

Social Experiments Involving the POSTUB Electronic Post

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POSTUB stands for Post Service in the Ubiquitous Network Age, and refers to an electronic mailbox (reception box) to receive messages on a secure basis at any time, anywhere and in any format. Nomura Research Institute, Ltd. (NRI) carried out social experiments involving POSTUB applications over three months from January through March 2002 with the participation of the Ministry of Public Management, Home Affairs, Posts and Telecommunications (MPHPT), some ten private companies and about 8,000 individuals. The three major trends that could be seen as environmental changes relating to messaging included: a shift from “messages addressed to many and unspecified persons” to “messages addressed to many and specified persons”; increase in number of chance to spread information by citizens themselves; and availability of various messaging media. These major changes are expected to give a rise to major issues relating to security, the digital divide (information gap), and address management in the future. A hypothesis concerning an electronic post as part of the social infrastructure was established as a means of resolving these three issues, and electronic post service was implemented on a trial basis to verify this hypothesis during these social experiments. While the results showed that this mechanism may be able to resolve many elements related to these three problems, it was also revealed that three important tasks concerning the development of the social infrastructural aspects, public education and technological progress remain to be resolved in order to actually construct and use an electronic post in the future. Addressing these tasks requires continued activities to construct POSTUB as part of the social infrastructure through the joint efforts of the government and the private sector, as the establishment of POSTUB infrastructure will accelerate the promotion of the “e-Japan strategy” and lead to the improvement of the international competitiveness of Japanese companies in the IT (information technology) field through the development of a ubiquitous network society.

I Environmental Changes in Messaging and Three Issues

NRI carried out social experiments concerning the new POSTUB messaging infrastructure over three months from January to March 2002 in cooperation with the MPHPT, some ten private companies and about 8,000 individuals. This section explains the background behind the conduct of these experiments and the hypothesis involved.

1 The Definition of Messaging

While there are various definitions concerning messages and messaging, this paper defines messages as “intentions and information addressed to specified persons” and uses the term “messaging” to label the action of sending such intentions and information. Accordingly, messaging by mass media addressed to many and unspecified audiences is not covered by this paper.

Messaging as defined in this paper uses media (means) that specify the recipient and designate the recipient’s address, such as mail, telephone, fax, and email.

2 Three Environmental Changes Surrounding Messaging

(1) Shifting from “addressed to many and unspecified persons” to “addressed to many but specified persons”

“In the beginning was the Word . . .” As suggested by this passage in the Bible, the ability to freely convey intentions and information through a fluent command of words has played an important role in the process of human evolution. I would therefore like to start by overviewing the way in which sending intentions and information, i.e., the means of messaging, has been developed by separating the process into three stages from the standpoint of the recipients.

In the first stage, Gutenberg invented typography around the middle of the 15th century. Coupled with the improvement in literacy, the rise of mass media expanded information sharing in terms of space and time, which in turn led to the first and second Industrial Revolutions. Mass media publications constituted a major means of sending information to many and unspecified persons in the 15th through 19th centuries. During this first stage, means of messaging that specified the recipients had not been common.

In the second stage, means of messaging such as mail and the telephone that specified the recipients were developed. While some persons had used mail through the old courier system, stage coaches, post horses, etc., for many years, it was not until the middle

of the 19th century when the modern postal system was established by Roland Hill in the United Kingdom that mail service became available to the general public at low prices. The major feature of this system was the uniform low price (one penny; hence the name “penny post”) nationwide. Systems such as this have enabled many people to make wide use of the mails. Similarly, the telephone was invented by Alexander Graham Bell in the latter half of the 19th century and became widely used early in the 20th century.

As these means of messaging enabled people to easily send messages by specifying the recipients, usage by the general public increased and communication systems have been largely developed by transcending the spatial and time limitations imposed on individuals. However, mail and telephones require destination information such as addresses and telephone numbers. This destination information was basically allocated on the unit of households for both street addresses and telephone numbers. This meant that messaging could be addressed to households only. In the case of the mail, for example, the address of family members living in the same household is the same and mail is sent to the same postbox. Similarly with telephone numbers, all family members basically use the same telephone number.

In the third stage, however, mobile phones and email that enable messages to be sent by designating a personal destination have emerged. While the locations of households are fixed, the locations of people change as they move about. And in order to send messages to people on the move, mobile phone numbers and email addresses are allocated to individuals. This is a feature of the new messaging system that has been rapidly developing since the end of the 20th century.

If these developments are outlined from the standpoint of the recipients, the main means of information delivery at the initial stage involved addressing the public at large (i.e., the masses). This gradually shifted to addressing households and more recently to addressing individuals. It is possible to infer a relationship with the social order in which the living unit in traditional societies in the old days was the community. This social order also gave way to households and then to the individual. At the same time, we may also consider that these changes in the means of communication have accelerated changes in lifestyles.

These new parameters involving the recipients of messaging raise the following two problematic hypotheses.

<Subject 1>

Addresses will be diversified, and address management will become complicated

As the further classification of messages addressed to individuals is expected in the future, the need will grow for a more detailed designation of addresses in

accordance with an individual’s role and membership in various groups—such as messages addressed to “individuals within a company,” “individuals within a household,” and “individuals within a local community.” This makes it necessary for recipients to manage a number of the addresses they use for themselves. At the same time, senders will also find it necessary to carry out update management on a host of entries within their own address books, making the management of individual addresses increasingly more complex.

<Subject 2>

Security will become important as the number of private messages increases

Compared to messages addressed to a mass audience, messages addressed to specified recipients generally involve private contents typical of personal correspondence. In the same way as stipulated in Article 21 of the Japanese Constitution (“Secrecy of Any Means of Communication”) and Article 9 of the Postal Law (“Secrecy of Correspondence”), the need to provide security will increase for electronic messaging as well.

(2) Increase in information origination from the public at large

While the previous section described the historical process in narrowing down the recipients of information, what changes have taken place with respect to the senders of information? (See Table 1.)

As discussed above, the number of information senders in the first mass media stage was limited, and information delivery mainly consisted of the “One → many and unspecified” format. In other words, it basically involved a limited number of political authorities, clergy and thinkers conveying information to the masses.

