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Empirical Study on Privacy Concerns and the Acceptance of e-Money in Japan

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In contemporary society, many services are offered electronically. Electronically-available personal identification is used to identify the users of these services. e-Money, a potential medium that contains an eID, is widely used in Japan. Service providers encounter certain limitations both when collecting the attribute values related to such eIDs and when using them for analysis because of privacy concerns. A survey was conducted to clarify which of these trade-offs to consider before deploying e-Money privacy, economic value, benefit, or services. Regression analysis and conjoint analysis were performed. The results of the analyses of the questionnaires revealed that there was a preference for economic value, service, and privacy, in this order even though many people were anxious about privacy.

1. Introduction

Various Internet services exist that relate to social life and the economy. When users use these services, information such as purchase history and usage history may be accumulated by the service provider. The service provider uses this data to offer information that can improve convenience; for example, recommendations. On the other hand, a feeling of uneasiness of customers arises when user data is accumulated. If this uneasiness is not eliminated in the future, the use of services that profit from such information may not advance, which in turn will hinder the creation of further new services and the development of a networked society. By clarifying the attitudes and actions concerning users' security and privacy, the Internet service environment can provide relief to users, and enhance the use of Internet services.

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Privacy problems arise when information belonging to individuals (personal information) is used or provided to external entities (leaked) in an undesired or unexpected way. The loss of privacy leads to the violation of three rights, namely, "seclusion," the right to be invisible (not recognized) to others; "solitude," the right to be alone; and "self-determination," the right to control one's personal information [1),2)].

In Japan, the situation of privacy protection from the legal perspective can be described as follows. In a leading case named "Utage no ato" [Tokyo District Court Judgment (Sep. 28, 1964)], privacy is defined as "legal assurance or right for private life not to be published unreasonably." It deals with facts that may be recognized as private, those that ordinary people do not want to disclose, and those that are unknown to ordinary people. In other words, privacy concerns depend on an individual's sensibility. The "Protection of Personal Information Act" was enforced in 2005. Article 1 of this Act prescribes duties to be observed by entities that handle personal information. Legally, personal data is usually defined as "data that relates to a living person who can be identified from that data." The data-protection law stipulates that a "data controller" should obey certain principles such as fairness, lawfulness, and adequateness. Therefore this Act covers the protection of some privacy concerns. To comply with this law, various enterprises have imposed strict rules concerning personal information. Therefore, Japanese businesses encounter difficulties when dealing with the appropriate use of personal information. In "Secure Japan 2008," planned by the National Information Security Center, it is stated that enterprises are exhausted due to the implementation of security measures [3)].

1.1 Recognition by Subject Entity

Another aspect of privacy concerns is the recognition of risks of personal data by the subject entity. This appears in an investigation of uneasiness in the "White Paper on Telecommunications" by the Ministry of Internal Affairs and Communications, which deals with consumers' anxiety regarding Internet privacy. It is reported that, in terms of Internet usage, "There is uneasiness in the protection of privacy information," and that this is a top-ranking concern (71.2%) [4)]. In this situation, it is essential to eliminate the privacy concerns of individuals, thereby enabling them to agree to the use of personal information. It is also very impor-

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tant for users and the service providers to trust each other by making clear the status of individual's perception and acceptance of risks on privacy.

1.2 e-Money in Japan

In Japan, e-Money, which is contained in electronic media and act like purses, is widespread. The spread of electronic money has accelerated, and the total number of e-Money cards now exceeds 130 million [5]. This indicates ownership of more than one card per person. An increase of approximately 20% growth rate continues, compared to the previous year. These cards are frequently used not only for trains, but also in convenience stores, restaurants, bookstores, and grocery stores. Because of this wide usage, many companies intend to use cardholders' information to develop new businesses. Thus, e-Money helps service providers actively generate business by using the personal information that is provided by users [6].

2. Related Studies

Many studies have been performed related to various aspects of privacy, including Privacy Enhancement Technology, privacy from legal or economic perspectives, or sociology, as listed in documents from a prime life project [7–9]. Privacy protection is also described in research documents from the viewpoint of recognition by the individual. There are studies such as Ref. 10), which conducted a survey across four countries including Japan, and revealed that, compared to people from other countries, Japanese people consider it more risky to disclose their individual information.

