Chapter 3

Three Challenges Facing Japan's Revival

Chapter 1 theoretically and empirically examined the channels linking ICT with growth. Chapter 2 analyzed the impact of the global economic crisis on Japan's current ICT status and evaluated Japan's ICT from the viewpoints of infrastructure, utilization and security by comparing seven ICT advanced nations. As a result, it has become clear that Japan needs to address the challenges relating to utilization and security, although it excels in infrastructure.

Based on these evaluations of the current status, chapter 3 proposes three challenges facing Japan's revival. Firstly, we will examine investment for increasing information capital equipment ratio. Secondly, we will discuss collaboration for overcoming national problems, and finally, we will propose a concept called "e-relationships" whereby the Internet gradually seeps into our lives, creating a secure society.

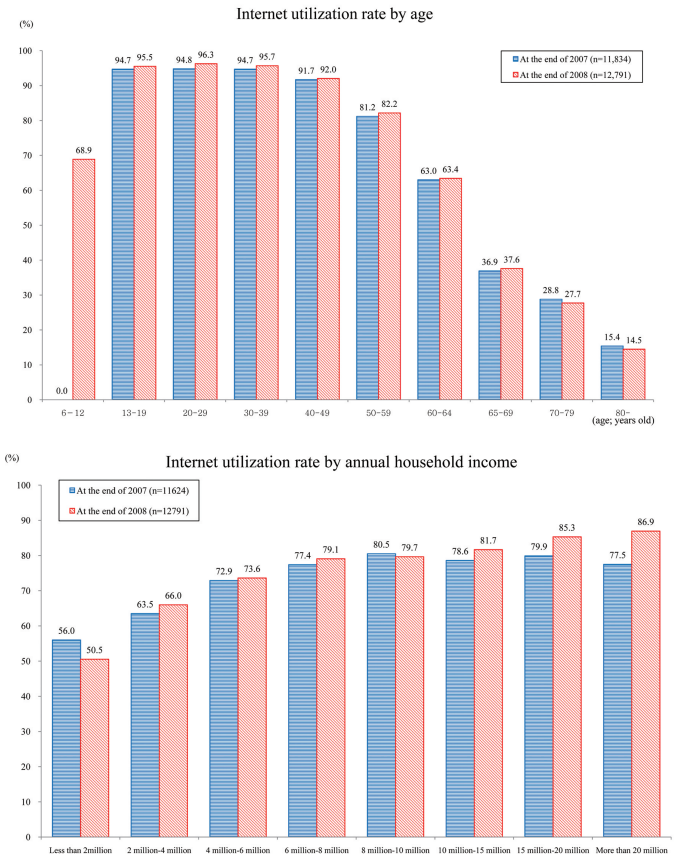
Section 1
Investment for Enhancing Information Accessibility

The comparison of seven countries in chapter 2, section 2, proved that Japan has the world's most advanced ICT infrastructure. It was also found that Japan is lagging slightly behind in terms of the dissemination rate of ICT equipment and services, despite the fact that charges and speed of broadband in Japan are the most favorable in the world. In this section, we will propose an investment strategy that would increase information capital stock per capita (information equipment ratio[33]), thus contributing to the dissemination rate as well as to an increase in the growth rate of the Japanese economy.

1. Persistent Information Gap

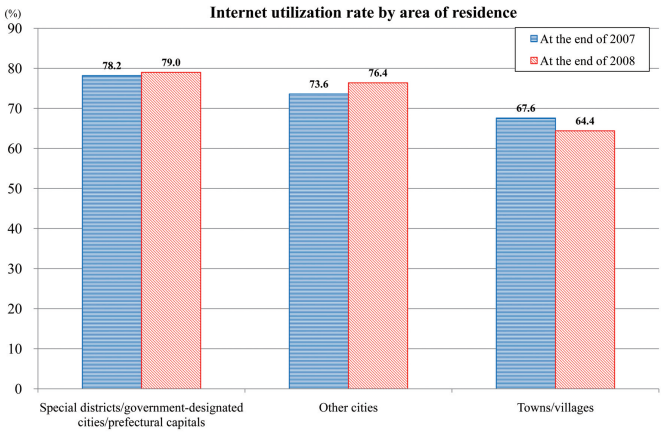
Figure 3-1 shows Internet utilization rate[34] by age, annual household income and area of residence, and it is typical that the rate is low for the following three categories: elderly people, low-income households and rural areas. What is noteworthy is that the utilization rate at the end of 2008 was lower than at the end of 2007 for those over 70 years of age, those with a household income of less than ¥2 million, and those living in towns and villages. While the national average Internet utilization rate has increased to 75.3%, with three out of four people using the Internet, the information gap has widened. There are

Figure 3-1 Status of Internet utilization by attribute



[33] Per capita capital is called "capital equipment ratio." Information capital per capita is accurately referred to as "information capital equipment ratio." the information capital in this discussion includes software applications as well as hardware through which information and knowledge are obtained. Thus, the term "information equipment ratio" is used for convenience.

[34] The Internet utilization rate is the percentage of the population over 6 years of age who has used the Internet in the previous year by means of (1) personal computer, (2) mobile phone (including PHS, mobile information terminals) or (3) other (game machine, TV, etc.).



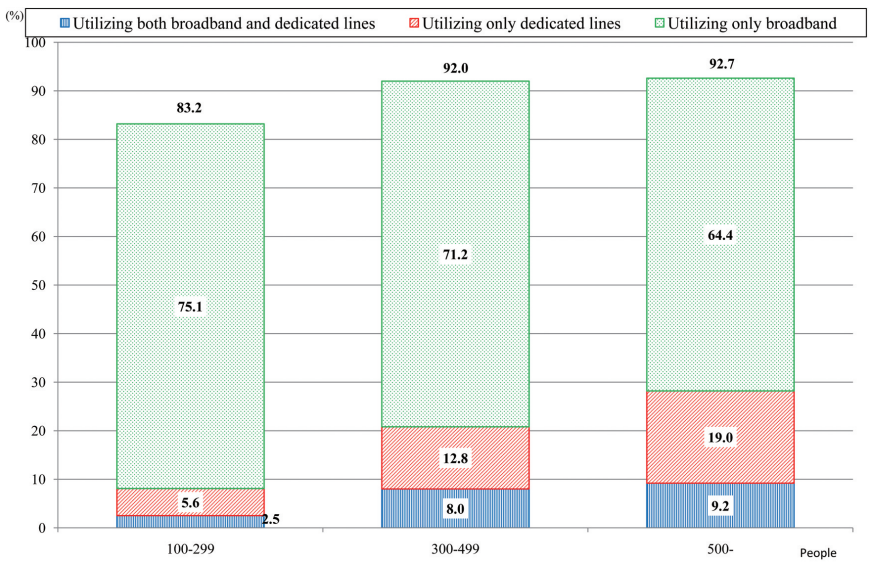
(Source) Survey of ICT Utilization 2008 , Ministry of Internal Affairs and Communications

concerns that the global economic crisis could cause elderly people, low-income households and those living in rural areas to be left behind in terms of access to the Internet.

There is also an information gap between companies. With the Internet utilization rate for companies reaching 99.0% as a whole, for companies with over 500 employees it is 100%, whereas for companies with less than 300 employees it is 97.8%. Although there is a gap, the use of the Internet has penetrated into small- and medium-size enterprises. However, the story is different when it comes to the utilization of high-speed, large-capacity networks. Figure 3-2 shows the utilization of high-speed networks by company size, and it has been observed that the larger the company, the higher the utilization rate of broadband or dedicated lines; in particular, the rate of utilization of dedicated lines tends to increase remarkably.

A broadband environment, such as an optical fiber network, could be critical to whether or not local small- and medium size enterprises can secure nationwide or worldwide sales channels. The broadband service area coverage rate for households reached 98.6% and the optical fiber service area coverage rate for households 89.5% (as of end of September 2008), but it is still necessary to steadily facilitate investment in information infrastructure with the aim of eliminating broadband-zero areas by 2010.