With the emergence of messaging in the second stage, the “One → many but specified” and “Many but specified → many but specified” formats became possible. Under traditional paper-based media, however, there were very few instances in which information was sent from many but specified senders to many but

specified recipients. In the case of postal mail, for example, it is perhaps only once a year that the public at large sends Christmas or New Year’s cards to many persons. Essentially, greater use is seen in the “One → many but specified” format, such as DM sent from a small number of enterprises to many individuals. However, the appearance of the Internet has led to an increased popularity of messaging under the “Many but specified → many but specified” format in which the general public originates information.

This is because the use of the Internet has substantially reduced the per-unit cost of the infrastructure for “many but specified” messaging, something that was rather expensive in the past. This has led to the widespread usage of the new “many but specified → many but specified” messaging among the general public, such as mailing lists via email and Web-based chats. Recently, moreover, the mechanisms for peer-to-peer (P2P) file exchanges that directly connect PCs via the Internet have been created. This “many but specified → many but specified” information delivery precisely constitutes the essence of Internet media.

As such, the spread of the Internet has led to an increase in messaging addressed to “many but specified” recipients, in which the public at large (i.e., the “many but specified”) become information senders. The problems these changes have brought about can be summarized in the following two issues.

<Subject 3>

Functions to guard against harmful activities such as spamming and transmitting viruses will become essential

Once it becomes possible to easily send messages to many persons, the chances of being victimized by harmful activities substantially increase. Examples such as spamming, chain letters (spreading false rumors), and viruses that automatically spread from individual to individual via email have already become social problems. Various authentication methods that include check functions to protect against such abuses will be required in the future.

Table 1. Information Delivery Formats

Format	Recipient Designation	Existing Media	Internet Media
1 → 1 (One sender and one recipient)	Specified individuals	Letters, Telephone Calls, Telegrams, Fax Messages	Email, Instant Message Service
1 → many (One sender and multiple recipients)	Many but unspecified	Books, Newspapers, Television, Radio (mass media)	Web homepages, Multicasting Service
	Many but specified	DM (letters), Limited-circulation bulletins	Email Magazine Service
Many → many (Multiple senders and multiple recipients)	Many and unspecified	Contributions to newspapers, etc., Public Bulletin Boards	Web-based Bulletin Boards, Chat Rooms
	Many but specified	Video Conferencing Systems	Napster, Mailing Lists, Instant Message Service

<Subject 4>

Address search and update functions will become necessary

If many people are engaged in sending messages, mechanisms that permit easy searches and updating of recipient addresses will be needed. In particular, as many people are using email addresses that are specific to information providers, addresses are often changed each time there is a switch in providers. Moreover, many people have multiple addresses such as those for company and home use. Accordingly, a mechanism such as a telephone directory that permits confirming the latest address will become necessary. As this also involves the matter of privacy, some combination with the above authentication function is required.

(3) Diversification in messaging media

The development of messaging has so far been discussed from the standpoints of information senders and recipients. Messaging media themselves have also been diversified, such as mail, telephone, email, Instant Message service, etc. While each of these media differs in terms of expression format (such as text, pictures, voice and moving pictures), many other differences are seen in terms of immediateness, multicasting, recordability, formality, etc. Even though alternative usages may be possible in some cases, these media can basically coexist without undergoing any winnowing process.

The diversification of such messaging media gives a rise to the following problematic hypotheses.

<Subject 5>

Selecting the appropriate messaging media involves complicated procedures

With the spread of broadband (high-speed, large-capacity circuits) technology and the emergence of new

media such as Instant Message service, increasing diversification will be seen in messaging media. This can make it difficult to select the appropriate media, as this depends not only on matching the medium with the contents of a message in consideration of the recipient, but also confirming a suitable destination address for the given medium and the transmission format that the selected medium requires. In addition to the increase in time and labor for media selection and address management, communications costs will also go up, as a cost for using each messaging infrastructure is required. This raises the possibility that overall usage frequency may decline.

<Subject 6>

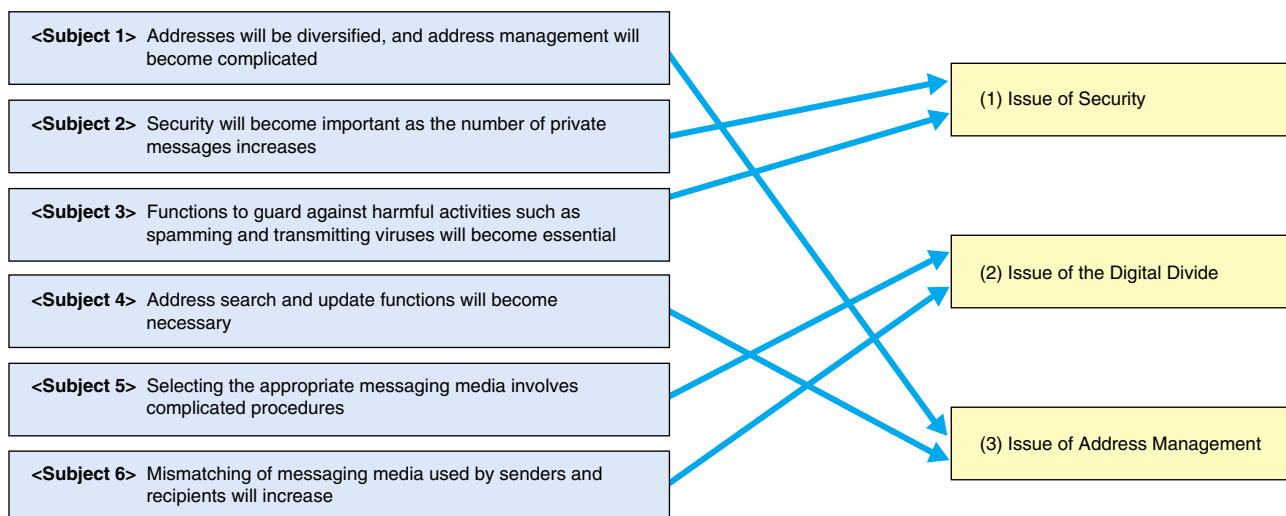
Mismatching of messaging media used by senders and recipients will increase

Messaging generally requires that both senders and recipients use the same means. In sending email, for example, the precondition is that the recipient must also be able to use email. As the sending media are limited depending on the type of information, however, there are people who are unable to receive certain types of information. For example, those without access to the Internet cannot read Email Magazine notifications issued by the Koizumi administration. Accordingly, diversification in messaging media will lead to a greater incidence of mismatches between senders and recipients, thereby reducing the rate at which information is successfully conveyed.

