in regions that had implemented many ICT human resources[32] measures, such as appointing a CIO or hiring external ICT-related personnel, or which had a large number of advanced ICT personnel working in the region.

(2) Excessive or insufficient ICT-related human resources

A survey of municipalities with regard to the need for ICT human resources, focusing on excessive or insufficient human resources for ICT-related programs, found that 78.2% of municipalities considered them insufficient when human resources for all stages, from proposal of ideas to implementation, were averaged (regions stating there was either a "severe lack" or "lack" of human resources.) To promote ICT utilization, it is necessary to compensate for this shortage not only with local government employees but also through partnerships with the private sector. However, 71.6% of municipalities felt there

were insufficient resources not only in the local government but in the region as a whole.

To promote local ICT utilization, it is necessary not only to cultivate human resources, but also to form partnerships with diverse human resources outside of communities in order to compensate for the lack of personnel in particular regions.

7. ICT utilization and partnerships

(1) Status of ICT utilization partnerships

Partnerships with other organizations are seen in approximately 60% of local governments (average across all sectors). This figure points to the relatively widespread formation of partnerships with outside groups in the promotion of ICT utilization in regions.

(2) NPOs and the "new public sector"

The "new public sector" means the concept of NPOs[33], businesses, etc., with participation and guidance of citizens, playing an active role as the proposers and providers of public funding and services rather than governmental bodies, enacting programs, systems and activities in a spirit of mutual assistance in fields of widespread public interest such as medicine and welfare, education, child-rearing, community development, scholarship and culture, the environment, employment and international cooperation. The new public sector is to be supported by

32 Highly skilled ICT personnel: In this survey, respondents were asked about six job categories entailing a high degree of knowledge or skill in the ICT field, namely CIO (Chief Information Officer) / CTO (Chief Technology Officer), system planner, project manager, system designer/developer (advanced), system designer/developer (intermediate), and system administrator.

33 NPO is short for Non-Profit Organization. An NPO engages in some activity that contributes to society, and does not aim to distribute its surplus funds to owners or shareholders. Among these, in Japan, "specified non-profit organizations" are those that obtained juridical person status under the *Act* on Promotion of Specified Non-profit Activities, applied to the governing authority for establishment and were authorized. The governing authority is the governor of the prefecture where the NPO is based, or if the NPO has offices in two or more prefectures, the Minister of Internal Affairs and Communications.

citizens, NPOs, businesses, etc. voluntarily and autonomously participating in social activities addressing regional challenges, which will be a guiding force on a par with the governmental institutions that have led the public sector thus far. For this reason expectations are high for the role played by NPOs[34].

Also the subjects of attention are providers of pro bono[35] services who use their specialized skills not for financial remuneration but to contribute to society as volunteers. They can be of great assistance to NPOs whose activities greatly benefit society, but which are short on human resources and funding.

With this in mind, we conducted a survey of local public entities, etc. regarding NPOs serving to uphold the "new public sector" and acting as a channel for pro bono activities, and specifically those engaged in regional digitization efforts. We analyzed the status of NPO participation, and challenges such as human resources and funding.

(3) Correlation between ICT utilization and NPOs

Examination of the correlation with the composite index, to see if the existence or cooperation of NPOs has an impact on ICT utilization, found that the presence of ICT promotion-related NPOs in a municipality and/or cooperation with NPOs in the ICT sector was correlated with a higher composite index (Figures 2-2-3-7 and 2-2-3-8). It is evident that partnership with NPOs helps to promote ICT utilization.

Regarding the correlation between establishment of digitization NPOs and the financial capability index, it was found that 68.3% of NPOs are in cities or special wards of Tokyo with a financial capability index of 0.75 or higher, whereas municipalities with financial capability index of 0.3 or less (generally speaking, the bottom 25% of municipalities) contained only 2.7% of such NPOs.

(4) Toward promotion of ICT utilization through partnerships

In order to revitalize local ICT utilization, first of all it is desirable for a wide variety of actors within regions to form cooperative partnerships. Particularly, high expectations are placed on NPOs, and in reality those regions

containing NPOs and forming partnerships with them have moved further forward with ICT utilization. It is also to be hoped that NPOs will play a role in flexibly and organically absorbing the duties that local governments and businesses are incapable of fulfilling, and have an especially important role to play in small or financially struggling regions. However, it is precisely those regions most in need of such partnerships that tend to lack NPOs engaged in digitization efforts. Furthermore, many of such NPOs are financially or organizationally weak, and their capabilities are clearly limited.

Naturally, there is no need to limit region partnerships to NPOs, and partnerships with other actors or industries within regions ought to be explored. This survey indicated that as there is difficulty in securing ICT human resources within regions, it is necessary to establish partnerships with a wide range of external actors and personnel as well.

Figure 2-2-3-7 Presence or absence of ICT promotion NPOs and composite index

	Yes (No. of local governments responding: 150)	No (No. of local governments responding: 456)
ICT promotion NPO in local government jurisdiction?	53.6	48.8

Figure 2-2-3-8 Cooperation with NPOs in the ICT sector or lack thereof, and composite index

	Yes (No. of local governments responding: 38)	No (No. of local governments responding: 568)
Cooperation between local government and NPO on ICT-related matters?	56.1	49.6

(Source) Ministry of Internal Affairs and Communications "Study on Promotion of Programs Employing ICT" (2011)

34 Ref: "The New Public Commons" (Cabinet Office website): http://www5.cao.go.jp/npc/index.html
35 Pro bono: short for "pro bono publico," Latin for "for the public good"