Figure 3-2 Utilization of high-speed networks by company size



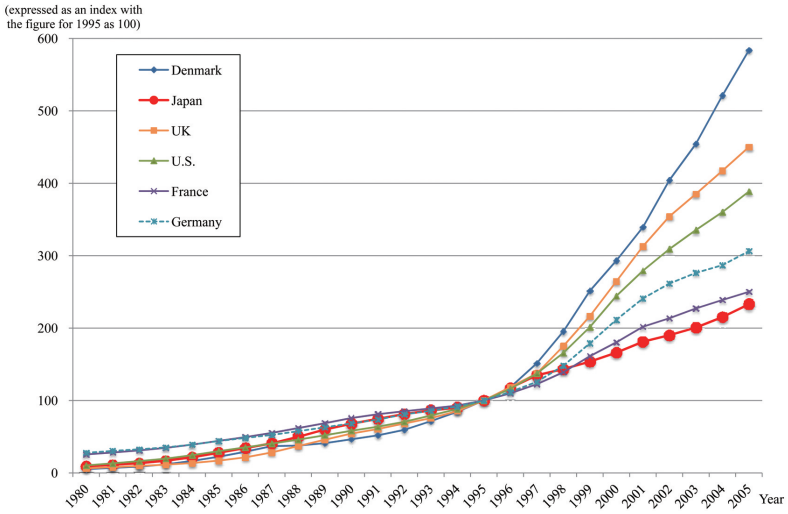
(Source) Survey on ICT Utilization 2008, Ministry of Internal Affairs and Communications

2. Lowest ICT investment among developed countries

Figure 3-3 shows an international comparison with regard to growth in information capital for six countries (U.S., UK, Germany, France, Denmark and Japan)[35]. The growth of ICT investment, whose contribution to economic growth is high, after 1995 was about 6-fold in Denmark and about 4-fold in the U.S. and UK, but less than twofold in Japan, the lowest among the six countries. Until 1995, Japan was nearly at the same level as other countries, but the gap widened after the so-called lost decade. For instance, if we compare the percentage of ICT investment with the total business investment in the private sector between Japan and the U.S. in 2006 that of the U.S. is 37% while that of Japan remains at 22%.

Figure 3-4 shows changes in information capital by industry. Although the growth in information capital in Japan's ICT industry is fifth among the six countries, it shows enough information capital accumulation to be comparable to the U.S. However, in terms of industries using ICT, Japan is ranked lowest or next to lowest in every industrial sector. In particular, Japan's

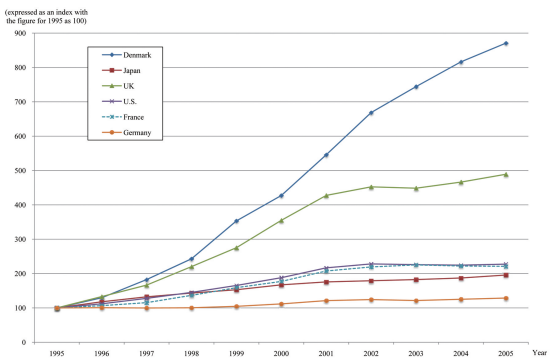
Figure 3-3 International comparison of growth in information capital (for the entire industry)



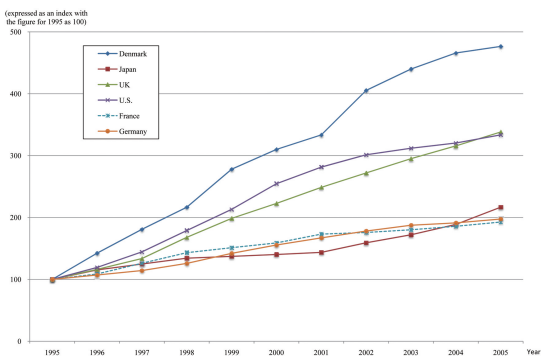
Compiled from EU KLEMS database

Figure 3-4 Growth in information capital by industry

(ICT industry (electronics/communications)



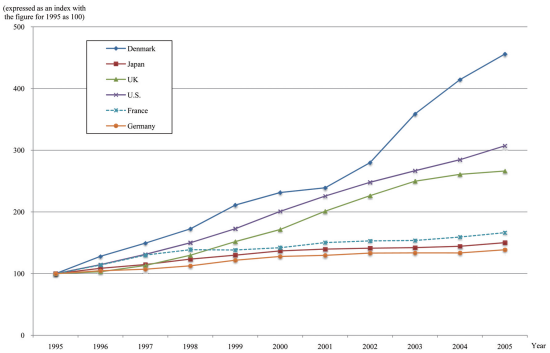
(Manufacturing excluding electronics devices)



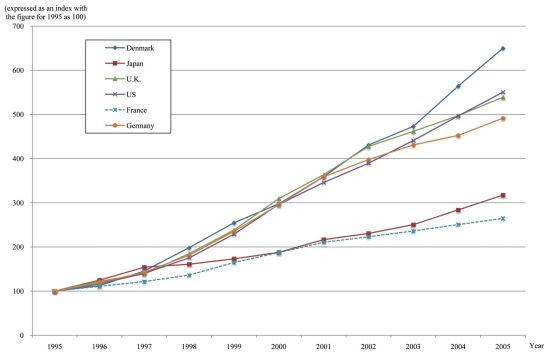
[35] Estimates were conducted by the EU KLEMS database. Among the seven ICT advanced countries compared in part I, chapter 2, section 2, three countries were excluded due to lack of date [Sweden (lack of chronological data), South Korea (some data was hugely volatile), Singapore (data unavailable)]; and Germany and France were included instead.

wholesale/retail/transportation sector, services for individuals, and public services are showing huge gaps with the other five countries, and Japan's information capital accumulation, mainly in the service industry, is lagging far behind other developed countries.

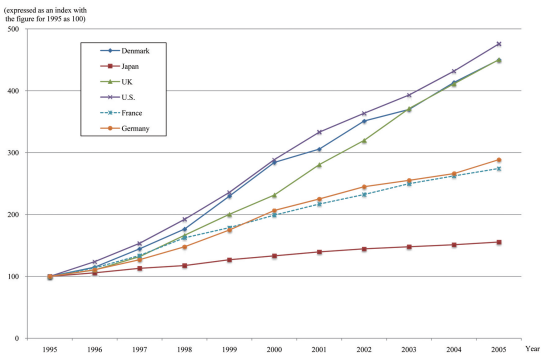
(Construction/ electricity/gas/water/agriculture, forestry and fisheries/mining)



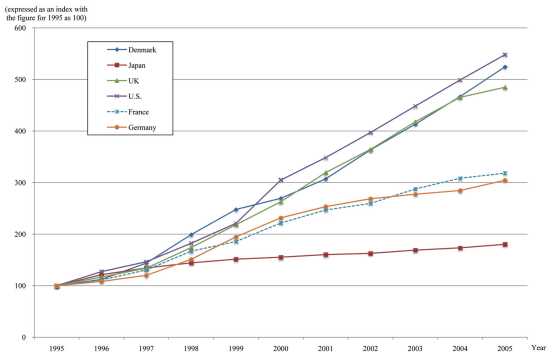
(Finance/services for business establishments)



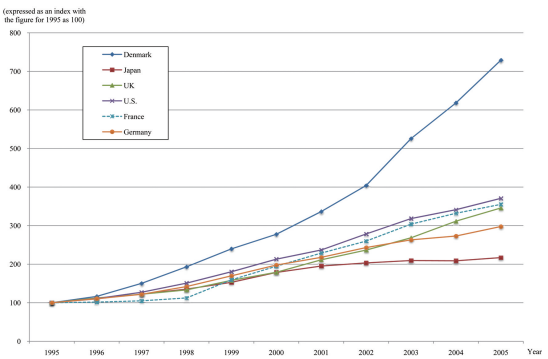
(Wholesale/retail/transportation)



(Services for individuals (food and drink/accommodation/self-employed, etc.))



(Public services (education/healthcare, etc.))



