Section 1

Use of Ubiquitous Networks by Individuals and Companies

1 u-Japan

"u-Japan" is what Japan will be like in 2010 when information and communications technology (ICT) will be applied toward resolving various problems in society. It is based on four principles: ubiquitous (connects everyone and everything); universal (can be easily used by the elderly, etc.); user-oriented (based on users' viewpoints); and unique (creative and vigorous). Among these, "ubiquitous" plays the key role. Ubiquitous networks are characterized by the realization of easy "person-to-person" plus "person-to-goods" and "goods-to-goods" communications **(Figure 1-1-1)**. They allow easy connection to networks "anytime, anywhere, by anything and anyone" by attaching small, low-priced devices to all kinds of things in all kinds of places. As a result, ICT will penetrate every corner of daily life like grassroots.

On the other hand, new problems will arise in the process of achieving u-Japan. For example, if individuals' purchase history and activity history become easily accessible through networks, there would be a risk of leakage or misuse of such personal information. In addition, if various devices at home become connected to networks, these devices would also become subject to virus infections and unauthorized access.

In order to overcome these problems and to achieve u-Japan in an ideal way, the MIC established the Policy Roundtable for Realizing a Ubiquitous Network Society in March 2004 and compiled the "u-Japan Policy" in December of the same year.

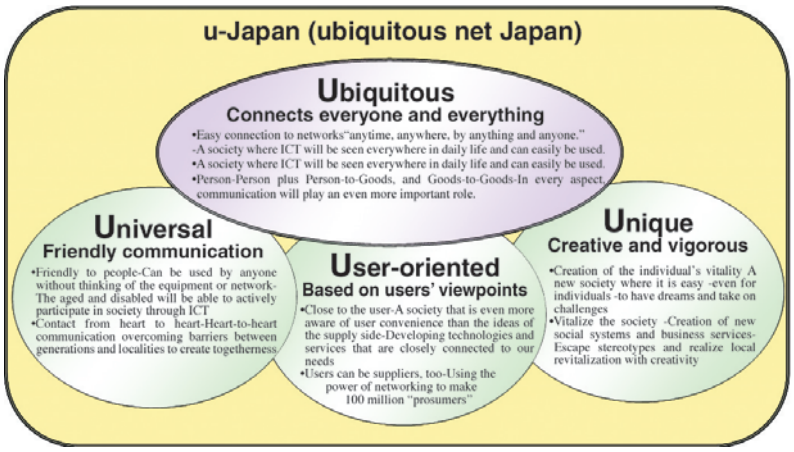
2 People's expectations for ubiquitous networks

Users were asked what special expectations they had of the various benefits of ubiquitous networks. The top answer was a "safer and more secure life" at 55.7%, followed by "greater convenience" at 42.2%, "quicker response to disasters" at 27.4%, and "safer and more pleasant to drive and/or walk" at 22.3%. The result indicates that user expectations are particularly high for matters related to safety and security **(Figure 1-1-2)**.

3. Trend in corporate use of ubiquitous networks

Corporate use of radio frequency identification (RFID) tags, contactless smart cards, and new network-compatible devices (ubiquitous network tools) are making notable progress.

Figure 1-1-1 The u-Japan concept



Produced from MIC, Final Report of the Policy Roundtable for Realizing a Ubiquitous Network Society