The privacy concern of individuals with regard to direct marketing has also been investigated [11]. In return for the reporting of financial news, the consumer may willingly offer demographic data. There are situations in which an individual may gladly offer information if it saves time. Another survey has indicated that the media flair surrounding the Internet has a negative influence on the recognition of risks in online purchases and that the recognition of privacy influences online transactions [12].

The EU [13] conducted an interesting survey in terms of the user's recognition of using new emerging services such as Social Networking Service (SNS). This survey discusses four paradoxes: the privacy paradox, the control paradox, the responsibility paradox, and the awareness paradox. It is noted that paradoxes exist in cases in which individuals must select a service despite privacy concerns. The individuals solve the contradiction themselves and decide their preferences to privacy and other factors. This situation must be clear for the efficient promotion of the use of personal data. To solve this situation, two main standpoints can be outlined: one focusing on personal interest and the other on economic interest.

Studies on privacy and economics have been conducted from the perspective of individual behavior. Research in this area, called privacy economics, has been performed [14,15]. Reference 16) reveals the way in which people recognize risks by using the theories of time inconsistency, hyperbolic discounting, and self-control bias. In a case related to eID, the research [17] investigated of the relationship between the level of authentication technology and economic value. This research is remarkable because of its use of conjoint analysis as a survey technique. There is another study which deploys conjoint analysis [18]. In this research, people are classified into three categories: privacy guardians, information sellers, and convenience seekers. Another study [19] surveyed of the attitudes of Internet users in which people disclose their own personal information in a trade-off against economic value.

Unfortunately, a research that scientifically conducts an investigative analysis on the privacy concerns of individuals in the Japanese online environment does not exist, as far as we know. This research has been avoided because media such as newspapers have been strongly against it as an invasion of privacy, for example, in 2000, a so-called basic resident register code of IDs to citizens was introduced which was targeted by the media [20]. It is necessary to recognize privacy concerns in order to investigate how it applies in Japan, since this phenomenon varies from to country.

3. Survey Design

A questionnaire was conducted to clarify individual concerns and preferences regarding privacy and other factors. This chapter describes the goal of the research, the methodology adopted, concrete questionnaires, and the scenario.

3.1 The Goal of the Research

Based on the aforementioned analysis involving e-Money and the related stud-

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ies, the goal of this research is to study the relationship between privacy or security and the user's behavior with respect to e-service. In order to take appropriate security measures, enterprises should have the knowledge of an individual's security or privacy concerns as well as that of factors that can help eliminate these concerns. It would be helpful for a service provider in Japan to make suggestions to promote e-services through a statistical survey of users' recognition of adopters' characteristics, the recognition of risks, and the factors affecting such recognitions.

We aim to answer the following questions in this paper:

a) What are Japanese people's concerns about privacy?
b) Which factors affect the use of e-Money that also request personal information? Some factors include the respondents' potential risks, benefit, and cost, as introduced by existing studies [8].
c) What is the order of preference of economic value, service, and privacy in terms of using e-Money? How is this preference related to the level of privacy concerns?

3.2 Methodology

3.2.1 Survey Outline

An Internet survey is considered to be appropriate for investigating the recognition and acceptance of the risks of privacy. This is because the target samples are Internet users, who can easily understand the environment of the e-Money scenario. For this reason, samples from the survey are not generalized. These questionnaires combine a portion of the IPTS (Institute for Prospective Technology Studies) questionnaires [8], with an original scenario for e-Money that we created, for another purpose cross-cultural experiments.

3.2.2 Conjoint Analysis

Because it is assumed that individuals decide about their privacy concerns by weighting against other factors, we believe that conjoint analysis based on experimental design was appropriate. This method involves the presentation of a card defined by an orthogonal table to the respondent, and the selection of a card that is suitable, in order of preference. It is possible to design a combination of attributes using the orthogonal table more efficiently than by compiling all combinations of all attributes. The user decides the order of each card, and each card is given a preference score. This score is assumed to be a whole utility. A whole utility is set as a dependent variable and the influence level (the coefficient) of each attribute is measured by using the regression analysis. A "part-worth utility value" can be calculated from this coefficient. Eventually, a relative importance and preference-order are extracted from the part-worth utility.