Compiled from EU KLEMS database

3. Acceleration of ICT investment: the key to economic regeneration

As we have seen thus far, since ICT investment has not increased in Japan as much as in other developed countries in the West, its contribution to growth is limited. Sluggish ICT investment is a phenomenon of ICT-using industries and it is possible that its stagnation could decelerate productivity growth in ICT-using industries, leading to a stagnation of the entire economy.

In order, then, to overcome the global economic crisis, it is essential to drastically increase ICT investment mainly in ICT-using industries. We will conduct a simulation of the impact of an acceleration of ICT investment on Japan's economy using an econometric model over the following pages.

To establish the impact of an acceleration of ICT on Japan's economic growth in the 2010s, a macro economic model was developed with 63 endogenous variables and 42 exogenous variables comprising five blocks: demand, household income, corporation, finance/banking and prices by explicitly incorporating the effects of ICT investment. Then, we estimated the impact of the activation of corporate investment on medium-term economic growth while checking the balance against other macro variables[36].

To estimate the impact we first drew up a baseline scenario[37] incorporating the recent global recession that assumes that the global economy, which is rapidly slipping into recession, will recover moderately in fiscal 2010, and then compared this with the estimated results for two other scenarios: an accelerated investment scenario[38] and an accelerated ICT investment scenario[39]. The accelerated investment scenario assumes that corporate investment will start growing across the board in fiscal 2010 because of investment promotion measures. The accelerated ICT investment scenario assumes that the ratio of ICT investment to private—sector corporate capital expenditure will rise because of measures to promote ICT investment. Figure 3-5 shows the results of the simulation of major indices for various growth rates and employment during 2011 and 2020.

Figure 3-6 shows the estimated value of real GDP growth rate for each scenario in the 2010s. While the

Figure 3-5 Major results of the simulation of medium and long-term economic growth

	Fiscal Year	2011-15	2016-20	2011-20
Real GDP growth rate (%)	Baseline scenario	1.7	1.5	1.6
	Accelerated investment scenario	2.2	2.1	2.2
	Accelerated ICT investment scenario	2.3	2.5	2.4
Nominal GDP growth rate (%)	Baseline scenario	1.8	1.8	1.8
	Accelerated investment scenario	2.4	2.7	2.5
	Accelerated ICT investment scenario	2.5	3	2.7
Potential GDP growth rate (%)	Baseline scenario	0.7	0.7	0.7
	Accelerated investment scenario	0.9	1.3	1.1
	Accelerated ICT investment scenario	1	2	1.5

(Source) Survey on the Impact of ICT Investment and the Accumulation of ICT-related Capital on the Japanese Economy, Ministry of Internal Affairs and Communications

[36] Jointly conducted by the Ministry of Internal Affairs and Communications and the Japan Center for Economic Research

[37] The 35th Medium-term Economic Forecast (FY2008-2020) released by the Japan Center for Economic Research was used as a baseline scenario. When calculating the estimate, it was assumed that the growth rate of the global economy will not reach 4% even in 2020, that the foreign exchange rate will remain at a high level, and that government spending will continue to restrain public investment. The same applies to the accelerated investment scenario and the accelerated ICT investment scenario.

[38] Compared to the baseline scenario, this assumes that the rate of private-sector corporate capital expenditure will rise at an annual average of about 3 percentage points during the 2010s (annual average rise of ¥3 trillion in monetary terms).

[39] Compared to the baseline scenario, this assumes that the ratio of ICT investment to private-sector corporate capital expenditures will rise at an annual average of about 2 percentage points during the 2010s (annual average ICT investment growth rate of about 6 percentage points and annual average rise of about ¥1.75 trillion in monetary terms).

average growth rate of real GDP in the 2010s in the baseline scenario is 1.6%, that of the accelerated investment scenario is 2.2% and of the accelerated ICT investment scenario 2.4%. While the average growth rate of nominal GDP in the baseline scenario is 1.8%, that of the accelerated investment scenario is 2.5% and of the accelerated ICT investment scenario 2.7%. If ICT investment is accelerated drastically, the annual average growth rate is highly likely to increase by around one percentage point both in real and nominal terms.

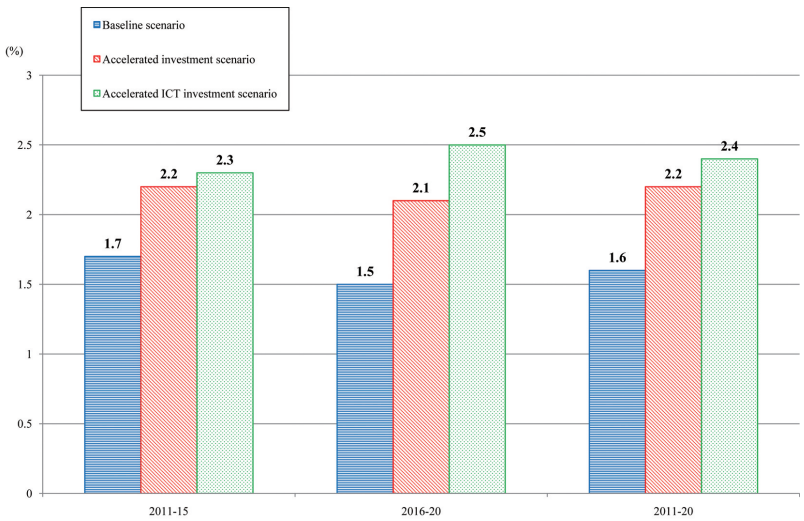
4. Strategic ICT investment is important

With the global economic crisis worsening, the world`s major economies have instituted drastic stimulus packages and a prioritization of ICT investment. To respond to this trend, Japan is also expected to realize measures to accelerate ICT investment.

However, since these measures require investment decisions that works against the economic cycle, strategic decision-making is necessary. Figure 3-7 shows the relationship between the economic cycle and real ICT investment. In the United States, ICT investment has steadily grown even under the economic slowdown, except for the IT bubble period in 2000, whereas Japan's ICT investment has tended to rise and fall in conjunction with the economic cycle.

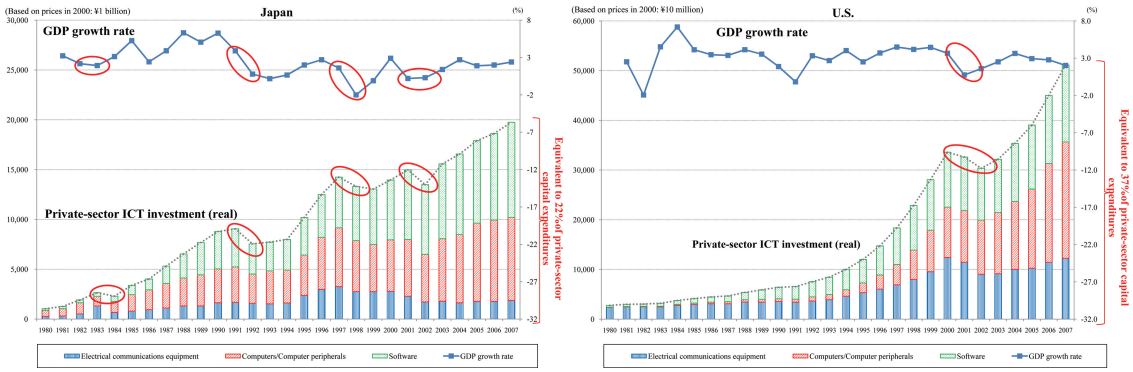
Let us now look at this relationship, comparing Japan and the West. Figure 3-8 shows the relationship between the number of times that nominal ICT invest-

Figure 3-6 The estimate of real GDP growth rate for each scenario in the 2010s



Compiled from the Survey on the Impact of ICT Investment and the Accumulation of ICT-related Capital on the Japanese Economy, Ministry of Internal Affairs and Communications

Figure 3-7 Economic cycles and ICT investment in Japan and the United States



Compiled from the Survey on Economic Analysis of ICT (2009), Ministry of Internal Affairs and Communications

ment (nominal ICT investment defined by OECD) registered negative growth against the previous year and real GDP growth. Japan's nominal ICT investment turned negative against the previous year nine times—the most frequently--and the growth rate was the lowest level among developed countries. The approach to investment in Japan, where ICT investment is reduced as soon as the economy slows down, is rather uncommon among developed countries. It is necessary to see ICT investment as an investment for future growth and to accelerate ICT investment in a continuous and strategic manner.

