



## Section 2 Japan's ICT Lagging Behind in Overall Evaluation

The previous section evaluated the current situation and problems facing Japan's ICT industry, and this section conducts two types of international comparisons in order to objectively analyze how advanced Japan's ICT is. First, we will look at an outline of the overall international evaluation of Japan's ICT based on the ICT competitiveness rankings by the World Economic Forum (WEF). Next, to understand the current status of Japan's ICT more accurately, an independent international comparison will be conducted from three viewpoints: ICT infrastructure, utilization and security.

### 1. Evaluation by ICT competitiveness rankings

Figure 2-12 shows changes in the ratings of major economies in the ICT competitiveness rankings<sup>25</sup> developed by the WEF. Japan was ranked 8<sup>th</sup> in 2004 but has remained low in recent years at around 20<sup>th</sup> position: ranked 19<sup>th</sup> in 2007 and 17<sup>th</sup> in 2008. Denmark and Sweden occupied the first and second positions for three years in a row, and seven European countries, led by the Northern countries, have secured top 10 rankings. In North America, the United States has been placed third, and in Asia, Korea has been ranked 11<sup>th</sup>, and Japan is behind all these countries.

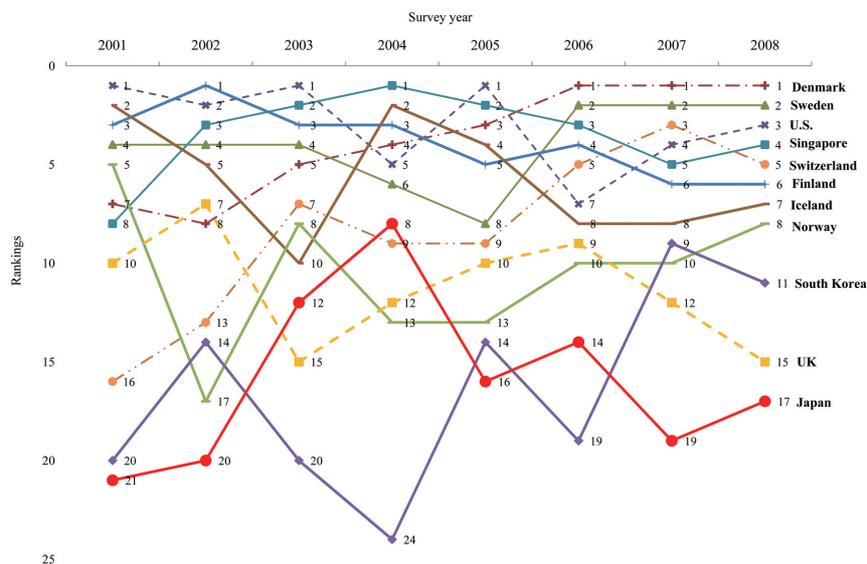
However, there are problems associated with the ICT competitiveness rankings: for example, many variables, such as tax systems, finance, education, law

and politics, are not directly related to ICT and many of the variables are qualitative ones based on questionnaire surveys conducted on a small group of experts. In order to accurately evaluate the current status of Japan's ICT, it is necessary to devise a more appropriate evaluation method, based on the direction of ICT measures implemented thus far.

### 2. International comparison of ICT in terms of infrastructure, utilization and security

With regard to national strategies for Japan's ICT, the development of a broadband infrastructure has been intensively promoted since the formulation of e-Japan Strategy 2001. After the formulation of e-Japan Strategy II in 2003, the policy priority has shifted from

Figure 2-12 Changes in ICT competitiveness rankings



Compiled from the Global Information Technology Report 2008-2009, WEF (2009)

<sup>25</sup> Based on ICT competitiveness index (Network Readiness Index) that counted a total of 68 indices comprising three ICT elements (total of 9 index groups): namely environment (market,

politics, regulations and infrastructure), readiness (of individuals, businesses and the government), and usage (of individuals, businesses and the government).

infrastructure development to the utilization of ICT. The promotion of u-Japan policies was launched in 2005, taking another step away from the electronic world toward the ubiquitous world, and ICT is being promoted with three keywords: infrastructure, utilization and security, incorporating a pillar of security (development of utilization environment) into the policies.

In order to objectively evaluate Japan's current status, including confirmation of the progress of ICT policies, we have performed an international comparison with countries considered advanced in ICT<sup>26</sup> (the United States, the United Kingdom, South Korea, Denmark, Sweden and Singapore) from three main viewpoints: infrastructure, utilization and security.