(4) Addressing three issues that need to be dealt with

The summarization of these six problematic hypotheses suggests that it will be necessary to address the three issues of security, the digital divide (information gap) and address management (see Figure 1).

Figure 1. Three Issues of Messaging



3 Overseas Trends in Messaging Services

As overseas postal service operators and private companies have implemented various activities to deal with these three issues, the following section overviews each of these approaches.

(1) Activities addressing the issue of security

Postal service operators such as the USPS (United States Postal Service), Canada Post and La Poste in France are widely providing secure email service. The USPS is providing several types of secure electronic messaging that include electronic authentication, and the usage of such services reportedly increased when the risk of anthrax-laced letters became a concern last fall.

Besides these services, private companies centered on delivery companies are also offering similar services. As the growth in the number of messages sent from individuals is small, however, the recent trend involving these services has tended to focus on messages sent from companies to individuals.

(2) Activities addressing the issue of the digital divide

Many postal service operators including USPS, Deutsche Post, Denmark Post and Japan's Postal Services Agency are providing a service called hybrid mail in which electronically received data are printed in hardcopy letter formats and then delivered. Of special interest, Deutsche Post offers a service called reverse hybrid mail, in which paper-based data such as letters are converted to electronic files or sent by fax. There are many postal service operators that provide services such as electronic contents certification and electronic postmarks (date certifications) in addition to these hybrid mail services.

Not a few private companies are also providing similar services. Features that distinguish such offerings from those of postal service operators include the adoption of high-value-added business models by many companies, including such services as free delivery to recipients after inserting advertising materials, fast deliveries, and conversion to voice messaging.

PayMyBills.com is an interesting case in the United States that offers reverse hybrid mail service that reads the image data in hardcopy bills sent to clients by postal mail and converts the information into electronic data that is then electronically relayed to the subscriber. As companies that issue paper-based data have gradually shifted to electronic formats, however, the services offered by PayMyBills.com have moved towards providing secure email service and electronic settlement service. The company has also started to provide additional services that permit searches and analyses of billing information.

As these cases indicate, a clear need for media conversion service can be seen particularly in messages

from companies to individuals. Furthermore, the spread of the Internet has made service contents even more complex, thus making it difficult to clearly distinguish among service classifications.

(3) Approaches to the issue of address management

European postal service operators in such countries as Germany, France and Italy are implementing a service that distributes email addresses and electronic mailboxes that can be used over the applicant's lifetime. In the United States, SRI International, a manufacturer of sorting machines, is considering the allocation of an "Indicode (Virtual Physical Address)" (codified address) to all individuals and the use of such codes as an address for both postal and email.

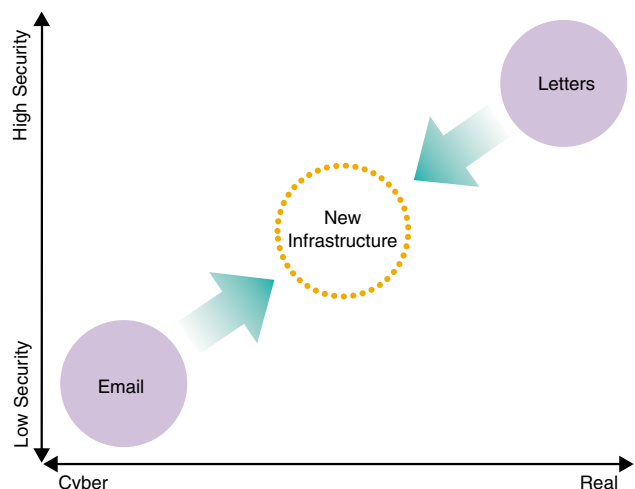
Active moves are also seen in the private sector to create mechanisms that can manage addresses (including authentication) on an integrated basis. These include Microsoft's "Passport" authentication and management system, the Liberty Alliance Project that aims at standardizing authentication and management systems, and the XNS (eXtensible Name Service) that is being developed by XNS.org, an independent nonprofit organization.

Such address management and integration systems will always impinge on the privacy issue. Moreover, more time will be required before we see the widespread usage of such systems because large-scale implementation is a prerequisite for such service: the system would have little meaning if such addresses were not used by everyone.

4 New Infrastructure Needed

The three issues of security, the digital divide and address management have also become problems in promoting the e-Japan strategy. This is why the Comprehensive IT Document Law¹ and the Electronic

Figure 2. Need for New Infrastructure



Signature Law² that came into force last year have not yet been used. Actually, it is difficult in terms of security and recipient acceptability for companies, the central government and local administrations to use email without security measures to send correspondence to individuals. In other words, no realistic electronic messaging infrastructure that is suitable for the delivery of letters exists under the present situation, and a new infrastructure is strongly needed (see Figure 2).

II Social Experiments Based on Electronic Post Hypothesis

A hypothesis concerning electronic post (POSTUB) as part of the social infrastructure was established as a means of solving the three issues related to messaging—namely, security, the digital divide and address management. Social experiments focusing on POSTUB were implemented for the purpose of verifying this electronic post hypothesis. In addition, the experiments were also aimed at confirming the specific needs for electronic post applications.

1 Hypothesis on Electronic Post (POSTUB)

POSTUB stands for Post Service in the Ubiquitous Network Age, and means an electronic mailbox (reception box) to receive messages on a secure basis at any time, anywhere and in any format. This is positioned as a cyber mailbox assigned to each individual vs. a real mailbox assigned to each household (see Figure 3).

The purpose of these POSTUB experiments was to solve three issues concerning messaging.

(1) Addressing the issue of security

- Providing a secure electronic post service that is fully protected against system failure and unauthorized access.
- Encryption for all routes from transmission to reception.
- Conducting virus checks for all messages.
- Message senders cannot transmit messages without ID authentication using PKI (Public Key Infrastructure).
- In the same way as for ordinary mail, the principle is that the sender bears the fees, which will be used as deterrent against spamming.
- Providing a tracking function to enable senders to confirm the time and date the recipient opened the message and the time and date the recipient read the contents (when the reception confirmation button is clicked).