Figure 3-8 Relationship between the number of times that nominal ICT investment turned negative against the previous year and real GDP growth

Number of times that nominal ICT investment turned negative against the previous year	Countries	Average year-on-year GDP growth rate
0-1 times	Australia (0), Canada (1)	3.10%
2-3 times	Netherland (2), U.S. (2), New Zealand (3)	2.80%
4-5 times	Belgium (4), France (4), Ireland (4), Italy (4), Switzerland (4), UK (4), Austria (5), Finland (5), Portugal (5), Spain (5)	2.80%
6 times	Denmark, Sweden	2.00%
9 times	Japan	2.00%

Period: 1988-2004
The OECD definition of nominal informatization investment is used. This includes public-sector, as well as private-sector, investment.
Compiled from County Statistical Profiles 2009, OECD

Section 2
Collaboration for Overcoming National Challenges

The comparison between seven countries conducted in chapter 2,section 2, showed that Japan is lagging behind other ICT advanced nations in terms of ICT utilization. Particularly, it was revealed that the utilization rate of ICT systems/services is low in public areas, such as healthcare/welfare, education/personnel and administrative services. In this section, we will present the forms of ‘collaboration’ that would facilitate ICT utilization and enable Japan to overcome its national problems.

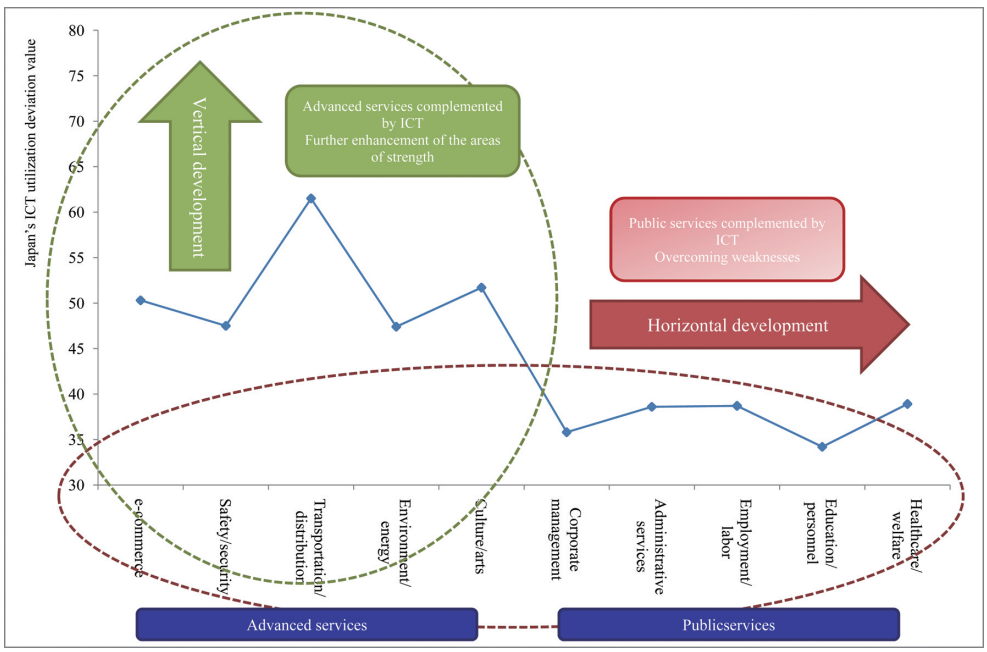
1. Promotion of ICT utilization: emphasis on “horizontal development” and “vertical development”

In order to proactively contribute to solutions to mounting social problems in an aging society with fewer children, the Ministry of Internal Affairs and Communications identifies the shift to ‘issue-solving oriented ICT utilization as the principle behind u-Japan policy. However, the matter for concern is the fact that ICT utilization is not progressing in public areas, such as healthcare/welfare, education/personnel, employment/labor and administrative services, which people are much interested in and are directly linked with people’s lives. Therefore, it is important to highlight the sectors that are lagging behind in terms of ICT utilization as priority sectors and horizontally spread ICT utilization in these sectors with the aim of raising the bottom.

At the same time, sectors with a high utilization rate, such as transportation/distribution and e-commerce, have nearly the same utilization rate as ICT advanced countries. It is necessary to further raise these strong sectors and to deepen and broaden the way ICT is used, in order to foster international competitiveness.

Therefore, the focal points for the promotion of ICT utilization, as figure 3-9 shows, are horizontal development and vertical development: horizontal development is overcoming the weaknesses of the lagging sectors and vertical development is enhancing the strengths of the advanced sectors.

Figure 3-9 “Horizontal development” and “vertical development” in the promotion of ICT utilization



2. ICT utilization to deal with national problems (horizontal development)

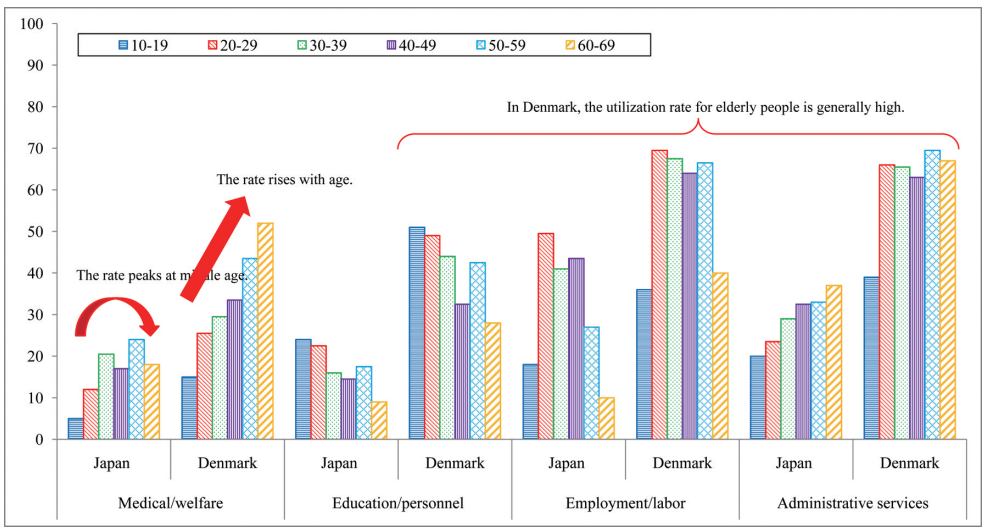
Figure 3-10 provides an analysis of utilization by age group in the lagging sectors, namely, healthcare/welfare, education/personnel, employment/labor and administrative services. What is noteworthy here is the high utilization rate among older people in Denmark. Compared with Japan, the utilization rate for those in their 50s and 60s is relatively high across all four sectors. In the healthcare/welfare sector, the demand for which is thought to be high among older people, more than 50% of users in their 60s receive healthcare/welfare-related services using ICT.

In order to upgrade Japan's ICT utilization, which will hopefully help to solve national problems in areas such as healthcare/welfare, education/personnel, employment/labor, and administrative services as well as eliminate worries from people's lives, Japan should study previous cases from countries considered advanced in ICT utilization, such as Northern Europe countries, as seen in chapter 2, section 2. Here, let us look at an Internet portal for citizens in Denmark.

Denmark created an portal for citizens (borger.dk) in 2007 as a one-stop site for access to public information by consolidating the e-administration services offered by the central and local governments with the aim of providing public digital solutions that can be easily used by citizens in their daily life as well as in business activities (figure 3-11). The weekly access figures reached 100,000 in the first quarter of 2008, a 40% year-on-year increase[40].

Features of the portal include (1) provision of cross-sectoral public information and services meeting the needs of users by setting up themes tailored to user groups of administrative services, such as family/children/young people, elderly people, Danes living abroad, and foreign nationals living in Denmark, (2) an advanced function which allows users to customize themes and services that they use frequently and to manage application procedures in an integrated manner. The provision of such user-oriented public services furthered the utilization of ICT systems/services in the public sector in Denmark, leading to high utilization by elderly people, who are often referred to as the vulnerable group of ICT users[41].