Conjoint analysis also has a feature that allows it to cater to the preference order among items, by comparing against a survey that respectively registers the level of the individual items of preference. Many people tend to prefer that the measures of security and privacy protection are set at the highest level. Therefore, when it is necessary to balance out the level of realistic measures, it is essential to decide the order of preference. Conjoint analysis, which can decide the order of preference among items, is a technique that is appropriate for the present study.

3.3 Survey on an Individual's Recognition of the Risks to Privacy

To understand how an individual recognizes the risks to privacy on the Internet, general questionnaires were designed as follows.

3.3.1 General Privacy Concerns

This question concerns the recognition of the way in which personal information is treated, for ensuring the individual understands the risks related to privacy online.

Q1: How concerned are you about the following risks in relation to your personal information?

The risks are indicated in eleven sentences; the scale ranges from Very concerned (1) to Not at all concerned (5). The sentences and results are shown in Table 3.

3.4 Survey Based on e-Money Scenario

Next, a survey based on a scenario that sets up an environment for using e-Money was conducted. Electronic money is defined as the data used for the settlement of a bill or a means of payment for things with monetary value. Here the user can enjoy the merits of being able to complete transactions that usually involve small settlement amounts within no time. By using e-Money instead of cash, the user can enjoy the above-mentioned advantage while remaining anonymous. On the other hand, if the user provides an address, full name, and his/her personal information to the public transportation provider, he/she can accept security services and/or gain economic benefits (e.g., a price reduction). In such

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Daisuke, your friend, likes to travel very much. He has e-Money that can be used all over the country. This e-Money is issued by a public transportation company that provides its services all over the nation. Users can recharge its value with cash by using the ticket machine at all stations. The e-Money provider introduces a version of e-money called Type B that asks users to register their current address, name, phone number, as well as their consent to analysis by the provider.
Daisuke receives a new offer from an e-Money issuer for an upgrade, which offers recommended information regarding places, shops, and goods through the analysis of Daisuke's frequented places and preferences.

Fig. 1 Scenario.

situations, questions regarding the risks, benefits, and characteristics of e-Money, and the attitude toward the use of e-Money are asked.

3.4.1 e-Money Scenario

Figure 1 describes the e-Money Scenario, which assumes the situation of a public transportation card that is actually used in Japan and can be easily imagined by the respondents.

3.4.2 Potential Risks, Characteristics of Scenario, Benefits of the Service, and Intention to Adopt

a) Scenario Adoption Enablers
Q2: What would make the service attractive?
The answer is selected from Yes/No/Don't know for each of six statements. These statements and the results are presented in Table 4.

b) Characteristics of the Service
Q3: To what extent do you agree with the following description of the service?
The answer is selected from a scale ranging from Strongly Disagree (1) to Strongly Agree (7) for each of seven statements. These statements and the results are presented in Table 5.

c) Potential Risks
Q4: What are the potential risks that you would want to mention to Daisuke?
The answer is selected from a scale ranging from Strongly Disagree (1) to Strongly Agree (7) for each of nine statements. These statements and the results are presented in Table 6.

Table 1 Attributes and levels.

Level / Attributes	Level1	Level2	Level3
Privacy	Anonymous	Security consent	Marketing use
Service	Discount (1%)	Insurance	None
Fee	Incentive(+105yen)	Free	105/month yen

d) Benefits of the Service
Q5: What are the potential benefits that you would want to mention to a friend?
The answer is selected from Yes/No/Don't know for each of seven statements. These statements and the results are presented in Table 7.

e) Intention to Adopt
Q6: Overall, do you think the use of the card is a good/bad idea, a wise/foolish idea, attractive/non attractive, or like/dislike?
The answer is selected from a scale of five levels for each sentence.

3.4.3 Profile Cards for Conjoint Analysis

Respondents are asked to select their preferred order of cards. **Table 1** shows the attributes and levels used in the profile cards.

It can be seen that privacy attributes are divided into three levels: anonymous, security consent, and marketing use. Anonymous implies that the subject entity does not want to reveal any personal information. Security consent implies that the subject entity provides personal information only for the purpose of security. Marketing use implies that the subject entity provides personal information for the purpose of marketing use. Service is broken down into three levels: discount (1%), insurance, and none. Fee is an economic parameter with 3 choices: incentive, free, and 105 yen/month. Nine profiles are defined in **Fig. 2** based on a 3×3 orthogonal table.