### (I) International comparison of ICT infrastructure

#### A. Evaluation method

Since there is abundant quantitative data allowing for an international comparison of ICT infrastructure, instead of, like the WEF survey, simply focusing on user charges and communication speed, a balanced evaluation should use comprehensive data, including data on new technologies. Thus, an evaluation was

performed on the seven countries in terms of 12 indices in the following six areas<sup>27</sup> relating to ICT: (1) user charges (2) speed (3) security (4) mobility (5) dissemination (6) infrastructure element.

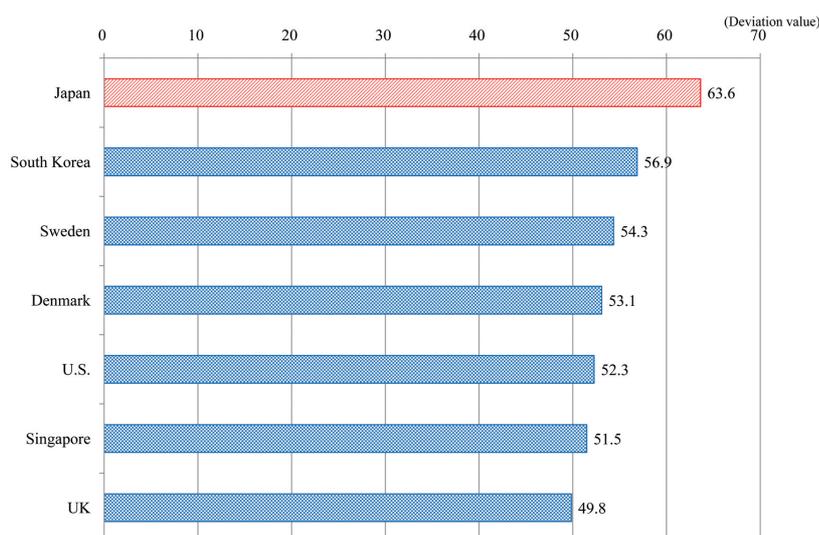
#### B. Overall rankings

Each index was obtained in principle by calculating the deviation value of the latest raw data disclosed by international organizations in order to eliminate arbitrariness and ensure neutrality. The overall evaluation rankings were created by calculating the mean deviations for each index for each country. Figure 2-13 is the result. Japan was ranked top, followed by South Korea, Sweden, Denmark, U.S., Singapore and UK in descending order<sup>28</sup>.

#### C. Evaluation by individual index

Figure 2-14 show the deviation values of the 12 indices for each country. Japan took the first position in five criteria: broadband charge, optical fiber ratio, broadband speed, ratio of bot-infected PCs and ratio of third-generation mobile phones. Speed was particularly excellent and safety and mobility were also highly evaluated.

Figure 2-13 International rankings for ICT infrastructure



Compiled from the Survey on Global Comparison in Relation to Japan's ICT Infrastructure (2009), Ministry of Internal Affairs and Communications

<sup>26</sup> Total of seven countries were selected for the international comparison: the U.S. (3<sup>rd</sup>), UK (15<sup>th</sup>) and South Korea (11<sup>th</sup>) to achieve a geographical balance among the countries ranked higher than Japan in the ICT competitiveness rankings of the World Economic Forum, as well as three top ranking countries (Denmark (1<sup>st</sup>), Sweden (2<sup>nd</sup>), Singapore (4<sup>th</sup>)) and Japan (17<sup>th</sup>).

<sup>27</sup> Six areas of variables are: (1) user charges (① basic telephone charges, ② broadband cost), (2) Speed (③ optical fiber ratio, ④ broadband speed), (3) security (⑤ number of secure

servers, ⑥ ratio of bot-infected PCs), (4) mobility (⑦ ratio of third-generation mobile phones, ⑧ mobile phone dissemination rate), (5) dissemination (⑨ Internet dissemination rate, ⑩ broadband dissemination rate), (6) infrastructure element (⑪ number of Internet hosts, ⑫ ICT investment ratio)

<sup>28</sup> The Ministry of Internal Affairs and Communications conducted the Survey on Global Comparison in Relation to Japan's ICT Infrastructure (2009) in 24 countries. The figure shows the result of 7 countries among the deviations of 24 countries.