(2) Addressing the issue of the digital divide

- Providing a messaging hub function that performs an intermediary role between the cyber network as represented by email and the real network as represented by letters, and which converts messages to the formats suitable to each medium (see Figure 4). Specifically, bills and transaction reports that have so far been received in a hardcopy letter format can be received electronically, and messages that have been received electronically such as Email Magazine notifications can be received in a letter format.
- Recipients can designate in advance the reception media for each type of message.
- A message that has once been received via electronic post can again be received in other formats such as a letter on request. (As this will

Figure 3. Concept of Electronic Post (POSTUB) in Comparison to Ordinary Mail

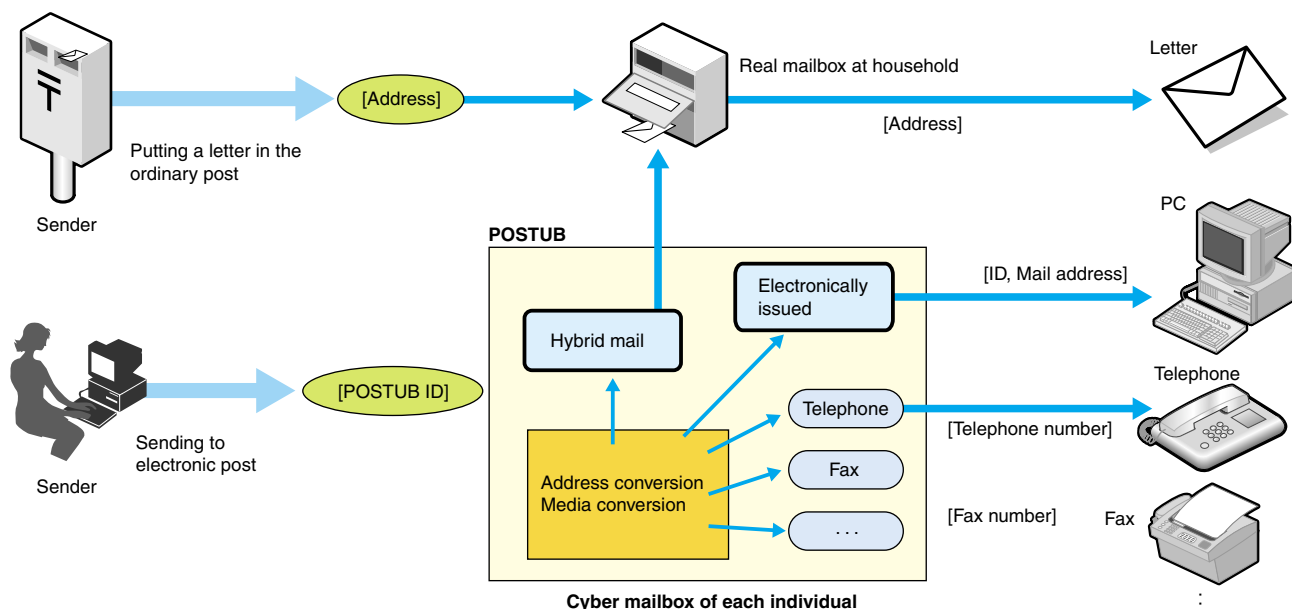
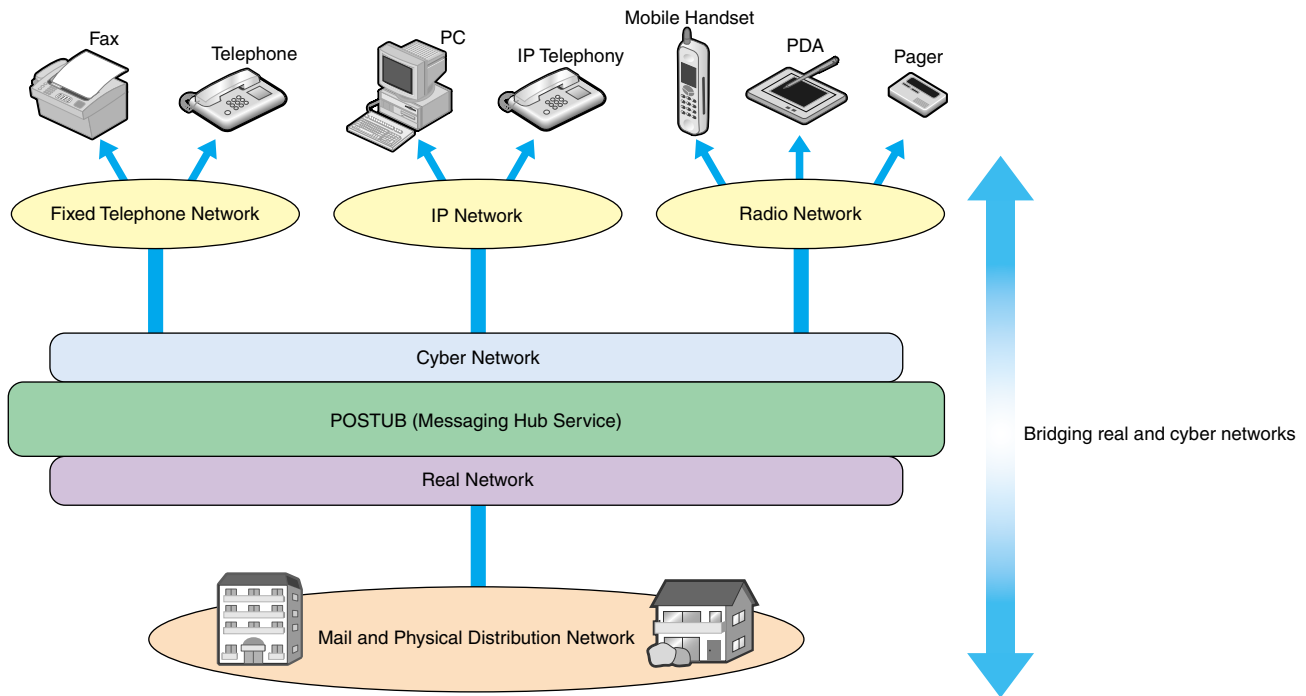


Figure 4. Messaging Hub Service by POSTUB

Note: IP = Internet Protocol.

enable the reception of the needed information only in a hardcopy letter format, electronic post service can offer an environmentally friendly alternative.)