4. Survey Results

The survey was conducted online by NTT Resonant Inc. from April 6 to April 8, 2010. The survey was entitled "Survey about e-Money." The total number of

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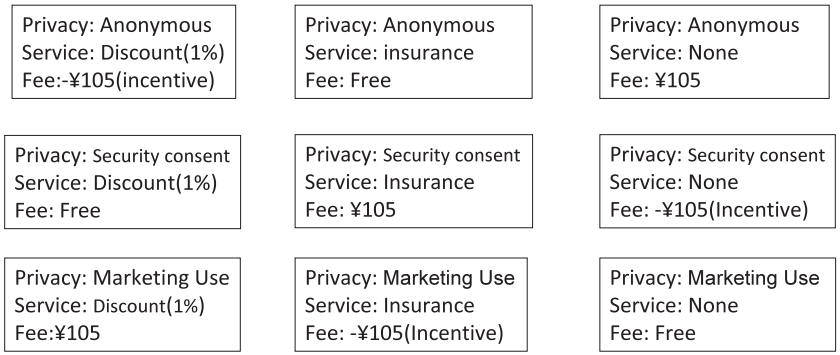


Fig. 2 Profiles used for conjoint analysis.

Table 2 Sample of respondents' age.

Age range	sample
15-24	24
25-34	30
35-44	27
45-54	24
55-64	6
65-74	3

valid responses was 114 samples that comprised of 62 males and 52 females. The distribution of age range is presented in **Table 2**.

The survey indicated that approximately two thirds of the respondents (67%) have used at least one type of e-Money, while it was 29.6% in the public survey, "Telecommunication Usage Survey in Japan" conducted by Ministry of Internal Affairs and Communication [21]. For the period in which e-Money is used, the majority (78%) of the respondents had been using e-Money for more than one year. Moreover, 41% of the respondents had used e-Money for one to three years, while 25% had used it for three to five years.

4.1 Results Based on Scenario

The results from the survey on general privacy and other factors based on the given scenario are described in the following sections. Factor analysis was executed in order to use factor loading for the multiple regression analysis in Section 4.1.7. All factor analyses were executed using the Principal Component Method with Squared Multiple Correlation (SMC) and Varimax rotation.

Table 3 General privacy concerns.

How concerned are you about the following risks in relation to your personal information	Very, Somewhat concern	Loss of Control	Identity damage
Companies possess information about me that I consider private	63%	**0.684**	0.242
My personal information is used without my knowledge	76%	**0.823**	0.242
My personal data is shared with third parties without my agreement	75%	**0.894**	0.191
I may be victim of financial fraud online	64%	**0.738**	0.420
My identity is at risk of theft online	62%	**0.635**	0.507
My online personal data is used to send me commercial offers	68%	**0.514**	0.414
My views and behaviors may be misrepresented based on my online personal information	44%	0.267	**0.824**
My identity is reconstructed using personal data from various sources	48%	0.311	**0.776**
My reputation may be damaged by online personal information	32%	0.133	**0.627**
My behavior and activities can be monitored online	47%	0.412	**0.619**
My personal safety may be at risk due to online personal information	56%	0.585	**0.610**

With Varimax Rotation, Accumulative Contribution Rate(ACR) : 64.03% , Cronbach alpha:0.925, Observed variables with bold numbers indicate an effect from the corresponding factor.

4.1.1 General Privacy Concern

Respondents are significantly concerned about the numerous possible consequences in privacy due to the spread of personal data. They are mostly concerned about stealth use and the improper sharing of their personal information. However, they are less concerned about their reputation being damaged by the leak of online personal information. The survey confirms this skepticism in regards to the safety of the Internet and privacy. Most people are "concerned" or "very concerned" about threats to their privacy online. The result of the factor analysis is also presented in **Table 3**. There are two factors extracted, called "Loss of Control" and "Identity Damage." The value of Cronbach's alpha is 0.926, which

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Table 4 e-Service adoption enablers by scenario.

