한국 유비쿼터스 정부 서비스에서의 사생활 침해와 심리적 거리와의 관계*

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The Relationship of Privacy Violation and Psychological Distance in Korean Ubiquitous Government Service*

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■ Abstract ■

Today the u-government services are becoming more personalized and intelligent. For the successful implementation of personalization, individual user's privacy concerns must be respected and taken care of. Based on the empirical survey results, this research summarizes the reluctance to the government's use of private information using six categories. We measure user's psychological distance toward e-government using the four levels, adopting the suggestions by the Proxemics. Since a positive correlation is identified between people's psychological intimacy toward e-government and their tolerance to the use of private information, the amount and/or types of private information should be sequentially used in personalization systems. Initially allowing the least intolerable private information such as occupation information, the personalization system should additionally use the next tolerable information such as health information or service request/interest information, as user's psychological distance toward government services becomes shorter.

Keyword : Ubiquitous Government, Privacy, Psychological Distance

1. Introduction

In parallel with the development of information technology (IT), governments have continuously developed new civilian services. The evolution of the Internet-from Web 2.0 to Web 3.0-is upgrading the online environment of government service from electric (i.e., e-government) era into ubiquitous (i.e., u-government) era. The services are becoming more customized and intelligent. That is, the new government services, armed with newer information technologies, are now targeting individual customers' needs rather than providing uniform services to the public. Under this service environment, governments must be able to determine the fair and reasonable level of personal information disclosure meanwhile protecting individual privacy for the successful implementation of u-government systems, in addition to the provision of clear visions and strategic roadmaps and management of enormously growing civilian databases.

The u-government based on intelligent Web 3.0 is undergoing a paradigm shift from the government based on the World Wide Web and Web 2.0. The focus of government service lies on the information flow for individuals rather than for the government or the general public, which is called the ubiquitous way. The word "ubiquitous" means being or seeming to be everywhere at any time. Therefore, government services and information must be continuously accessible everywhere at any time in u-government systems. Individually customized service would be one of the most prominent benefits that the u-government offers, which supposedly increases the customer satisfaction level. Traditionally, government service was one-way and supply-oriented service. Later on it became government-civilian two-way cooperative service. Now its focus is on individual customers and their interests.

Personalization in this research refers to proactively customizing products and services to meet the tastes of individual customers based on their personal information such as preferences and interests. During the last decade, customer orientation has become a main issue in the e-government [19]. Personalized government portals in the u-government provide citizens with fully customized services, meaning that the government exactly knows what individuals need and suggests the way to fulfill their wants. Since the public sector is currently less personalized than the private sector, there is much room for personalization in governmental organizations. Personalization policies and trends in government services give governmental organizations various new opportunities for their service strategies [38], which might result in the provision of higher values to the citizens.

However, personalization entails obstacles in its implementation process. Knowing an individual's preferences and being able to predict his/her behavior are essential in personalized or customized services. Concerning personalized services, many private organizations have already implemented the personalization system or lie in near-completion stage. In so doing, they experienced people's reluctance to opening their private information. Sometimes people voluntarily disclose their personal information [29, 30, 46, 49]. For example, some people would offer their personal information to the public through their personal homepages or blogs on the web. On the other hand, involuntary or forced disclosure of private information, say, for the implementation

of intelligent recommendation systems, has brought about people's objection in many cases [3, 41, 47].

The personalized service, a key feature in u-government systems, inevitably carries more or less privacy problems. Such problems may be partly resolved in a legal way or a technical way [8, 24, 47]. Another way to deal with privacy problems would be a methodological approach, which will be proposed in this paper. The purpose of our study is to propose a solution to privacy violation problem that might occur in the course of personalized government service. We introduce the concept of "psychological distance" that an individual might feel toward the u-government and assess it with the Proxemics. To understand and analyze this in u-government systems, the research develops a distance estimation model and suggests a distance-based personalization model.

2. Related Studies

2.1 Ubiquitous Government

The word "ubiquitous" comes from a Latin word, meaning omnipresent or existing everywhere. The word has been popularly used in the information technology area since Palo Alto Research Center used the term, "ubiquitous computing." Due to Internet revolution and application development based on ubiquitous technology, the idea of u-government arose. The ubiquitous government is the one that provides personalized and continuous services anywhere and at any time using various devices and thus creates added values [6].