South Korea, which came 2nd, took the first place in ICT investment ratio. Optical fiber ratio, ratio of third-generation mobile phones, internet dissemination rate and broadband dissemination rate were also highly evaluated. Sweden which came 3rd, took the first place in Internet dissemination rate. Broadband dissemination rate and mobile phone dissemination rate were highly evaluated and other criteria were well balanced, with deviation values of over 50.

tion, the following 10 areas were set: (1) healthcare/welfare, (2) education/personnel, (3) employment/labor, (4) administrative services, (5) culture/arts, (6) corporate management, (7) environment/energy, (8) transportation/distribution, (9) security/safety, (10) e-commerce. We then presented three cases of specific ICT system services<sup>33</sup> for each area and asked about the overall utilization for each area.

**(2) International comparison of ICT utilization**

**A. Evaluation method**

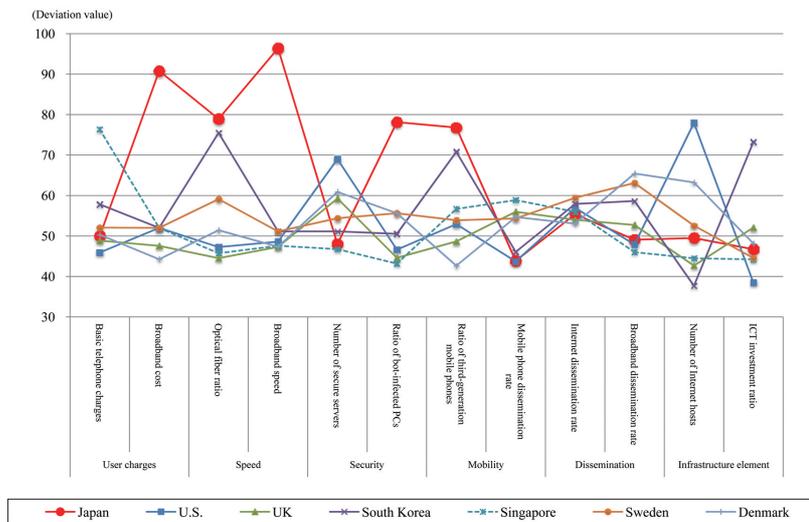
Next, the progress in ICT systems and utilization of services is evaluated to show how effectively the world's highest level of ICT infrastructure is being used. Since there is little quantitative data that allows for an integrated international comparison, unlike ICT infrastructure for the utilization of ICT, we conducted an online questionnaire targeting users in the aforementioned seven countries<sup>32</sup>. For the survey on utiliza-

**B. Overall rankings**

In order to comprehensively compare the utilization in the 10 areas for each country, the deviation value concerning utilization in each country was calculated from the mean value of the sum of the utilization rates<sup>34</sup> for each area.

As a result, as figure 2-15 shows, the most advanced country in terms of utilization was Singapore, followed by Denmark, South Korea and Sweden. Japan was ranked fifth out of the seven coun-

**Figure 2-14 Deviation values by index relating to ICT infrastructure**



Compiled from the Survey on Global Comparison in Relation to Japan's ICT Infrastructure (2009), Ministry of Internal Affairs and Communications

<sup>29</sup> Users in seven countries were grouped by age, and 1000 responses were returned from each country.

<sup>30</sup> ICT system services in each area include: (1) healthcare/welfare (electronic chart, pension payment simulation, etc.), (2) education/personnel (home life-long education, in-school LAN, etc.), (3) employment/labor (provision of placement information system, telework, etc.), (4) administrative services (online application, online tax declaration/taxation system, etc.), (5) culture/arts (tour information/audio information, purchase/use of internet contents, etc.), (6) corporate management (facilitation and upgrading of production and distribution process management by electronic tags, etc., B2B e-settlement system, etc.), (7) environment/energy (remote monitoring system for the usage of water, electricity gas, etc., automatic control ventilation and lighting, visualization of electricity consumption, etc.) (8) transportation/distribution (e-tickets using IC card, system to

confirm the position of goods for courier services), (9) safety/security (security confirmation system at time of disaster, danger alarm system, etc.), (10) e-commerce (settlement system by credit card or e-money, online system for financial transactions, etc.)