Figure 3-10 ICT utilization rate by age group in healthcare/welfare, education/personnel, employment/labor and administrative services



Source: International Comparison of ICT-related Developments (2009), Ministry of Internal Affairs and Communications

[40] This effort has been recognized globally, and won the World Summit Award in the e-government category of the UN World Summit on Information Society held in November 2007.

[41] Sub-themes of the service for elderly people include inheritance/last will, jobs, nursery care, travel (daily mobility/travel), pension/retirement.

Figure 3-11 Home page of borger.dk

Cited from the website borger.dk

3. Advancement of ICT utilization that takes advantage of Japan's strengths (vertical development)

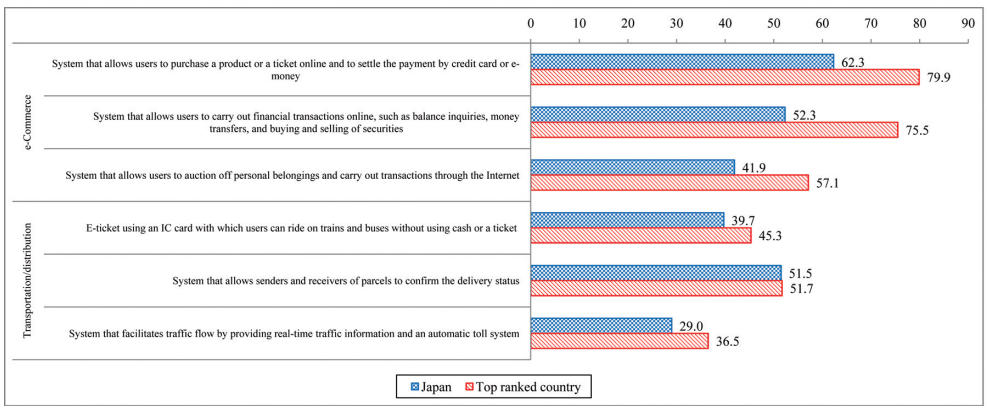
Figure 3-12 compares the top ranked country of the aforementioned comparison of seven countries with Japan in the categories of e-commerce and transportation/distribution with respect to the utilization rate of specific ICT systems/services.

Although there is a gap between Japan and the top ranked country in terms the utilization rate of online shopping, online banking and online auctions, Japan' rates are relatively high at 62.3%, 52.3% and 41.9%, respectively.

Meanwhile, Japan is ranked 1st in transportation/distribution and its utilization rate in each category is by no means inferior to the top ranked country, with a particular high utilization rate of the delivery confirmation system for home-delivery services at 51.5%.

Figure 3-13 shows the number of the Internet users by terminal (people who have used the Internet in the previous year). The number of the Internet users from mobile terminals (mobile phones, PHS, etc.) is 75.06 million people, accounting for 82.6%. For the percentage of third generation mobile phones in mobile phone terminals, which enable the high-speed use of the Internet, Japan is ranked top in the aforementioned seven-country comparison (See figure 2-14). Thus, Japan is the most advanced nation in the world[42] in

Figure 3-12 Utilization rate for specific ICT systems/services in e-commerce, transportation/distribution



(Source) International Comparisons of ICT-related Developments (2009), Ministry of Internal Affairs and Communications

[42] According to the World Internet Project (http://www.soc.toyo.ac.jp/~mikami/wip/sympo2009.2/090219mikami.pdf), the survey conducted in November 2008 showed that Japan's mobile Internet usage rate was 47.5%, ranked first among the 28 countries.

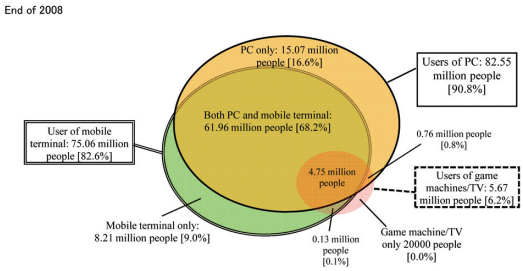
terms of mobile Internet usage.

Japan's mobile phones are not limited to the use of telephone, e-mail or Internet, but also provide various services, including audio-visual distribution, camera functions, mobile shopping, e-money, e-tickets and e-keys, serving as an attractive personal terminal to users. In recent years, attention has been drawn to the use of action history data of users called a lifelog[43], a dramatic development in mobile phone services, and services are being developed which use positional information, information on payment history, etc.

Figure 3-14 shows a comparison of the purposes of Internet use among the aforementioned seven countries. The characteristics of Japan is that use for communication purposes is high, for example, e-mail, writing on websites/blogs/BBS, SNS, and posting/sharing videos[44].

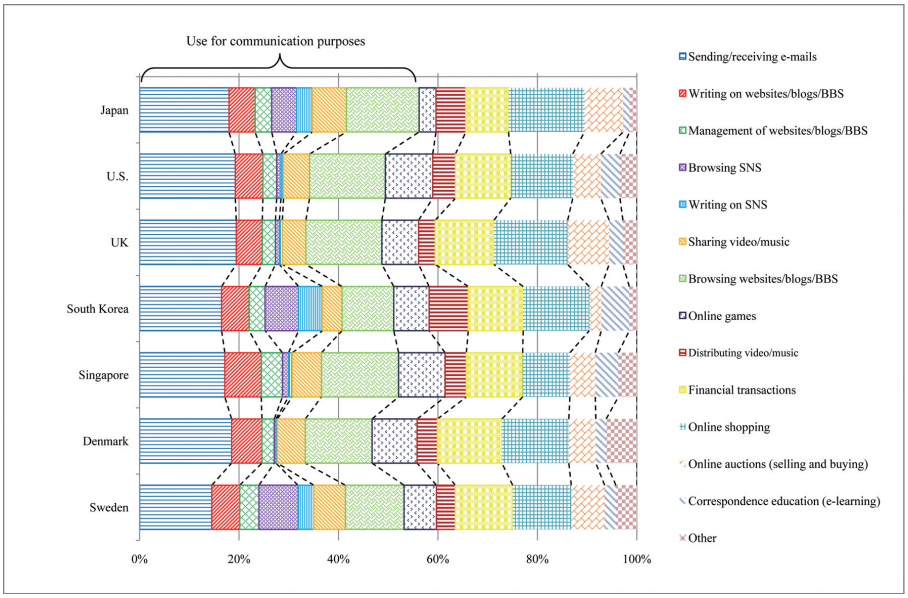
Furthermore, social media has exhibited remarkable growth in recent years. There are sites that compare product information, such as price and quality, by consumers and sending of product information via blog as word-of-mouth information for e-commerce, and there are often cases where manufacturers develop products while communicating directly with consumers via word-of-mouth information sites.

Figure 3-13 Types of Internet terminals used by users (individual users)



(Source) 2008 Communications Usage Trend Survey, Ministry of Internal Affairs

Figure 3-14 International comparison of the purpose of Internet use



*Percentage of responses by purpose, using the number of responses (multiple answers) by purpose of Internet use in each country as a parameter
(Source) International Comparison of ICT-related Developments (2009), Ministry of Internal Affairs and Communications

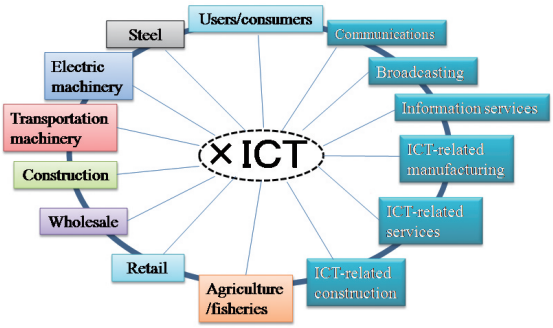
[43] In the world of the Internet, information on web-access, mail history or payment of users is collected as a lifelog, which is used for direct marketing and recommendations to send optimal advertisements or information in accordance with the needs of individual users.