Adoption enablers	Yes
If other friends strongly recommend he/she use it	30%
If the service is free	68%
If one can choose the personal data he/she wants to give	62%
If the service saves time	55%
If it is very easy to subscribe	67%
If privacy is fully preserved	76%

implies that the questions have internal consistency.

4.1.2 Scenario Adoption Enablers

In terms of the service adoption enablers in the scenario (see **Table 4**), a range of factors may encourage respondents. These enablers should have a central position in any initiative to try to promote the consumption of e-services. It is remarkable that people lay great emphasis on whether the service preserves their privacy in the scenario (76%). Free service and the ease of subscription are also attractive in the scenario. In the scenario, a friend's recommendation is less influential in terms of service adoption.

4.1.3 Characteristics of the Service

Concerning e-service characteristics, there are relatively negative views regarding trust, system reliability, fit with lifestyle, and apparent benefits (see **Table 5**). Three factors are extracted, called "trust", "ease of use", and "preference".

4.1.4 Potential Risks

The recognition of risks in the use of the scenario is surveyed as potential risks. Because the mean value exceeds 5.0, the recognition of risks is said to be high (see **Table 6**). Two factors are extracted, called "explicit risk" and "implicit risk". "Explicit risk" implies that the risk will directly influence the respondent; the other risk does not result in a direct influence.

4.1.5 Benefits of the Service

Concerning costs or benefits, most people judge the services described in the scenario as relatively easy to use, secure, and, to a much lesser degree, as a means to save money (see **Table 7**). There are a high percentage of "I don't know" answers (30 to 56%), which possibly implies that people need to witness and try the system to be able to answer. The results from the factor analysis indicates

Table 5 Characteristics of the service.

To what extent do you agree with the following description of the service?	Strongly Agree	Average	Trust	Ease of Use	Preference
Learning to use such service would be easy for me	0.184	4.54	0.091	**0.937**	0.115
I would find this service easy to use	0.175	4.54	0.261	**0.911**	0.072
I would trust the system	0.088	4.54	**0.839**	0.203	0.271
I think the service would be reliable	0.105	4.55	**0.770**	0.140	0.464
I think using this system would fit well with the way which prevent third party's abuse	0.088	4.53	**0.618**	0.150	0.221
Using this system would fit into my lifestyle	0.053	4.53	0.355	0.093	**0.817**
The benefits of using this system are apparent to me	0.105	4.52	0.567	0.136	**0.641**

With Varimax Rotation ,ACR : 77.9% , Cronbach Alpha : 0.87, Observed variables with bold numbers indicate an effect from the corresponding factor.

Table 6 Potential risks.

What are the potential risks you would mention to Daisuke?	Strong Agree, Somewhat Agree(%)	Average	Explicit	Implicit
Your activities may be monitored	39	5.096	0.418	**0.740**
Information may be collected that could be used against you in future life	39	5.097	0.549	**0.764**
Someone may hack into the system and steal your personal information	42	5.107	0.606	**0.680**
You may get unauthorized charges on credit card	41	5.117	**0.780**	0.390
Someone may use your identity instead of you	36	5.100	**0.821**	0.386
You will receive unwanted commercial offers	55	5.110	0.338	**0.775**
Your privacy may be at risk, resulting in embarrassment	43	5.093	0.667	0.656
Your privacy may be at risk, resulting in serious personal consequences	39	5.093	0.748	0.517
Your personal data will be shared with unauthorized persons	37	5.094	0.719	0.581

With Varimax Rotation ,ACR : 81.08% , Cronbach Alpha : 0.97, Observed variables with bold numbers indicate an effect from the corresponding factor.

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Table 7 Benefit of the service.

What are the Potential benefits you would mention to your friend?	YES	NO	Don't Know	Secure	Benefit	Easiness
The service requires a minimum of effort on his/her part	52%	18%	30%	0.156	**0.414**	0.350
It would be easy to get this service to do what you want it to do	56%	13%	31%	0.085	0.265	**0.835**
This system would enable to identify oneself more securely	35%	19%	46%	0.319	**0.472**	0.416
This service will help one save some money	36%	25%	39%	0.263	**0.612**	0.222
This system would provide a valuable service	45%	18%	38%	0.250	**0.759**	0.220
This system would make it easier to identify oneself	21%	29%	50%	**0.841**	0.330	0.148
This system would make him/her effectively control its personal data	18%	25%	56%	**0.916**	0.231	0.119

With Varimax Rotation ,ACR : 64.49% , Cronbach Alpha : 0.87, Observed valuables with bold numbers indicate an effect from the corresponding factor.