<sup>31</sup> First, respondents were asked to choose an appropriate answer as to the use of ICT system services corresponding to each area for the following options: "Have used the service", "Have not used the service, but have heard of it", or "Have not used or heard of the service." Then, the rate of responses of "Have used the service" was regarded as the utilization rate. Among respondents, only people in employment were counted for corporate management. Employment was classed as follows: executives/officers, employees (clerical), employees (technical), employees (other), self-employed, specialists, civil servants.

tries. There are about 11 points separating the top four countries and the bottom three countries, identifying the top four countries as advanced ICT utilization countries and the bottom three as lagging behind in utilization.

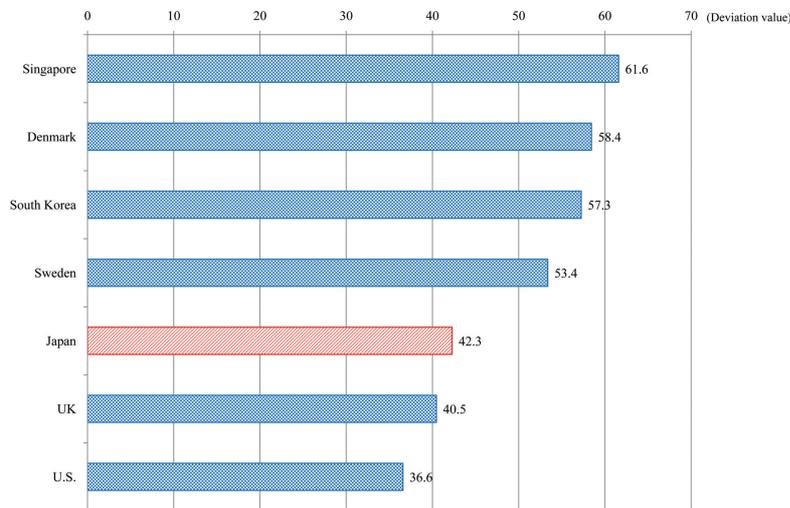
**C. Evaluation by area**

Figure 2-16 shows the deviation values of utilization in the 10 areas for each country. Japan's deviation values are low at less than 40 in five areas: healthcare/welfare, education/personnel, employment/labor, administrative services, and corporate management.

The low score for utilization is notable. On the other hand, Japan has the highest deviation value for transportation/distribution, and has some average values for culture/arts, e-commerce, safety/security and environment/energy.

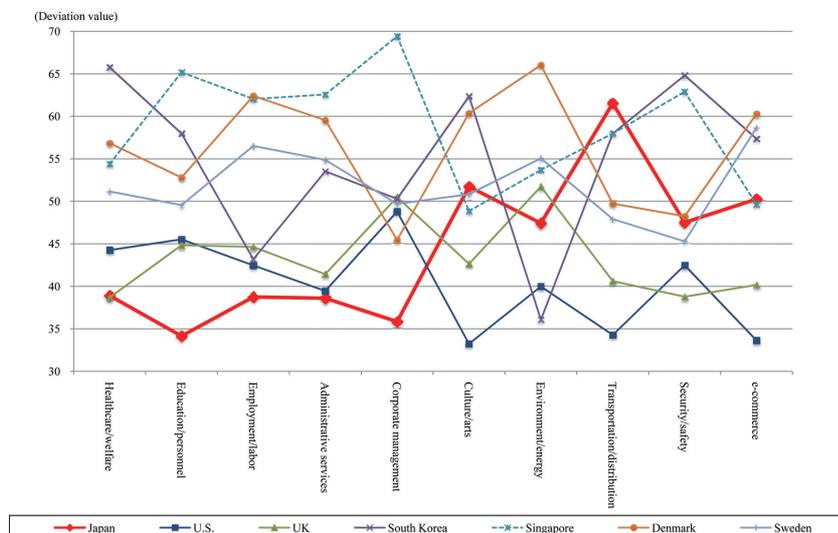
When looking at Singapore, which scored the highest marks, its deviation values are highest for education/personnel, administrative services and corporate management, and other areas are also highly evaluated. Denmark was second and has the highest scores for employment/labor, environment/energy and e-commerce, and also has high scores for

**Figure 2-15 International rankings relating to utilization of ICT**



NB. Deviation value was calculated from the mean value of the sum of the rate of utilization for each area (Source) International Comparison of ICT-related Developments (2009), Ministry of Internal Affairs and Communications

**Figure 16 Deviation values concerning ICT utilization**



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

healthcare/welfare, administrative services and culture/arts. South Korea was third with the highest deviation values for healthcare/welfare, culture/arts and safety/security.