[44] According to Technorati, a blog search service in the U.S., in the fourth quarter of 2006, there were more blogs in Japanese (37%) than in any other language.

4. ICT serving as a catalyst in promoting collaboration, together with "horizontal development" and "vertical development"

What is commonly found in high utilization in both "horizontal development" and "vertical development" is that a platform of collaboration has been established where cross-sectoral business operators and users/consumers can interact with each other, with ICT tools, such as mobile phones and websites, acting as a catalyst. From this viewpoint, the ICT industry is expected to incorporate advanced technologies and provide ICT solutions that are easy to use for business operators of various kinds. In other words, it is a matter of course that the ICT industry keeps providing inexpensive and convenient ICT services. Besides that, we envision a kind of industry that promotes collaboration beyond business boundaries and between suppliers and users, behind the scenes. Figure 3-14 shows a summary of such a concept.

Figure 3-14 Collaboration between the ICT industry and other industries



Section 3
Trust Fostered by "e-Relationships" that Assure Secure Internet Utilization

The comparison of seven countries conducted in chapter 2, section 2, proved that sense of security in Japan is low compared with the other ICT advanced countries. Even though the safety of Japan's ICT infrastructure is quite high on a global scale, this does not seem to be linked with the sense of security of users. This section proposes strengthening trust (e-relationships) as the third challenge facing the revival of Japan in which the Internet is infused into our real lives and people have a sense of security.

1. Concerns of ICT utilization and reaction to concerns

(1) Three major concerns of citizens and companies

A. Concerns of citizens about ICT utilization

In view of the spread of concerns about using ICT among citizens we conducted an attitude survey[45] among individual users about concerns associated with ICT utilization for the purpose of gaining a clear picture of where the concerns of Japanese ICT users lie as well as considering solutions for eliminating such concerns.

For the survey, we classified the problems associated with ICT utilization into 10 categories: (1) privacy, (2) information security, (3) illegal/harmful contents, (4) information literacy, (5) geographical divide, (6) intellectual property, (7) e-commerce, (8) manners and social codes of conduct related to ICT utilization, (9) institutions and customs adapted to cyber society and (10) soundness of global environment and mental and physical health, and asked about concerns by presenting three typical cases in each category.

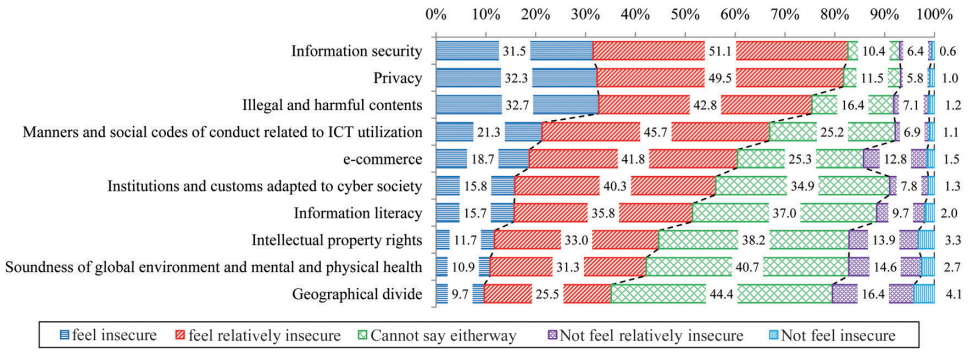
Figure 3-16 indicates whether or not people feel insecure about the 10 categories. The highest percentage of responses was for "feel insecure[46] about information security" at 82.6%, followed by "privacy" and "illegal/harmful contents".

B. Concerns of companies about ICT utilization

We conducted an attitude survey[47] among companies about concerns associated with ICT utilization by presenting three typical issues for each of the 10 categories.

With regard to companies' levels of concerns over ICT utilization (figure 3-17), the highest percentage of responses was for "feel insecure information security" (57.1%); nearly 60% of companies responded that they were concerned. "Privacy" and "illegal/harmful contents" were also cited frequently; nearly half of companies feel concerned. It was found that information security, privacy and illegal/harmful contents are the issues companies are most strongly concerned about, as in the case of individual users.

Figure 3-16 Citizens' levels of concerns about 10 safety- and security-related categories



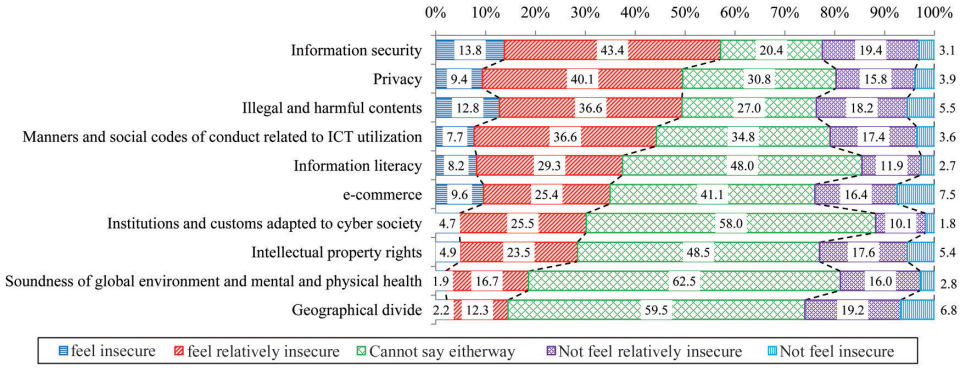
(Source) Survey on Safe and Secure ICT Utilization in an Ubiquitous Network Society (2009), Ministry of Internal Affairs and Communications

[45] We conducted a web-survey targeting Internet users nationwide in different age groups, which drew responses from 2000 people.

[46] Sum total of "feel insecure" and "feel relatively insecure"

[47] We conducted a mail survey targeting companies in different sectors nationwide, which drew response from 1106 companies.

Figure 3-17 Companies' levels of concerns over 10 safety-and security-related issues



(Source) Survey on Safe and Secure ICT Utilization in an Ubiquitous Network Society (2009), Ministry of Internal Affairs and Communications

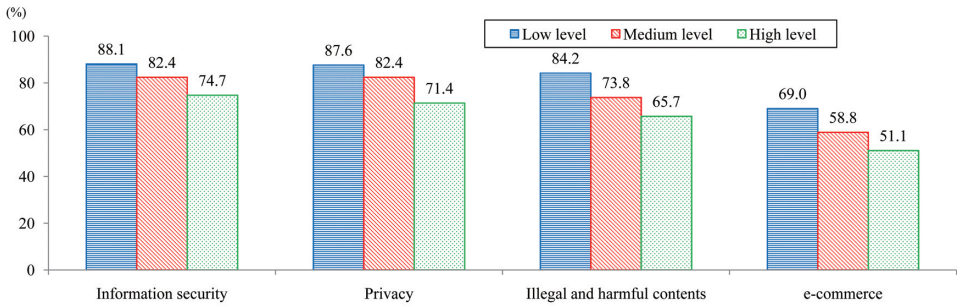
2. Enhancement of information utilization capability alleviates concerns

(1) Analysis of concerns among citizens by level of information utilization capability

We compared the concerns among citizens with their information utilization capability[48] in six categories (out of 10 categories) in which far more than half of respondents responded with either "feel insecure" or "feel relatively insecure": specifically, information security, privacy, illegal/harmful contents, manners and social codes of conduct related to ICT utilization, e-commerce and institutions and customs adapted to cyber society (figure 3-18). With respect to the four categories, namely, information security, privacy, illegal/harmful contents and e-commerce, the higher the level of information utilization capability, the lower the percentage of concerned respondents.