(3) Addressing the issue of address management

- Providing a universal address (POSTSUB ID) to permit the integrated management of addresses that differ depending on media, such as a postal address (letters), telephone number (telephone, fax), email address (email), etc.
- Senders can send messages by using this POSTUB ID regardless of the media selected for use.
- In the case of relocation, provider change, address change, etc., recipients are required to register only the changed information in POSTUB, which manages all addresses on an integrated basis. Senders can send messages without being aware of differences in the media used or the recipient's address changes.
- Confidential letters, etc., can be properly delivered without mistake by accurately confirming the identification of the recipient when the POSTUB ID is issued.

2 Targets of Social Experiments

Social experiments based on the electronic post hypothesis were implemented in the three months from January to March 2002 under the following assumptions (see Table 2).

- (1) Only messages from companies to individuals were covered.
- (2) Only two reception media (letters and electronic post service) were used.
- (3) The sending company confirmed the identification of the recipients.

MPHPT, NRI, banks, and companies in the fields of credit cards, securities, correspondence education, an email magazine distributor and printing services, etc., joined these social experiments. General consumer monitors were publicly invited through the Website and also individually solicited by participating companies.

Two types of transmission functions were made available: the collective transmission function that transmits collectively from spooled print data in the host computer, and the on-demand transmission function in which the destination of each transmission is designated on the Web browser screen. An unspecified transmission function that transmits messages by selecting destinations in accordance with area, etc., was also made available.

With respect to recipient-side functions, both the method of receiving messages via electronic post service and a method of receiving letters were used. Reception via electronic post involved procedures in which a PDF (Portable Document Format) file containing the message text was received upon logging in via Web browser after receiving an email notification via ordinary email. For letters, standard-sized sheets (A4-sized paper with one-

Table 2. Outline of POSTUB Social Experiments

Implementation period		January 7 to March 31, 2002
Participating organizations (Information senders)		Total of ten organizations (MPHPT, NRI, banks, credit firms, publishing company, Email Magazine services, etc.)
Experiment monitors (Information recipients)		<ul style="list-style-type: none"> • Must be PC users • Must be Internet users • Publicly invited (Web) + Solicited by each participating company
Transmission formats available in experiments	Destination designation method	<ul style="list-style-type: none"> • Collective transmission from spooled print data in the host computer, etc. • On-demand transmission through destination designation by CSV file on the Web • Unspecified transmission for destinations selected in accordance with age, gender, location, occupation, interests, etc.
	File format	<ul style="list-style-type: none"> • Word, PowerPoint, PDF • Up to 1M bytes
Reception formats available in experiments (selected by recipients in advance)	Electronic format	<ul style="list-style-type: none"> • After receiving notice via ordinary email, receiving PDF file through electronic post and reading the file by Web browser.
	Paper (ordinary mail)	<ul style="list-style-type: none"> • A4-sized paper; one-side color printing • Mailed sheet folded in three, or A4-sized book • Limited to two copies per person during experiments • Limited to 100 pages per copy

Note: CSV = Comma Separated Value Format; PDF = Portable Document Format.

side color printing) were received. In the event of any cases that involved a large number of pages, a postal parcel or the nonstandard-sized mailing was received after simple binding.

III Verifying Hypothesis and Confirming Needs by Social Experiments

While the results of social experiments are being summarized as of the beginning of June, the following section provides a preliminary outline. The final results will be posted on the POSTUB homepage (<http://www.postub.com/>).

1 Social Experiments with Approximately 8,000 Monitors

As the period for these experiments was relatively short (two months for soliciting monitors and three months for the transmission and reception experiments), there was a concern that the number of monitors and messages exchanged might fall short of expectations. With the cooperation of participating companies, however, the purposes were achieved as initially planned (see Table 3).

The number of monitors was approximately 8,000 persons and the number of messages exchanged exceeded 160,000 in the three-month period. The message

contents covered a wide variety of fields, such as bank transaction details, securities transaction reports, credit card invoices, Email Magazine notifications, and DM.

The opening ratio of messages received via electronic post was about 53 percent in the case of notices concerning “*Yu-Pack* parcels at post offices”. While this ratio is lower than that for letters but higher than that for existing email, simple comparisons cannot be made as these exchanges were for trial service and the ratio could be affected by other factors, such as message contents.

2 Evaluation by Sender Companies

Interviews with each participating company that sent messages were conducted after the completion of the experiments. The following views were elicited during these interviews.

(1) Issue of security

- Cost reductions can be expected as documents now delivered by ordinary mail can be electronically sent on a secure basis.
- POSTUB can enhance customer service as recipients (customers) can see messages anywhere via electronic post.
- POSTUB is useful for marketing as its tracking function enables companies to understand which messages are actually opened.
- In making POSTSUB part of the social infrastructure, it is desirable to apply the same Civil

Table 3. Results of POSTUB Social Experiments

Monitor attributes	<ul style="list-style-type: none"> • Number of monitors: 7,927 • Male monitors: 70%, female monitors: 30% • Residents of Tokyo and three surrounding prefectures accounted for 53% • Persons in their 30s accounted for 45%
Number of messages exchanged during experiments	<ul style="list-style-type: none"> • 165,222 in total (1,693 types) • About 21 messages received per monitor
Number of letters mailed (Ratio of selecting letters)	<ul style="list-style-type: none"> • 6,645 letters in total (about 4% of the total) • In the case of simulated documents, about 4 percent of recipients selected hardcopy letter-format mailings in advance
Examples of messages exchanged	<ul style="list-style-type: none"> • Transaction reports, balance reports (securities firms) • Investment information report (securities firms) • Credit card invoices (credit firms) • Transaction confirmation documents (banks) • Email Magazine services (Email Magazine publishers, etc.) • Notifications (MPHPT, etc.)
Electronic post access frequency	<ul style="list-style-type: none"> • Average of 980 hits per day (12.3% of all monitors) • Average online time: about 5 minutes
Opening ratio of documents received via electronic post	<ul style="list-style-type: none"> • 53% in the case of post office <i>Yu Pack</i> parcel notices

Code sending basis rule³ that is used for ordinal mail. Even if the arrival basis rule is applied, the risks accompanying contracts can be reduced as the tracking function permits confirming the date and time of message arrival.