### (3) International comparison of ICT security

#### A. Evaluation method

Since ICT security depends on subjective value judgments and there is little quantitative data which allows for an integrated international comparison as in the case of ICT utilization, we conducted an online questionnaire targeting users in the aforementioned seven countries. In doing so, we have set the following 10 areas as issues related to ICT security: (1) privacy, (2) information security, (3) e-commerce, (4) illegal/harmful contents, (5) intellectual property rights, (6) manners and social code of conduct related to ITC usage, (6) information literacy, (8) geographical divide, (9) soundness of the global environment and physical and mental health, (10) institutions and customs adopted to cyber society. We then presented

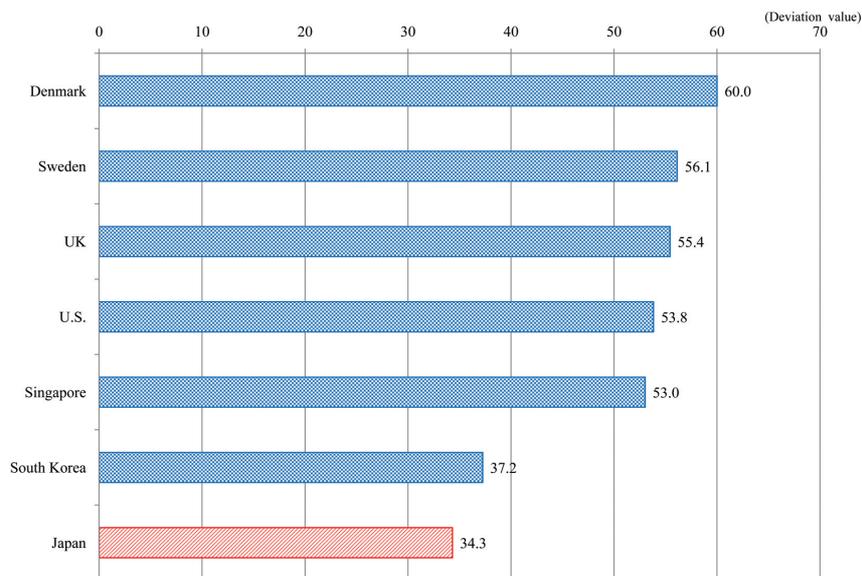
three specific issues<sup>35</sup> involved in each area and asked them about overall security.

#### B. Overall evaluation rankings

The responses were awarded points to comprehensively compare users' sense of security with regard to ICT in the 10 areas for each country, and deviation values regarding sense of security for each country were calculated from the sums in the 10 areas. As a result, as shown in figure 2-17, the country that scored the highest was Denmark, followed by Sweden, UK, U.S., and Singapore, with Japan the lowest after South Korea. There were about 16 points between the top five countries and the bottom two countries, and users' sense of security in Japan and South Korea is particularly low.

These survey results should be carefully evaluated. This is because sense of secure or insecure subjective and may reflect cultural background or national character. In other words, there is a possibility that a higher percentage of users of ICT in Japan feel insecure

Figure 2-17 International rankings on sense of security regarding ICT



NB. Sense of security in each area was scored in the following manner: "not feel insecure" = 2 points, "not feel relatively insecure" = 1 point, "cannot say either way" = 0 point, "feel relatively" = -1 point, "feel insecure" = -2 points  
(Source) International Comparison of ICT-related Developments (2009), Ministry of Internal Affairs and Communications

<sup>32</sup> Specific issues involved in each area are: (1) Privacy (illegal acquisition of credit card number, outflow of personal data possessed by public organizations, etc.), (2) Information security (virus infection, illicit access, including or identity fraud and defacement, etc.), (3) Illegal/harmful contents (access to illegal/harmful sites such as online dating sites, posting of defamation and infringement of rights), (4) Information literacy (lack of sufficient knowledge to use and operate ICT equipment, information divide), (5) Geographical divide (geographic divide of optical fiber and terrestrial digital broadcasting, gap between local governments' use of e-applications, etc.), (6) Intellectual property rights, (illegal distribution of pirated DVDs, illegally

downloading literature using file-sharing software), (7) e-commerce (trouble with online sellers, safety of e-settlement systems such as e-money), (8) manners and social codes of conduct related to ITC usage (lack of manners concerning use of blogs/BBC, lack of manners concerning conversations and taking photos using mobile phones), (9) Institutions and customs adapted to cyber society (incomplete online administrative services, for example, there are some products not available on the Internet), (10) Soundness of the global environment and physical and mental health (increase in energy consumption caused by an increase in the use of ICT equipment, increase in waste due to replacing ICT equipment).

partly as a result of their cultural background and national character, even though an objectively safe social infrastructure has been developed. Figure 2-18 shows such an example. When assessing safety in terms of the bot infection rate of PCs, Japan scores the highest, but the overall index for sense of security is the lowest (See Figure 2-17).