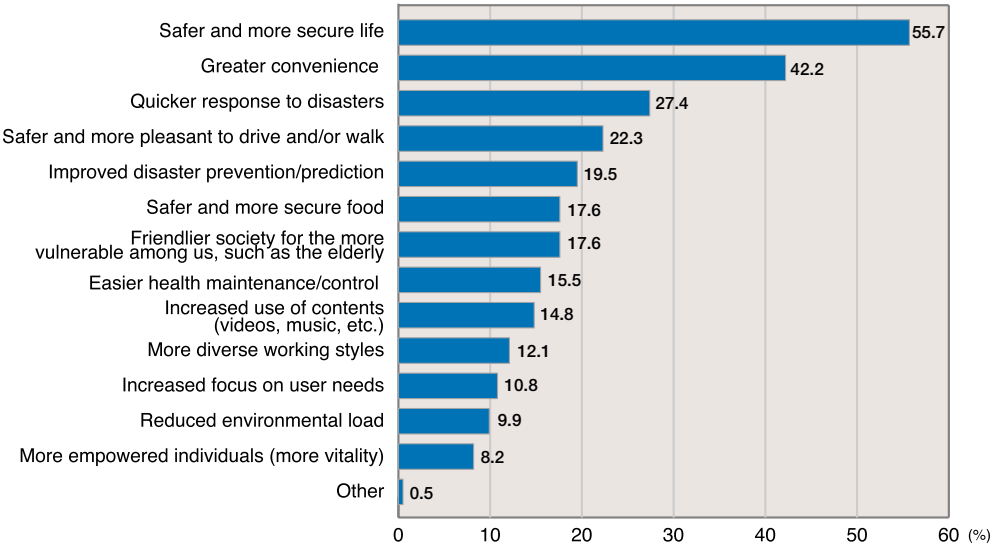
(1) Introduction of ubiquitous network tools in intra-corporate/inter-corporate operations

Comparing the status of the introduction of ubiquitous network tools in intra-corporate/inter-corporate operations between FY 2003 and FY 2004, the percentage of companies that answered "already introduced" increased by 4.4 points for RFID tags and 9.2 points for contactless smart cards, while the percentage of companies that answered "introduction under consideration (including 'introduction scheduled')" increased by 15.3 points for RFID tags and 17.2 points for contactless smart cards. This suggests that the introduction of ubiquitous network tools has progressed and that more companies have come to consider introducing them **(Figure 1-1-3)**.

(2) Offer of general consumer products and services using ubiquitous network tools

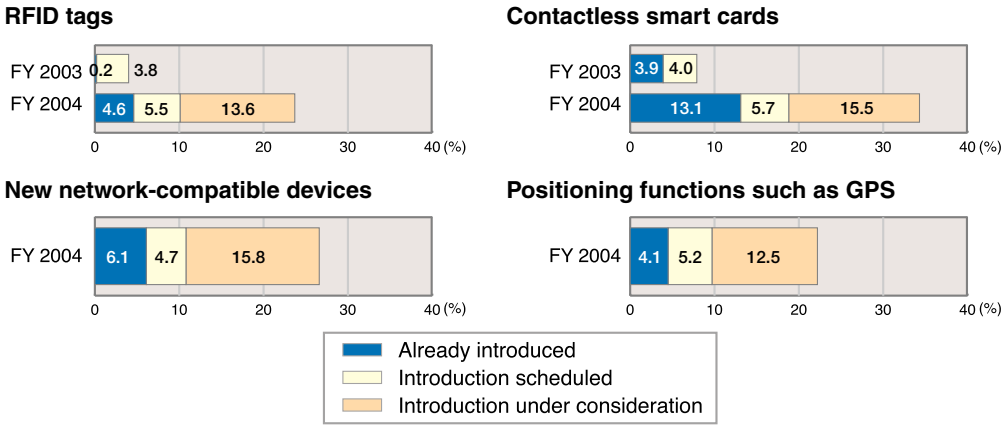
Comparing the status of offer of general consumer products and services using ubiquitous network tools between FY 2003 and FY 2004, the percentage of companies that answered "already offered" increased by 4.3 points for RFID tags and 4.5 points for contactless smart cards, while the percentage of companies that answered "offer under consideration (including 'offer scheduled')" increased by 6.4 points for RFID tags and 7.7 points for contactless smart cards. The result indicates that more companies have come to consider offering products and services using ubiquitous network tools in line with the increased offer of such products and services **(Figure 1-1-4)**.