(2) Issue of the digital divide

- As POSTUB makes it possible to reduce costs at the sender side through converting messages to an electronic format without impairing the convenience of recipients, it is easy to obtain the understanding of recipients.
- As the need to own two overlapping systems (electronic delivery system and ordinary mail system) can be eliminated, message transmission efficiency can be improved. Furthermore, it is desirable if connections to the existing mail system can be easily made.
- If it becomes possible to distribute books on a print-on-demand basis in the future, it will become easy to operate publishing businesses.
- For paper-based delivery, it is desirable that messages arrive in about two business days at a maximum. It is also desirable to provide for an express delivery option that would deliver messages by 10:00 a.m. the following morning.

(3) Issue of address management

- With respect to the management of email addresses in particular, costs can be reduced if integrated management becomes possible, as considerable time and labor are required to update address lists.
- It is desirable if recipients (consumers) take proactive steps to notify companies of their universal addresses (POSTUB ID).

- As it is important to properly conduct recipient ID confirmation at the time of issuing universal addresses, some type of official certification is required.
- In addition to the ID confirmation, social infrastructural elements should be so established to clarify where responsibility lies should any problems occur with respect to the legal positioning of the electronic post system.

These results would seem to indicate that the three issues arising from the sender standpoint are mostly resolved by POSTUB. In particular, many companies expressed the view that POSTUB can lead to an “enhancement of customer service” and “cost reductions” in the long run. As problems, however, many expressed the view that treating electronic post service, as a “social infrastructure” would require clearly defined responsibility and a firm legal foundation.

3 Evaluation by Sender Consumers

Questionnaire surveys were conducted twice on the Website in the course of the experiments. The number of effective responses was 5,226 persons for the first survey, and 4,487 for the second. In addition, follow-up interviews were carried out with a total of 28 monitors in four groups. These interviews revealed the following.

(1) Issue of security

- With respect to comparing the attractiveness of each trial service, 60 percent to 70 percent of respondents were impressed by the high security and the fact that spamming was eliminated (see Figure 5).

- Respondents concerned over the leakage of personal information via POSTUB accounted for 64 percent, and those who felt that a public organization should take responsibility for security amounted to 40 percent (see Figure 6).
- Many respondents indicated that most people did not fully understand how low security was in the case of ordinary email.
- As many people took high security for granted, few people would agree to pay a fee to improve security and the impaired operability this would entail.

(2) Issue of the digital divide

- With respect to comparing the attractiveness of each service, 70 percent of respondents were impressed by the ability to select between hardcopy letters and email. Similarly, respondents who wanted to use the function of selecting letters or email after the service is actually started accounted for 46 percent (see Figures 5 and 7).

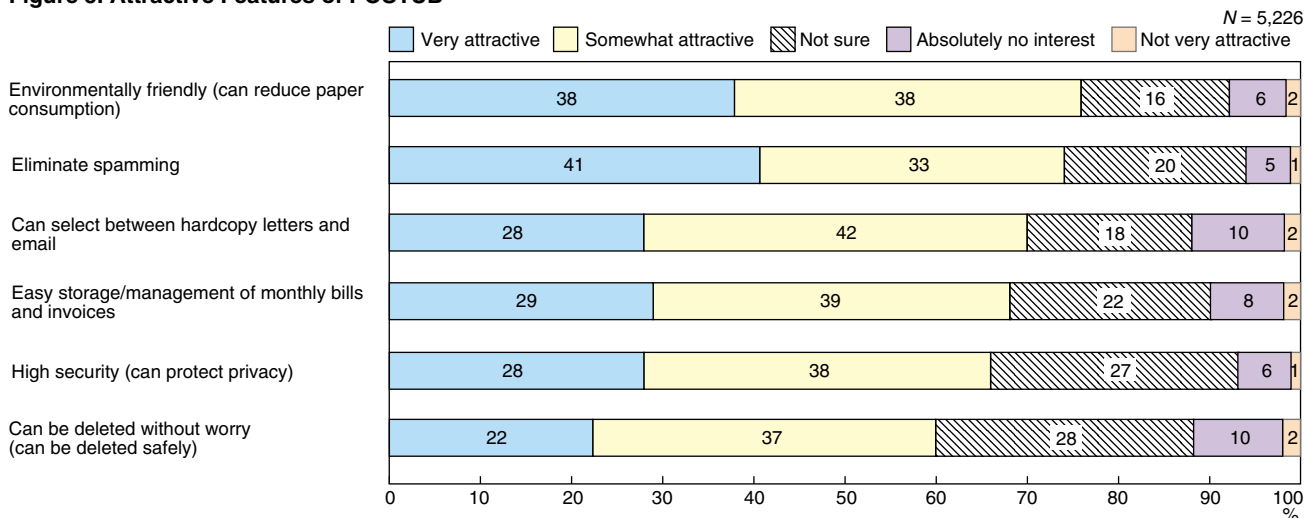
- Respondents who were attracted by the environmentally friendly feature accounted for 76 percent.
- While respondents who wanted to receive messages by fax accounted for 25 percent, those who wanted to hear messages by voice conversion represented only 9 percent.

(3) Issue of address management

As transmissions from the general public were not covered in these experiments, the issue of address management was not subject to verification or evaluation. However, some related questions were included in the questionnaire.

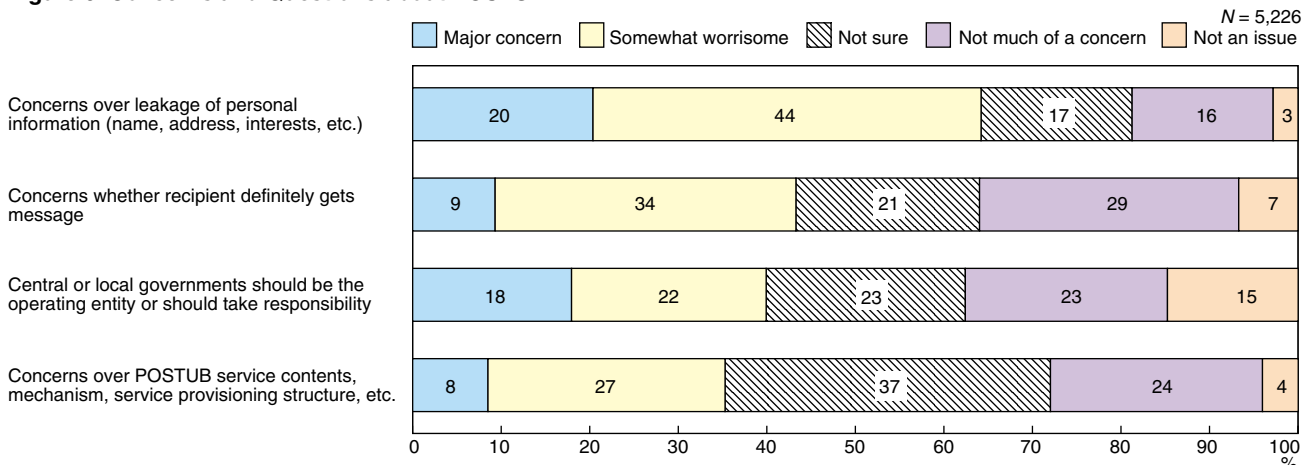
- Respondents who had three or more email addresses accounted for 68 percent. Those with five or more represented 27 percent.
- A large number of respondents (40%) singled out “email addresses that can be used permanently” as a function that they would use if available.