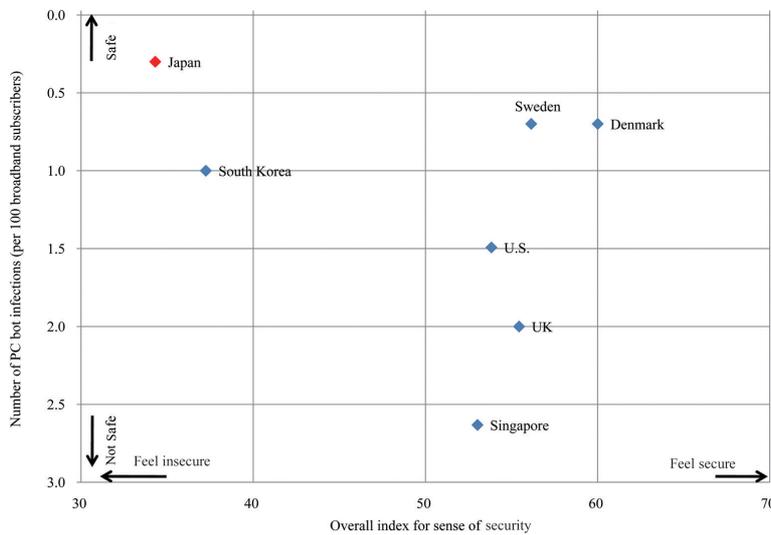
**C. Evaluation by area**

Bearing in mind that users in Japan and South

Korea tend to feel insecure concerns even though the ICT infrastructure is safe, as described above, let us now look at the deviation values for sense of security for each country in the 10 areas (figure 2-19).

The sense of security felt by Japanese and South Korean users is particularly low in every area, and other countries have deviation values exceeding 50, showing a bipolar tendency. The deviation values for Japan are less than 40 in every area, with particularly low values for information literacy.

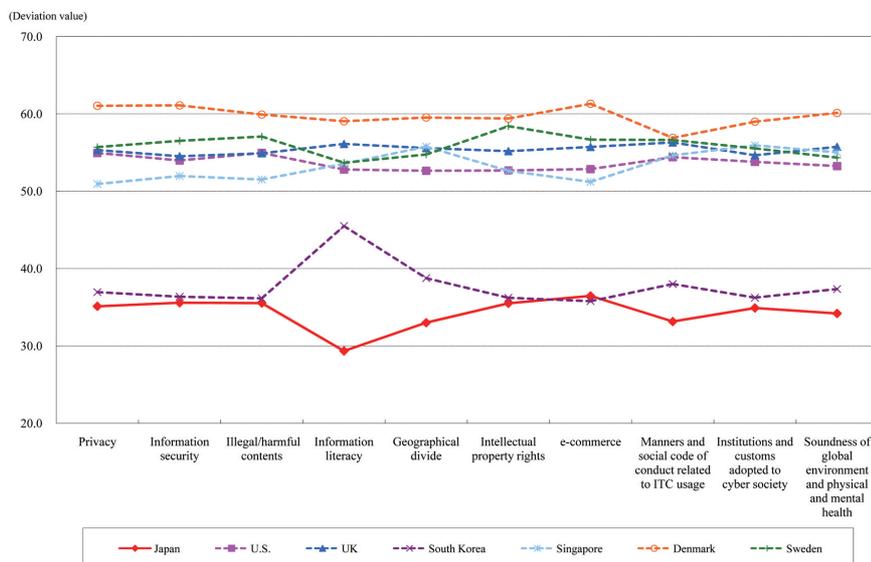
**Figure 2-18 Relationship between rate of PC bot infections and overall index for sense of security**



Bot infection rate of PCs: Compiled from International Comparison of ICT-related Developments (2009), Ministry of Internal Affairs and Communications

Overall index for sense of security: Compiled from International Comparison of ICT-related Developments (2009), Ministry of Internal Affairs and Communications

**Figure 2-19 Area-specific deviation values concerning sense of security of ICT**



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