For example, Korean electronic government has been undergoing paradigm shift in parallel with the evolution of the Internet. Lee [23] introduced the main characteristics of three electric government generations with respect to web evolution, focus, service level, information disclosure, communication, channel, and accessibility (see <Table 1>). The u-government is different from the e-government in several aspects. In e-government systems, government services are focusing on citizens in general. However, the u-government systems aim at providing customized intelligent services. They make various types of valuable public information available on

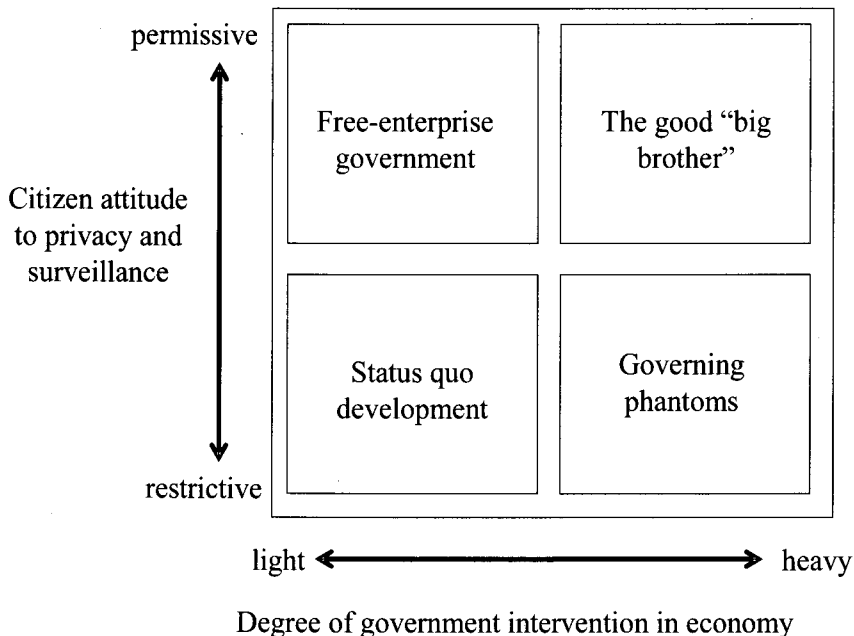<Table 1> Paradigm Shift in the Korean Electronic Government

	Government 1.0	Government 2.0 (e-government)	Government 3.0 (u-government)
Web evolution	World wide web	Web 2.0	Real-world web (Web 3.0)
Focus	government	citizen	Individual
Service level	Service provider oriented	Government-private sector cooperative service	Intelligent, customized service
Information disclosure	Restrictive	Expanded	Real time
Communication	One-way	Two-way	Individually customized
Channel	Wired Internet	Wireless and mobile Internet	Integration of wired, wireless, and mobile Internet
Accessibility	First-stop-shop (by portal)	One-stop-shop (by intermediate government service)	My government (by individual-based government service portal)

a real time basis. They integrate wired, wireless, and mobile networks to present individually customized communication services through individual-based government service portals.

The Korean government enacted a local community information plan called "u-Life 21" in 2007. The purposes of this plan are to prevent thoughtless development of local government information systems, to prevent the duplication of local government's investments in information systems, and to develop a shared local government information system. The plan allows local governments and local authorities to collaborate with each other and use the same data sources. As a result, the government can save enormous information costs and increase communication efficiency. The u-Life 21 attempts to use its resources to expand services to the local resident using ubiquitous technologies. The services

within the plan include u-transportation, u-environment, u-culture, u-welfare, u-security, u-education, u-industry, and u-community life. The local government encourages residents to participate in the implementation of u-Life 21 and makes high-quality services available everywhere at any time so that anyone can conveniently enjoy the services.

The Gartner Group [15] presented four possible scenarios of future governments. [Figure 1] illustrates the types of future governments which are determined by the two driving forces, the degree of government intervention in economy and citizen's attitude to privacy and surveillance. Based on these two driving forces, future governments are classified into one of four categories : status quo development, governing phantoms, free-enterprise government, and the good big brother. In consideration of the services in u-Life 21, the

permissive

Citizen attitude to privacy and surveillance

Free-enterprise government

The good "big brother"

Status quo development

Governing phantoms

restrictive

light ◄―――――――――► heavy

Degree of government intervention in economy

[Figure 1] Four Possible Scenarios of Future Government [15]

Korean government can be classified into the good big brother, in which the government heavily involves community activities while citizens must be permissive to private information disclosure and surveillance.