Figure 3-19 shows the relationship between information utilization capability and concerns associated with manners and social codes of conduct related to ICT usage and institutions and customs adapted to cyber society. It indicates that even if information utilization capability is high, this does not necessarily serve to alleviate concerns and that concerns of the group with high capabilities are slightly higher than those of the group with medium capabilities. From this, when a issues, such as information security can be prevented by users individually an enhancement of information utilization capabilities is expected to reduce concerns. On the other hand, concerns over society as a whole, such as manners and institutions/customs, cannot be eliminated immediately by users' efforts, and enhancement of information utilization capabilities alone does not lead to a solution. Therefore, in addition to measures for

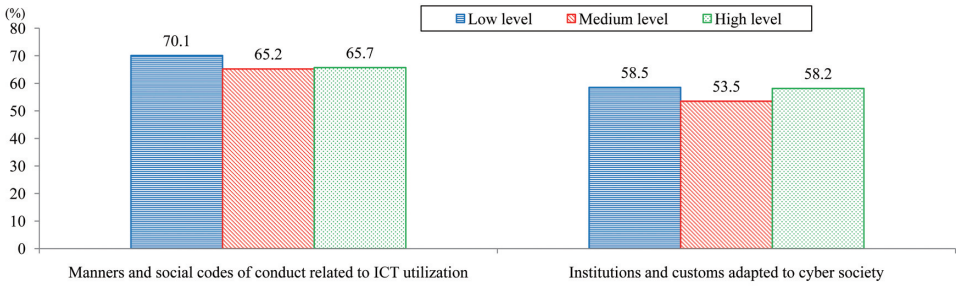
Figure 3-18 Extent of concerns among citizens by level of information utilization capability in four areas, including information security



(Source) Survey on Safe and Secure ICT Utilization in Ubiquitous Network Society (2009), Ministry of Internal Affairs and Communications

[48] As an index to directly measure information utilization capability, we chose to use the ability of users to handle PCs and the Internet. Specifically, we identified (1) those who are capable of PC- or the Internet troubleshooting and giving advice to others as having a high level of capability and (2) those who are capable of troubleshooting or setting up devices with the help of instructions or advice as having medium level of capability and (3) those who can carry out typical operations, such as receiving and sending e-mails and browsing websites, but cannot set up devices as having a low level of capability.

Figure 3-19 Extent of concerns among citizens by level of information utilization capability in two areas (Manners and social codes of conduct related to ICT usage and institutions and customs adapted to cyber society)



(Source) Survey on Safe and Secure ICT Utilization in Ubiquitous Network Society (2009), Ministry of Internal Affairs and Communications

enhancing information utilization capabilities, these issues require other policy measures such as intervention by developing regulations/rules on an as-needed basis.

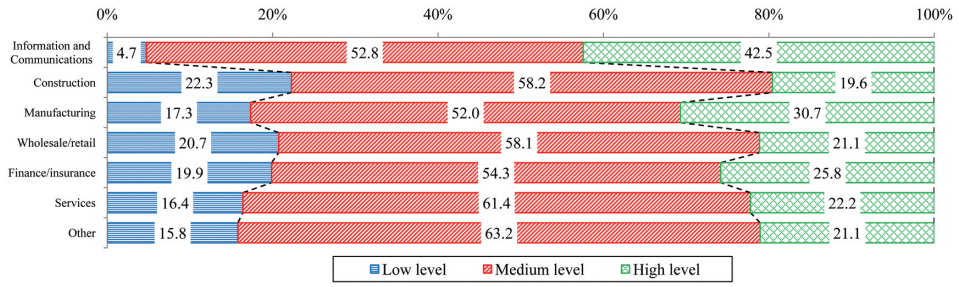
(2) Characteristics of concerns among companies by level of information utilization capability

Simply installing an ICT system does not guarantee that the company will smoothly use it. It requires many employees with high ICT utilization capabilities. Thus, this analysis used the number of ICT utilization initiatives to develop and secure human resources concerning ICT system utilization[49] in each company as an index to measure the ICT utilization capabilities of companies as a whole. When looking at ICT utilization capability by business sector (figure 3-20), the percentage of companies with high capabilities is high in business sectors with advanced ICT utilization, such as information and communications, manufacturing, finance/insurance, and services sectors. On the other hand, companies with low capabilities in construction and wholesale/retail account for more than 20%, and it is observed that initiatives to develop and secure human resources have not been implemented in these business sectors.

(3) Analysis of concerns among companies by level of ICT utilization capability

Let us now compare the extent of the three major concerns (information security, privacy and illegal/harmful contents) over which nearly half of companies were concerned with the number of ICT utilization initiatives to develop and secure human resources associated with ICT system utilization. Figure 3-21 shows the results and it demonstrates that the more initiatives, the fewer the concerns about ICT utilization.

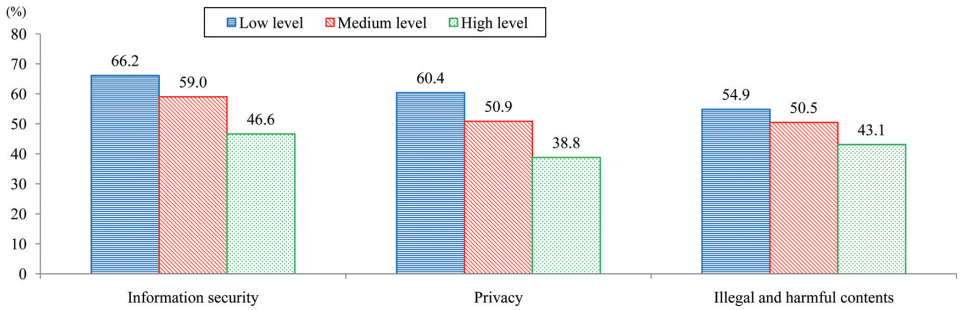
Figure 3-20 Distribution of level of ICT utilization capability by business sector



(Source) Survey on Safe and Secure ICT Utilization in Ubiquitous Network Society (2009), Ministry of Internal Affairs and Communications

[49] Among the following initiatives, a company having implemented two or more initiatives is identified as a company with high level ICT utilization capabilities, a company having implemented one of the initiatives is identified as a company with medium level ICT utilization capabilities, and a company having implemented no initiatives as low level. Initiatives: (1) Enhancement of in-house training for employees, (2) Enhancing support for employees' elf-learning opportunities outside the company, (3) recruiting new graduates as ICT experts (4) recruiting ICT experts mid-career, (5) hiring ICT experts on a temporary basis.

Figure 3-21 Extent of three major concerns among companies by level of ICT utilization capability



(Source) Survey on Safe and Secure ICT Utilization in Ubiquitous Network Society (2009), Ministry of Internal Affairs and Communications

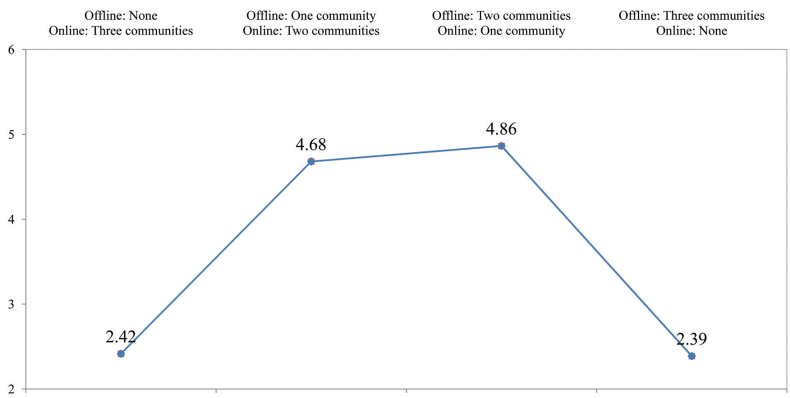
3. e-Relationship society achieving a balance between virtual and real world

(1) Formulation of a "relationship strength" index reflecting participation in both an online community and in an offline community

There are a number of previous studies on social capital that analyze the relationship between economic growth and sense of security by measuring qualitative social capital, such as trust, norms of reciprocity, and networks, and by creating a social capital index. Using these studies as a reference, we regarded both online and offline communities as a type of social capital and developed an index with quantified "relationship strength" of individuals generated from the difference in participation in the two types of community[50], thereby analyzing the relationship between relationship strength and the sence of insecure about ICT utilization.