Figure 1-1-2 Benefits expected in ubiquitous networks (multiple responses possible)



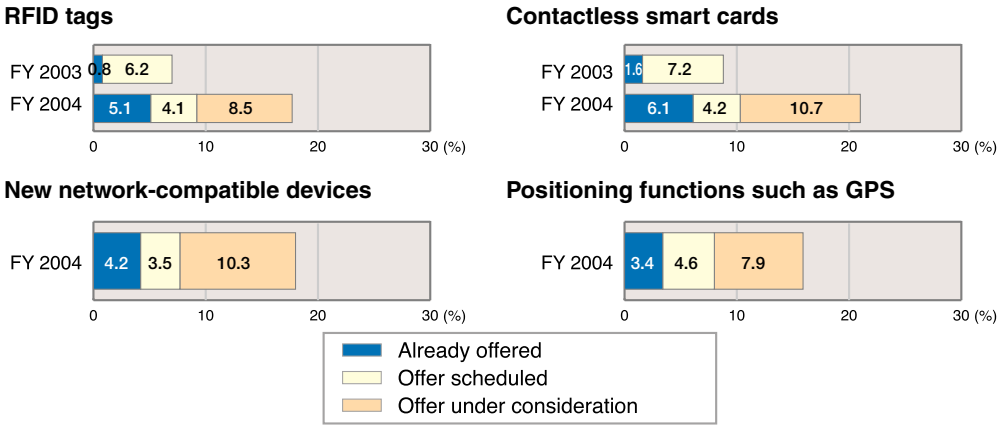
Source: Survey on Trends Concerning a Ubiquitous Network Society (Web survey)

Figure 1-1-3 Introduction of ubiquitous network tools in intra-corporate/inter-corporate operations



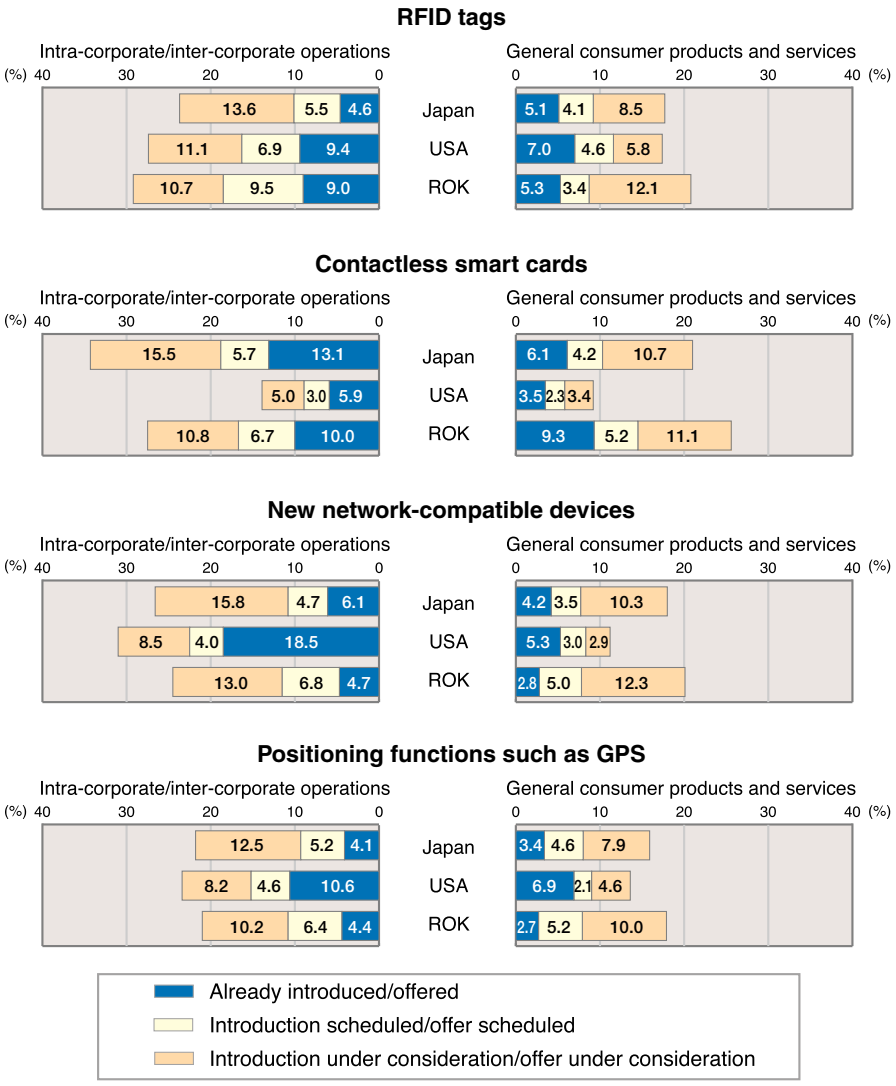
Source: Survey on the Status of Corporate Use of ICT (Web survey)