Figure 5. Attractive Features of POSTUB

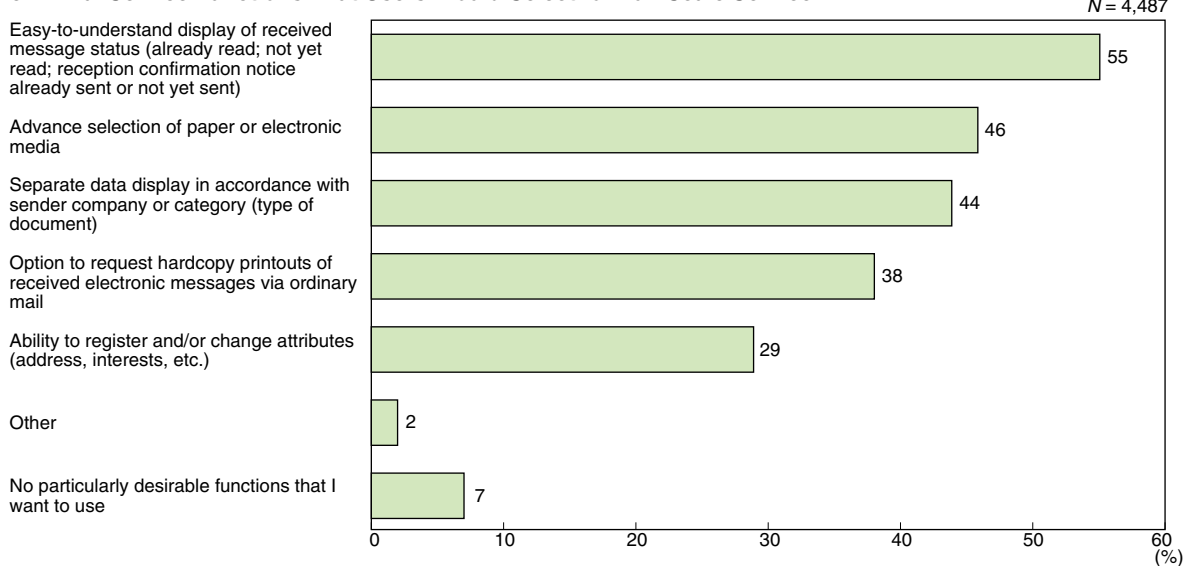


Source: NRI “Questionnaire on POSTUB Social Experiments,” February and March 2002.

Figure 6. Concerns and Questions about POSTUB



Source: NRI “Questionnaire on POSTUB Social Experiments,” February and March 2002.

Figure 7. Trial Service Functions That Users Would Select for Full-Scale Service

Source: NRI "Questionnaire on POSTUB Social Experiments," February and March 2002.

While these results suggest a high degree of acceptance among recipient consumers for electronic post services, it would appear that their recognition of pending problems requiring resolution was low. In particular, few people saw the issue of security as a major problem.

As monitors for these social experiments were solicited via the Web, participants tended to lean towards a certain stratum that was familiar with IT (information technology); indeed, about 60 percent of the questionnaire respondents were broadband users. Accordingly, a strong inclination for electronic needs was seen in overall terms. However, these user trends can be seen as a precursor of the situation in Japan several years ahead.

Questionnaire surveys also revealed that respondents who expressed an overall willingness to use POSTUB service if actual service is started accounted for 80 percent of all the monitors who participated in the experiments.

4 Outcome of Social Experiments Approached the Essence of Electronic Post Service

By carrying out these social experiments, the electronic post hypothesis could be verified, and specific user needs could be confirmed. In addition to these results, the experiments also made it possible to clearly picture the new concept of electronic post (POSTUB), thereby opening up a new viewpoint for many people.

The electronic post system becomes significant by combining several functions such as security and hybrid mail. In other words, value exists in the mechanism itself. Accordingly, it was difficult to clearly

understand the entire system, and the need for POSTUB could not be clarified at the preparatory stage of the experiments. At the initial stage, moreover, participating companies and consumers had individual requirements for each function (such as security, address management and conversion to letters), thereby making it difficult to integrate these needs.

Following the completion of experiments, however, the POSTUB mechanism as a whole became better understood and new needs arose. At the same time, participating companies presented new proposals to pursue during the next stage.

The results were useful in terms of technology as well, particularly with respect to the system itself. Most noteworthy was the fact that, as the per-message capacity is large in comparison to that of ordinary email, scalability is an essential element. At the same time, however, difficulties were encountered in securing compatibility between security (e.g., PKI-based authentication) and operability (i.e., ease of use). Moreover, the issues to be dealt with in the future were clarified with respect to file formats for messages and the printing process when converting to a hardcopy letter format.

IV Future of POSTUB Messaging Infrastructure

1 Three New Tasks

The results of the social experiments revealed that there are needs for POSTUB and that POSTUB is an effective means of solving three issues. However, it was also

found that the new tasks described below must be addressed in order to actually build and use an electronic post system as part of the social infrastructure.

The first relates to the development of the social infrastructure aspects. Many companies and the general public consider that gathering many electronic post messages at a single site will settle the matter of cost-bearing, clarify responsibility, and improve convenience. This means that they want an electronic post system as part of the social infrastructure, not as the service of a single company.