The Korean government gradually increases its good big brother's role in the u-Life 21 system and directly provides services to the customers utilizing all possible IT technologies. The Korean u-government system has been and will be performing selected service activities. For example, the electric identification systems will be integrated. The system stores a wide range of physical information such as finger prints and iris. Individually customized services will also be provided. The services incorporate the customer relationship management (CRM) strategy that has been vastly adopted by the private sector. The most recent individual medical and health information will be stored in electronic files as well as in smart cards which provides real-time data reading and writing capabilities. People who are in need of continuous medication monitoring or solitary aged persons will wear a smart bracelet or transplanted micro chips within their bodies for seamless health condition monitoring and calling for help in case of emergency. The ubiquitous system even allows the government to efficiently manage the data about the resident's commercial activities, tax filing, address changes, motor vehicle locations, and so on.

The leading countries in mobile and wireless technologies take the lead of ubiquitous government system development. In the United Sates, the Florida court has integrated a variety of nationwide data systems that contains criminal information into a single database and is currently providing the real-time criminal search service

[16]. The u-government system of Finland utilizes advanced ubiquitous technologies. Finnish citizens can freely access the available municipal government database and receive various services by simply using web browser, PDA, and mobile phone [4]. The Japanese government has been involved in developing national infrastructure management projects. The project includes developing intelligent traffic systems, vehicle information, and transportation communication systems which result in better national traffic management concerning traffic congestion, car accidents, road works, and even parking lot availability [22].

Berners-Lee et al. [7] showed an interesting example of ubiquitous services offered by a government. A lady asks the web agent to search available doctors who can treat her mother's medical need and to make a reservation using the web browser at hand. The web agent reads her mother's medical history and recent prescriptions by accessing the database of her mother's current doctor. Then, the web agent examines the list of medical experts within a 20 miles boundary, checks which doctors are available, and inquires whether her current insurance policy covers the medical treatment. For the successful implementation of this system, private information such as medical history and health conditions as well as other information such as doctors' schedule must be available. However, a tradeoff apparently exists between the service level and privacy invasion. The intelligent and customized services that many leading countries have been planning will bring more advanced civil services and better life conditions to local residents. However, implementing such services will also require private information disclosure and has a

high possibility of resultant privacy violation.

2.2 Personalization and Privacy Concern

A common idea about web personalization is that web pages must be designed to meet individual visitor's needs and preference. Various technologies such as rule-based personalization, collaborative filtering, and learning agent are utilized in the implementation stage. Most successful commercial websites such as Yahoo.com and Amazon.com have recommended their products and services based on the analysis of users' interests and purchasing history. Commercial personalization plays an essential role under such personalized business circumstances because using personal information such as customers' interests and needs would bring benefits to both firms and users. One-to-one marketing helps firms to build a strong relationship with customers, whereas customers can expect better services [35].

Web personalization is mutually beneficial to firms and individual customers in the following sense.

- Firms would have opportunities to enhance business performance by tracking individual customers' activities and analyzing their preferences and purchasing tendency.
- Personalization brings convenience to customers. Customers can enjoy tailored service with less time commitment and effort [2].
- Both parties can build a stronger emotional and psychological relationship, which is gradually formed while using interactive communication systems. Many devices such as e-mail, online feedback, communities, and personalized web pages may be used as the interactive communication systems linking

firms and users.

Customer orientation and personalized services became a main issue in the public sector, too. Osborne and Gaebler [33] advocated customer driven systems because governments could improve accountability and efficiency, stimulate innovation, and empower citizens. With similar reasons, CRM strategies are applied to public administration [34]. Customization in the public sector can be explained with the social exchange theory. Alford [1] classified citizens into three categories-clients, beneficiaries, and obligates. He conceived that clients pay for the public service they receive. Beneficiaries receive something without paying. Obligates are obliged to do something like prisoners. He insisted that all three types of citizens must be treated as customers who exchange something for the services they receive. In order to make the personalization work in the public sector, governments should strengthen their public administration functions. Maybe the result of customized service, improved customer satisfaction, helps to legitimize public administration [43].

While implementing web personalization systems, private organizations have suffered from individual privacy problem. Many studies have shown that users do not want the Internet vendors to build and share sophisticated consumer profiles with private information [11]. Rezgui, Bouguettaya, and Eltoweissy [41] enumerated some important dimensions of web privacy including information collection, information usage, information storage, information disclosure, information security, access control, monitoring, and policy changes. In the informational perspective, privacy is a right to control the collec-

tion and use of information about oneself [10, 32]. For example, in order to build up a recommendation system, service providers need to analyze cookies and recently visited items of users, which is a threat to individuals because it deprives of the right to control private information, namely, privacy violation.

Like the situations in the private sector, personalization in the public sector also needs knowledge of customers like local residents and citizens. For instances, municipalities examine customer needs to offer more customer-oriented services [44]. Pieterson, Ebbers, and van Dijk [38] mentioned some user-side obstacles in implementing personalized e-government services, which include access, trust, control, privacy, and acceptance. These five factors influence success/failure of the personalization individually as well as in a group.