Figure 1-1-4 Offer of general consumer products and services using ubiquitous tools



Source: Survey on the Status of Corporate Use of ICT (Web survey)

Figure 1-1-5 Introduction of ubiquitous network tools



Source: Survey on the Status of Corporate Use of ICT (Web survey)

(3) Comparison among Japan, the United States, and the Republic of Korea concerning the trend in corporate use of ubiquitous networks

The percentage of companies that have "already introduced" ubiquitous network tools in intra-corporate/inter-corporate operations was high in Japan for contactless smart cards and high in the United States for the other tools. Meanwhile, the percentage including companies that are "scheduled or considering introduction" was high in Japan for contactless smart cards, high in the Republic of Korea for RFID tags, and high in the United States for the other tools.

The percentage of companies that "already offer" products and/or services using ubiquitous network tools was high in the Republic of Korea for contactless smart cards and high in the United States for the other tools. Meanwhile, the percentage including companies that are "scheduled or considering offering" was high in the Republic of Korea for all tools, followed by Japan **(Figure 1-1-5)**.

4. Example use of ubiquitous networks

(1) Services provided through mobile phones with contactless smart card technology

While the functions of mobile phone terminals are becoming more and more advanced, such as the Internet access function and the camera function, various services provided through mobile phone terminals with contactless smart card technology were launched in July 2004 **(Figure 1-1-6)**.

The users of mobile phones with contactless smart card technology (379 persons) were surveyed with regards to the services they use, the degree of satisfaction with the services, and the intent to continue using the services. The most frequently used service was "electronic money settlements" at an overwhelming 76.5%, followed by "membership cards, reward cards, etc." at 33.2% **(Figure 1-1-7)**.

With regard to the degree of user satisfaction for the services, 34.0% answered "very satisfied/satisfied," which exceeded the 11.6% who answered "very dissatisfied/somewhat dissatisfied" **(Figure 1-1-8)**.

In terms of the intent to continue using the services, "want to continue" was high at 65.7%, and as many as 87.1% of the users predicted that the services "will spread widely/will spread to a certain extent."

(2) Utilization of RFID tags for safety of school children

In order to understand the effectiveness and problems involved in use of RFID tags for safety of elemen-

Figure 1-1-6 Examples of the services of mobile phones with contactless smart card technology

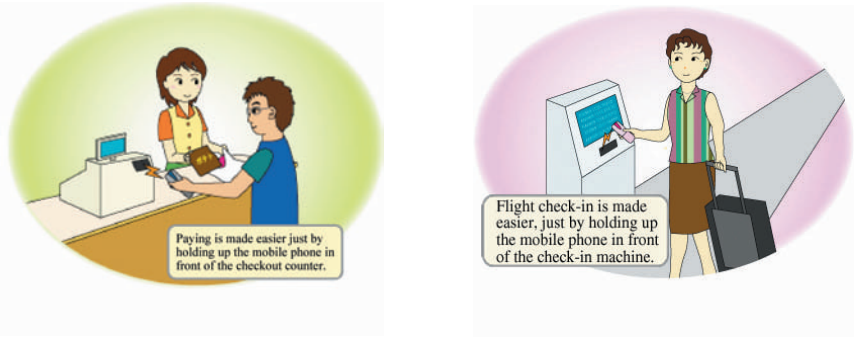


Figure 1-1-7 Services of mobile phones with contactless smart card technology used by users (multiple responses possible)