Table 8 Intention to adopt and attitude.

Overall, do you think that:	Mean	SE	Median	Mode	S.D	Variance
A good idea — A bad idea	2.825	0.008	3	3	0.823	0.677
A wise idea — A foolish idea	2.912	0.007	3	3	0.782	0.612
Attractive — Non attractive	2.886	0.090	3	3	0.957	0.916
You like it — You dislike it	3.009	0.071	3	3	0.758	0.575

Cronbach Alpha : 0.931

that three factors are extracted, called, "secure", "benefit", and "easiness".

4.1.6 Intent to Adopt and Attitude

Finally, it was asked whether the respondent had a positive attitude, or an intent to adopt the scenario. The mean values, which are from 2.825 to 3.009 indicate a positive attitude toward adopting the scenario (see **Table 8**).

4.1.7 Effect of Factors on the Intent to Adopt and the Attitude

All three variables (risk, benefit, and characteristics) could constitute a complete picture for motivating e-service adoption. Multiple regression analysis was executed, "intent to adopt" is set as an dependent variable, and "benefit", "characteristics of service", and "potential risk" are set as independent variables (see **Table 9**).

Table 9 Multiple regression analysis.

	Variables	partial Regression Coefficient	Std. partial Regression Coefficient	t-value	p-value	Sig.
Benefit	Secure	0.160	0.201	2.578	0.011	*
	Benefit	0.227	0.247	2.876	0.005	**
	Easiness	0.149	0.167	2.166	0.033	*
Characteristics of Service	Trust	0.185	0.222	2.674	0.009	**
	Ease of Use	0.027	0.035	0.428	0.670	
	Preference	0.195	0.224	2.722	0.008	**
Potential Risk	Explicit	-0.106	-0.126	-1.619	0.108	
	Implicit	0.068	0.080	0.943	0.348	
Constant		3.092		55.188	0.000	**

Coefficient of determination : 0.423, Statistical significance:** :<1%, *:<5%

Variables whose scales start from negative values are reversed for consistency with the other variables. Factor-loading values in factor analysis are used for each independent variable. The result of the analysis follows the coefficient of determination of 0.423, which implies that the independent variables are explained by dependent variables at a certain level. There was no multicollinearity in checking the VIF value. By comparing the standard partial regression coefficient, the results are explained as follows:

a) The most affecting factors for adopting the service are "Benefit", then "Preference".
b) The variables of potential risk do not affect the results significantly.
c) "Easiness" of "Benefit" affects the results significantly, but "Ease of Use" of "Characteristics of Service" does not. It can be possibly said that even if there are similar factors, their effect differs depending on the aspects; in this survey, the aspects are "Benefit" or "Characteristics of Service".
d) "Trust" of the service and the benefit of "Secure" are both significant.

4.2 Result of Conjoint Analysis

Table 10 presents the results of the conjoint analysis based on the profile cards

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Table 10 Part-worth and relative importance.

Levels	Attributes	Part-Worth			Relative Importance (%)		
		Weak	Strong	all	Weak	Strong	all
Privacy	anonymity	0.486	0.211	0.336	20.7	24.8	20.5
	security purpose consent	0.184	0.573	0.371			
	marketing agreement	-0.672	-0.781	-0.708			
Service	discount service (1%)	0.443	0.503	0.477	18.5	21.4	21.1
	insurance service	0.155	0.164	0.155			
	no service	-0.598	-0.667	-0.632			
Fee	105 yen incentive	1.201	0.825	1.026	60.8	53.8	58.4
	free	1.006	1.059	1.012			
	105 yen /month	-2.207	-1.883	-2.038			

mentioned in Section 3.3.3. A decision coefficient indicates a value exceeding 0.9995, which is extremely high and sufficient. There are two groups: strong-risk perception and weak-risk perception, which are divided according to the mean value of the general privacy concerns stated in Section 4.1.1, Table 3.