It is well known that web surfers often give fictitious information about themselves over the Internet due to the lack of trust on identification systems. People tend to protect their privacy with pseudonyms or anonymous surfing. Nowadays, users can even surf the Internet anonymously without leaving IP addresses using advanced web-browsing technologies [40]. The lack of trust in security makes users more or less reluctant to the private information using by e-government systems.

Privacy threats happen in various forms. Wang, Lee, and Wang [48] listed up four types : improper acquisition of information (e.g., uninvited tracking); improper use of information (e.g., unwanted data sharing with third party); improper storage and control of personal information (e.g., no means to remove unwanted information); and privacy invasion (e.g., spam

mailing). Roy Morgan Research [42] reported that about 90% of the Australian web users want to know who and which organizations can access to their personal information and how their personal information is used. Whether people can control their own information or not is an important determinant factor for them to accept the personalization system.

2.3 Psychological Distance and Intimacy in Cyber Space

Many have sought to discover the meaning of psychological distance between individuals and interpersonal distance in the Internet environment. Ickinger and Morris [21] analyzed the underlying meaning of interpersonal distance detected in their behavioral game. They found that people use interpersonal distance as a means of defense against another person's negative characteristics, rather than a positive system that interacts with others. In the virtual experiment by Bailenson et al. [5], psychological distance between a human and a cyber system is examined. The reaction toward a virtual human is observed. People tend to keep more distance when an unfamiliar virtual human is approaching from the front compared to the case when approaching from the back. People try to keep a certain distance when the virtual human steps into their personal territories.

Like psychological distance, intimacy can be a very important factor in the Internet environment. The word "intimacy" is derived from a Latin word, meaning inner or inmost [36]. Intimacy is indicative of one's deepest nature and marked by close physical, mental, and social association [31]. Reis and Shaver [39] viewed intimacy as a core social psychological process with distinct

communicative and emotional features. The majority of research on intimacy is in the area of psychology. Most psychological research on intimacy focuses on the intimate relationships between men and women.

Stern's study [46] is one of few studies about intimacy in the area of business administration. Intimacy is an important factor founding service relationships between firms and customers. In service marketing, intimacy is measured with five attributes : communication (self-disclosure), caring, commitment, comfort, and conflict resolution. Stern asserted that firms should devote efforts to develop intimacy-based information technology. The antecedent variables to consumers' intimacy in service industry include employee's benevolence, employee's credibility, employee's image, and customer's satisfaction [18].
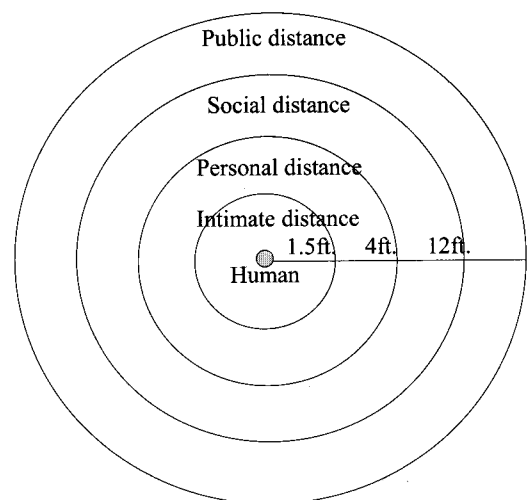
The concept of intimacy can be expanded and applied into the relationship between a human and cyber space. Although the degree of intimacy is weaker than that in face-to-face environment, intimacy between a human and the cyber system exists in the virtual world [45]. While citizens use and interact with government services, they can develop psychological intimacy or psychological distance toward e-government. While McKenna [26] was investigating the critical success factor for the Philips's case, he discovered that virtual intimacy, electronic collegiality, and instant familiarity are important factors in the virtual world.

2.4 Proxemics

Not only languages but also sensory recognition about space and distance establish communication in human society. The distance that

people feel comfortable on each object is different. The perception about the proper distance is influenced by many factors such as culture, gender, and race. When an unfamiliar object steps into someone's territory, he/she unconsciously steps back to keep proper distances. Ickinger and Morris [21] explained this kind of behavior as a defense mechanism. When proper distance is not sustained, it is difficult to continue communication and further develop the relationship.