To meet this goal, a new mechanism needs to be jointly created by a greater number of companies, central and local governments and consumers in general. At the same time, it is desirable to define the legal framework for electronic post systems, apply the sending basis rule, and clarify the responsibility for security in order to develop electronic post as part of the social infrastructure.

The second concerns educational activities. In particular, the general consumer has little recognition of the low security for email exchanged via the Internet. Accordingly, extensive educational activities need to be conducted concerning security, etc.

The third involves the development of technology. Difficulties were encountered during the social experiments in opening PDF files received. In order to build

an electronic post system within the social infrastructure in the future, it is necessary to promote technological developments and standardization with respect to system specifications, such as reception file formats, data formats at the sender side, etc.

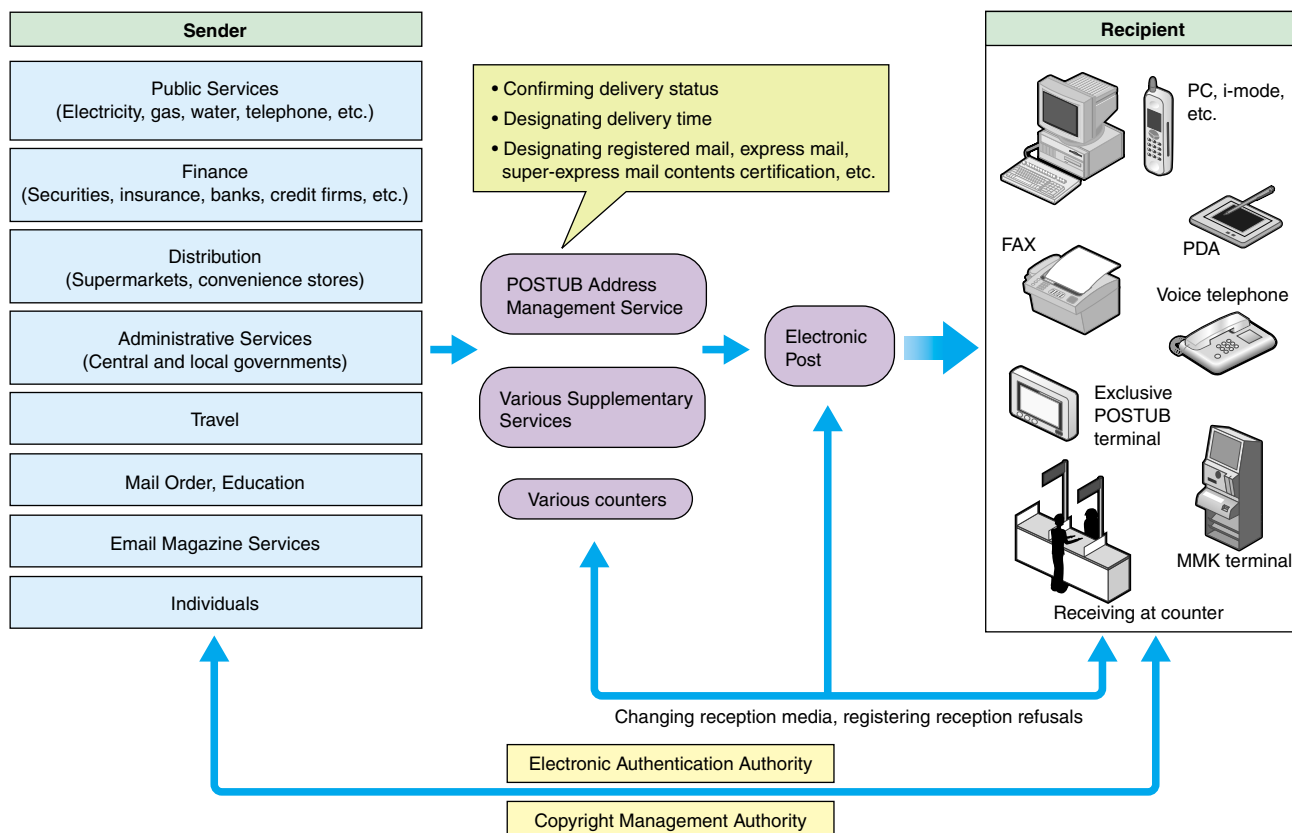
2 Future Concept of POSTUB

As part of the future POSTUB concept, we intend to focus on the following points in developing the services that were carried out during the social experiments (see Figure 8).

- Participation by a greater number of senders and recipients
- Supporting a greater number of reception media
- Adding various supplementary services
- Providing counters, etc., to handle people who cannot use PCs

In pursuit of this future concept and in order to resolve the above three tasks, sufficient time should be taken to conduct joint activities by many organizations (both public and private). In particular, as methods such as PFI (private finance initiative), in which the social infrastructure is created under the leadership of the private sector, have recently been gaining more attention,

Figure 8. Future Concept of POSTUB



Notes: MMK = Multimedia Kiosk; PDA = Personal Digital Assistant.

extensive studies are required with respect to the formats that can be used in developing a POSTUB infrastructure.

Accordingly, NRI intends to continue joint activities with MPHPT, companies, and the public at large on the basis of the results obtained through these social experiments in order to build POSTUB as part of the social infrastructure.

Attempts to build electronic post systems such as POSTUB as an infrastructural element have already been implemented in other countries, such as the “ePOST” system of the Canadian Postal Service and the “Postbox Project” of the Belgium Post Office. These efforts make us recognize anew that infrastructure such as POSTUB is necessary in an Internet-reliant society.

We believe that POSTUB will accelerate the promotion of the e-Japan strategy, improve international competitiveness and the growth of Japanese companies in the IT field through the creation of a ubiquitous network society, and lead to the vitalization of the Japanese economy.

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- (1) Comprehensive Amendments to the Laws Requiring the Delivery of Documents, Etc., to Enable the Usage of Electronic Media; effective as of April 1, 2001.
 - (2) Law Concerning Electronic Signatures and Authentication Operations; effective as of April 1, 2001.
 - (3) The sending basis rule under the Civil Code stipulates that contracts between parties at remote locations become effective at the time an agreement notification is sent in the case of ordinary mail. For electronic notifications, the Electronic Contract Law (the Law on Exceptions to the Civil Code Concerning Electronic Consumer Contracts and Electronic Agreement Notifications, which became effective on December 25, 2001) specifies the arrival basis rule, which means that a contract becomes effective at the time the agreement notification arrives.
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