The "part-worth" represents the level of utility for the respondents. For all samples, the monthly charge is considered to be an element that discourages its use, according to the value of part-worth in Table 10. In addition, users show a strong opposition to the use of their personal information for marketing purposes. On the other hand, it is indicated that "incentive", "free of charge", and "discount service" are positive for evaluating its utility. Users do not prefer to pay usage charges every month. An incentive of 105 yen and free are both positive effects to the utility. Respondents evaluate the disclosure of their personal information for marketing use as a negative utility. However, they will reveal their personal information if it is to be used for security purposes. No service on e-Money will have a negative effect on utility for the respondents.

Compared to the differential of risk extent, anonymity has a greater effect on utility for a weak-risk group than that for a strong-risk group. On the other hand, respondents in a strong group show a higher positive effect for "security purpose consent" than a weak group.

The relative importance, which represents the level of the respondents' preferences, is 58.4% for "fee", 21.1% for "service", and 20.5% for "privacy" (see Table 10). This result is different from that of the scenario adoption enablers described in Section 4.2.1, which states that the most important aspect is "privacy". Compared with risk extent, the orders of relative importance are the same, regardless of privacy concerns. The following shows a comparison of the strong group against the weak group:

- A strong group places a higher importance on "privacy" than a weak group.
- A weak group places a higher importance on "fee" than a strong group.

5. Findings

5.1 Factors Affecting the Use of e-Money and Preference Order

Findings from the result of the general questionnaires on the recognition of privacy risk are as follows. It was indicated that there were two main factors concerning privacy: the loss of control, and the potential damage to one's identity. In particular, the respondents were anxious about the damage to their identity, because it relates to a loss of control. Moreover, it was shown that most respondents indicated that privacy was the most important factor in using the system. In addition, the "privacy is fully preserved" answer was most preferred in response to the question regarding the scenario of using e-Money as protection.

The analysis of the factors that influence the intent to adopt indicates the benefit has a more positive effect than risk perception. It is also considered that risk is evaluated less than it has been in the past. In other words, it is possible to say that the benefit dominates risks in certain cases.

The adoption enablers' order of preference was privacy, price, and easiness; however, in conjoint analysis, the order was price, service, and privacy. This indicates that the individual has determined a trade-off between price and privacy. The analysis provides interesting results in terms of the individual's decision of preference among privacy, economic value, and services. Comparing the extent of risk perception, the strong-risk group evaluates the utility of security consent more than anonymity; for the weak group, it is the opposite. This implies that strong-risk groups understand risks more appropriately and need a logical way to protect their personal information than weak groups, which prefer anonymity. As for preference order, it is the same order for risk perception differences. However, the weak group evaluates economic value more than the strong group.

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A limitation of this survey is that it is not necessarily sufficient because the sample number is 114 and the samples are not generalized. It is not claimed that the result of this survey covers average citizens in Japan. We intend to conduct the survey on a larger scale to further generalized it. It is also considered that the design of the conjoint card also needs a more detailed evaluation. In conjoint cards, similar economic parameters exist in terms of service and fee level, and it might suffer from evaluating them in order of preference. It is also expected that the survey will be conducted in situations other than for e-Money.

5.2 Implication on Policy Makers and Service Providers

As mentioned, Japanese enterprises are too exhausted to comply with the personal information protection law. The Act uniformly decides information and disregards the types of services and individuals' cognition. To promote business by using personal information, it is necessary for policy makers to consider individuals' concerns about the perception of privacy risks and acceptance.

This study proves that individuals are willing to provide their personal information, and that they recognize the benefits and economic value, even if they are anxious with respect to privacy. It is preferable that the service provider presents factors that indicate benefits for promoting the adoption of their services.

6. Conclusion

This study investigated the way in which individuals perceive the risks and advantages of the use of private information online, so that service providers can optimally utilize individual information. In the investigation, most respondents were anxious about privacy. According to the analysis, individuals evaluate their trade-offs in terms of benefits and cost when deciding whether to adopt a service. Next, the order of the preferences of privacy, service, and economic value become clearer enough the use of conjoint analysis. As a result, the highest level of importance was indicated in terms of the provided economic value, service, and privacy.

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