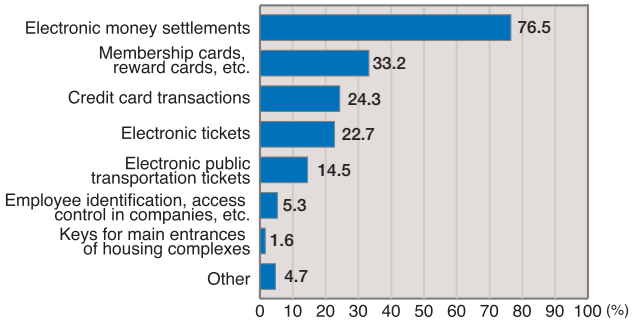


Figure 1-1-8 Degree of user satisfaction for the services of mobile phones with contactless smart card technology

Source for Figures 1-1-7 and 1-1-8 : Survey on Trends Concerning a Ubiquitous Network Society (Web survey)

tary school children, the Kinki Bureau of Telecommunications of the Ministry of Internal Affairs and Communications (MIC), implemented a demonstration test for a system that records the school arrival and departure times using RFID tags and notifies parents of this information by e-mail under the cooperation of Shinjo Daini Elementary School in Tanabe City, Wakayama Prefecture (October 25 - November 5, 2004) **(Figure 1-1-9)**.

After the test, a questionnaire survey was conducted on the participants to check their evaluations of the demonstration test. According to the survey results, the school arrival and departure notifications sent to the parents' mobile phones had been "checked almost everyday" by 81.0% of the parents, while 82.9% "felt more reassured/felt slightly more reassured" throughout the demonstration test **(Figure 1-1-10)**. As for the future need for safety or security programs using ICT technology, such as RFID tags and network cameras, 71.3% answered that they were "necessary/somewhat necessary." The biggest reason was "because the social conditions have changed, and criminal incidents occur frequently," which was mentioned by 65.8% **(Figure 1-1-11)**.

(3) Utilization of Contactless Smart Cards for Production Management

A factory of a PC manufacturer had conducted operations by allotting one instruction sheet per PC unit, and having the respective production line staff members confirm the specifications and precautions indicated in the relevant part of the production instruction sheet. However, it was time-consuming to check the relevant part of the sheet. In addition, a barcode printed on the sheet had been read in each process of assembly, inspection, shipment, etc. for production management, and this reading process was conducted about 100,000 times a day. Thus, in order to facilitate confirmation of the content of the production instruction sheet, reduce the barcode reading process load, and reinforce traceability, contactless smart cards were introduced in September 2004.

Due to the introduction of the contactless smart cards, the factory became able to facilitate confirmation of the operation content, automatically store data such as production history and inspection results in the assembly/inspection phases, and improve efficiency of the

Figure 1-1-9 Outline of the demonstration test of the use of RFID tags for safety of school children