In order to find out the specific relationship between participation in offline and online communities and the newly developed relationship strength index, the respondents who participants in communities in the same number was extracted to graphically show the relationship between the difference in participation in communities and the relationship strength index. Since the largest number of people participate

Figure 3-22 "Relationship strength" by participation in communities (The total number of communities in which an individual participates: 3)



* The numerical figure shows the mean values of relationship strength of participants in each group
(Source) Survey on Safe and Secure ICT Utilization in an Ubiquitous Network Society (2009), Ministry of Internal Affairs and Communications

[50] The "relationship strength" index was based on the following three concepts: (1) Identification of the respondent's sense of community (Identifying the respondent's sense of community regarding both online and offline communities based on questions concerning two elements of social capital: trust and norms of reciprocity, (2) Expressing each community's "strength of bond" as a numerical value (The strength of bond for each community is expressed as a mean value of points awarded for the sense of community held by participants, (3) Expressing in numerical terms each individual's relationship strength as an index (sum of the level of bonds in communities in which each respondent participates)

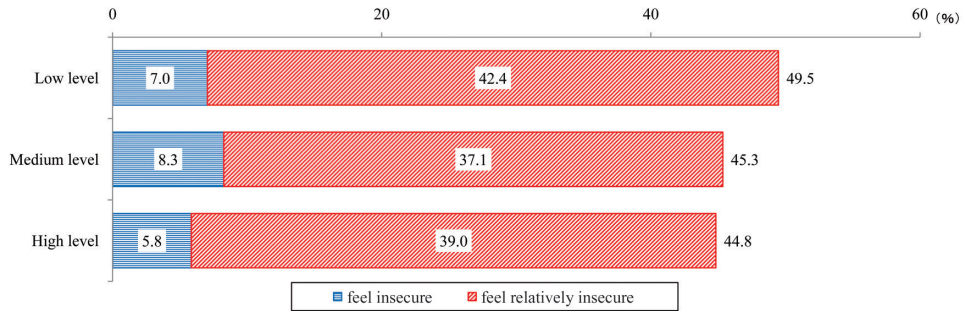
in three communities, we have extracted respondents who participate in three communicates (figure 3-22). The result shows that those who participate in both online and offline communities in a balanced manner (those participating in two offline communities and one online community or those participating in one offline community and two offline communities) have higher relationship strength values than those who participate in either offline or online communities (those participating in three offline communities or those participating in three online communities)[51].

(2) Relationship strength and concerns about ICT utilization

Figure 3-23 shows the extent of sence of insecure about ICT utilization by relationship strength. The percentage of people who feel insecure about ICT utilization is 44.8% in the group with high relationship strength, 45.3% in the group with medium strength and 49.5% in the group with low strength, indicating a slight tendency that the higher the relationship strength is, the lower the the sence of insecure is.

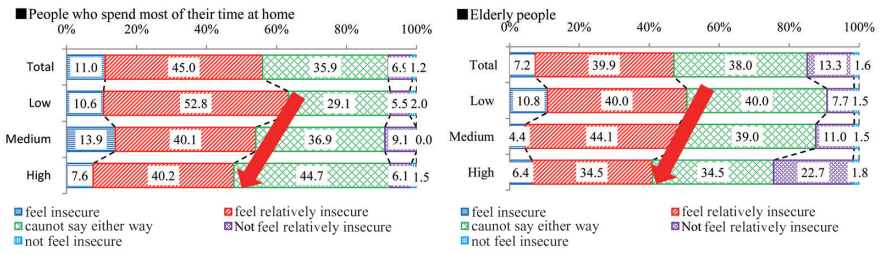
When looking at all users, the effect of an increase in relationship strength on the reduction of sence of insecure rather limited, but a greater effect of an increase in relationship strength on the reduction of concerns may be generated in some groups of users. Thus, we analyzed the relationship between relationship strength and concerns by user group[52]. The results show that there is a particularly prominent tendency among people who spend most of their time at home and elderly people that the higher their relationship strength is, the lower their sense of insecure is. Figure 3-24 shows the results. The percentage point difference for people who responded with "feel insecure" between the group with low relationship strength and the group with high relationship strength is 14.7 points for people who spend most of their time at home and

Figure 3-23 Sence of insecure by relationship strength



(Source) Survey on Safe and Secure ICT Utilization in an Ubiquitous Network Society (2009), Ministry of Internal Affairs and Communications

Figure 3-24 The extent of concerns by relationship strength level of people who spend most of their time at home and elderly people



(Source) Survey on Safe and Secure ICT Utilization in an Ubiquitous Network Society (2009), Ministry of Internal Affairs and Communications

[51] The respondents participating in two, four, five and six communities also exhibit a mono-modal shape and it is found that people who achieve a balance between participation in online and offline communities have higher relationship strength.

[52] The category people under age includes those other than housewives and househusbands under 20 years of age, the category young people includes students, part-time workers, unemployed people and others aged between 20 and 29 years, the working category includes company executives/managers, self-employed people, specialists, and civil servants aged between 20 and 59 years, the category people who spend most of their time at home includes homemakers under the age of 60 years, part-time workers, unemployed people and others aged between 30 and 59 years, and the category elderly people includes those over 60 years of age.

11.9 points for elderly people.

Nearly half of users who spend most of their time at home and elderly people have low ICT utilization capabilities and they have an overwhelmingly high tendency to participate in no or only offline communities. Therefore, people who belong to these user groups have the potential to participate in online communities while increasing their ICT utilization capabilities and increase the relationship strength through a synergic effect of offline and online communities, thereby alleviating sence of insecure.

(3) Secure Internet society by adding "e-relationships" to local community and family relationships

The analysis results thus far have suggested that even users with insufficient ICT utilization capabilities can possibly alleviate their concerns about ICT utilization by achieving a balance between face-to face personal relations, such as offline communities, and human relations on the Internet, such as online communities.

The phenomenon of expanding electronically-connected relationships through an ICT network, such as the Internet and mobile phones, is sometimes called "e-relationships[53]." It is very important for "e-relationships" to connect to real communities by linking with local community and family relationships. ICT utilization is effective as an alternative to face-to-face exchanges but it is more effective if used to complement face-to-face exchanges. Japan's revival faces the challenge of establishing e-relationships that are linked with local community and family relationships. ICT is nothing but a tool without a mind; it is we, the users, who have a mind. Then, how should we lead this new technology that is very convenient and useful but can be dangerous if misused? Society as a whole must make a concerted effort to lead ICT in a direction where effective utilization of e-relationships will bring back community bonds, which is the advantage of Japan, and people and companies can meet and help each other transcending boundaries of distance and time, thereby generating vitality.

[53] See the feature article "Age of e-Relationships," Nihon Keizai Shimbun (January 1, 2004). Fujisawa-city envisions an "e-Relationship City of Fujisawa"

Section 4
Toward Realizing Japan's Revival by Tacking the "I x C x T" Challenge

Based on the evaluation of the international comparison of ICT infrastructure, utilization, and security in chapter 2, this chapter presented specific directions titled "Three Challenges Facing Japan's Revival." In other words, for Japan to overcome the global economic crisis and achieve revival at an earliest possible time, there are three key ICT challenges for which concentrated efforts must be made.

(1) **I**nvestment: ICT investment, mainly by industries using on ICT utilization, should be drastically accelerated.
(2) **C**ollaboration: The ICT industry should act as a catalyst for actively promoting collaboration between stakeholders.
(3) **T**rust (e-relationships): The creation of secure society in which e-relations coexist with local community and family relationships through the achievement of a balance between the virtual and real world.

Lastly, let us summarize the relationship with the channels linking ICT and growth that were mentioned in chapter 1. First, regarding the challenge of (1) investment, the drastic acceleration of ICT investment promotes the accumulation of ICT capital through the channel of economic power and contributes to an increase in productively through innovation, leading to growth. Next, regarding (2) collaboration, collaboration between business sectors contributes to a rise in the productivity of ICT user corporations, also through the channel of economic power, leading to growth. And finally, regarding (3) trust, the improvement of ICT utilization capabilities contributes to an increase in human capital through the channel of intellectual power and the strengthening of bonds contributes to an increase in social capital through the channel of social power, leading to growth.

Figure 3-25 Three Challenges Facing Japan's Revival