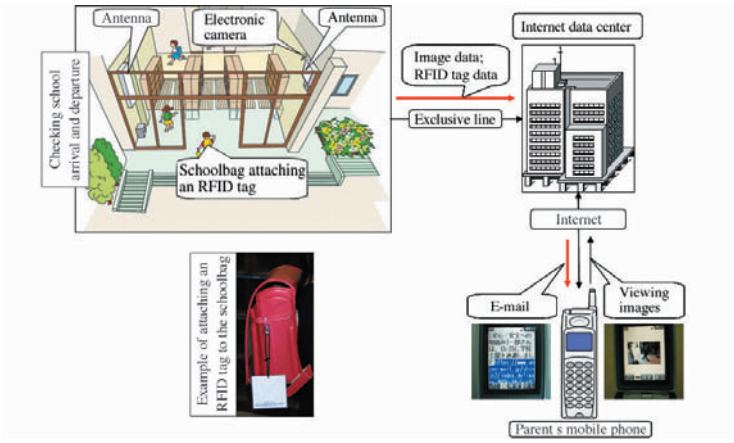


Figure 1-1-10 Overall impression of the program

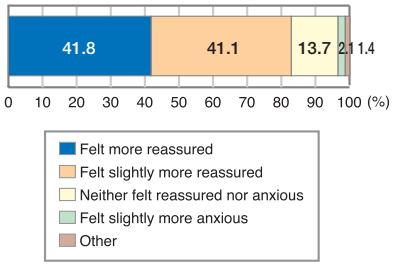
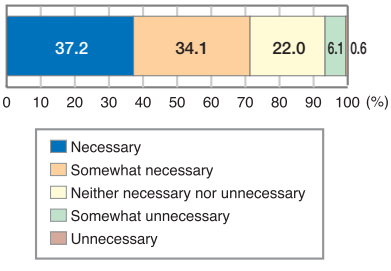


Figure 1-1-11 Future need for safety or security programs using ICT technology



Source for Figures 1-1-9 to 1-1-11: Kinki Bureau of Telecommunications, MIC, Study Group on Utilization of RFID Tags in the Public Sector (March 2005)

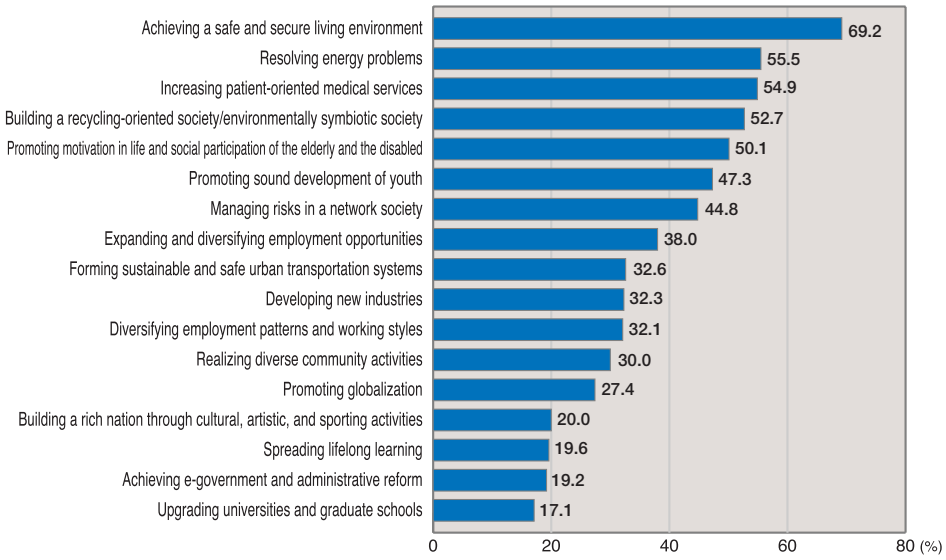
shipping/delivery processes by reading multiple contactless smart cards in a batch, and improve the productivity by more than 10% as a result.

5. Japan's future challenges and solutions using ubiquitous networks

The "Policy Roundtable for Realizing a Ubiquitous Network Society" conducted a questionnaire survey on 6,000 consumers concerning the important themes that Japanese society should address toward 2010. As a result, the theme that was most mentioned as being extremely important was "achieving a safe and secure living environment," indicated by nearly 70% of the respondents, followed by energy, medical care, and the environment **(Figure 1-1-12)**.

In addition, more specific challenges were investigated regarding these individual important themes, and examples of solutions using ubiquitous networks were identified through consumer group interviews and corporate interviews **(Figure 1-1-13)**.

Figure 1-1-12 Important theme that Japanese society should address toward 2010 (multiple responses possible)



* Respondents who answered "very important"

Figure 1-1-13 Specific future challenges and solution examples using ubiquitous networks

* A key ICT solution for each issue is exemplified after the arrow.

Source for Figures 1-1-12 and 1-1-13: Produced from MIC, Final Report of the Policy Roundtable for Realizing a Ubiquitous Network Society