The Proxemics theory by Hall [17] explains how human beings use space within the context of culture. Human perception of space is molded and patterned in the cultural environment and has a significant influence on the success or failure of communication. Hall claimed that people tend to put themselves in a bubble and then keep proper distance not to burst the bubble. Depending on the degree of social interactions, the interpersonal distances are classified into four categories : intimate distance, personal distance, social distance, and public distance (see [Figure 2]). The physical distances for the four categories are

[Figure 2] Four Bubbles in Hall's Proxemics

suggested as follows : 0 to 1.5 feet for intimate distance, 1.5 to 4 feet for personal distance, 4 to 12 feet for social distance, and 12 or more feet for public distance, respectively.

Communication between objects that belong to intimate distance is similar to the one that is made in a very close relationship such as family and lovers. The level of formality is minimal. Intimate distance would be the minimal private space for the self defense, so it must not be trespassed impolitely. In personal distance, the relationship between objects is characterized by close relationship with a moderate level of formality. In social distance, people make a light conversation and a third party freely joins and leaves in the middle of the talk. In this space, conversation is more official than personal. Public distance is found when someone delivers a lecture. The psychological distance between objects is the farthest and personal conversation is not allowed.

McMillen [27] insisted that privacy has a psychological dimension. Individuals vary in their need for privacy exposure level. Their allowance of privacy varies across time. These concepts of psychological distance and intimacy can be applied to the relationship between users and the u-government system. For example, a first time visitor to the u-government system does not feel comfortable or intimate toward the system. His/her psychological distance would then belong to public distance. In the space where the relationship is not intimate, only public and basic information is shared between the two parties. As the visitor comes back to the system several times, he/she begins to feel comfortable with the system and develop trust. The psychological distance is then evolving into social distance. As the

psychological distance becomes shorter, people tend to allow the government system to come closer. At this stage, the u-government concerns more about the users and becomes ready to offer customized services because the proper distance that the users feel decreases. Regular users might feel more comfortable and intimate about the u-government service and develop loyalty so the distance that they have in mind would be personal or intimate one.

3. Privacy Management in Personalized Government Services

3.1 Tolerance to Using Private Information

The first task of this paper is to classify various types of private information into several categories and then investigate how tolerable people are to the government's use of their private information. Andrade, Kaltcheva, and Weitz [3] used three dimensions for classifying private information :

- ID information : e-mail address, phone number, and name
- Sensitive information : social security number and medical information
- General habits information : product preferences and interests/hobbies

They claimed that privacy problem must be taken good care of because these privacy concerns ultimately reduce the benefits of personalization that firms deliver to customers.

Another approach to classify private information was performed by Rezgui, Bouguettaya, and

Eltoweissy (2003), in which web users' private information is categorized as follows :

- Personal information : information such as a person's name, marital status, mailing and e-mail addresses, phone numbers, financial information, and health information.
- Digital behavior information : activities while using the web, including the sites they visit, frequency and duration of these visits, and online shopping patterns.
- Communication information : electronic messages, postings to electronic boards, and votes submitted to online polls and surveys.

In the studies by Andrade, Kaltcheva, and Weitz [3], the distinction between ID information and sensitive information is not clear. For example, social security number and phone number might be ID and sensitive information at the same time. In the studies by Rezgui, Bouguettaya, and Eltoweissy (2003), all the examples belong to personal information, and further financial and health information might be separated from ID type information.

Thereby, we tried to avoid term such as sensitive information and personal information and finally decided to use the six categories. For the purpose of more detailed analysis of privacy issues in u-government systems, six categories are used in this study for the classification of private information :

- ID information (e.g., name, social security number, phone number, address, e-mail address, etc.).
- Family information (e.g., marital status, spouse, children, parents, sibling, etc.).

- Wealth and credit information (e.g., yearly income, real estate, credit rate, etc.).
- Service request and interest information (e.g., history of inquiry and submitting petitions, preference and tastes, frequently surfing categories, interests, etc.).
- Health information (e.g., health condition, medical treatment history, allergy, genetics, etc.).
- Occupation information (e.g., company man, professional, own business, student, housewife, unemployed, etc.).

230 respondents out of 300 participants were used for analysis (response rate = 76.7%). Ninety undergraduate students (39.1% : aged 20s) and One hundred forty graduate MBA students (60.9% : aged 30s and over) from the Sogang University participated in the survey. The graduate MBA students were full time workers from various industries. The survey was performed during October and November, 1997. The response rate was comparatively high for this type of survey because the participants were taking courses at a certain school. 70 surveys were excluded from analysis because they provided incomplete answers due to lack of experiences. Even thought this study tried to gather opinion from various fields by investigating full time workers enrolling in the MBA program, more various people should be participated in the survey in the future research to reduce the sample bias.

Respondents are asked to rank their reluctance if the government use the above six types of private information for personalizing government services. Ranks are recorded from 1 to 6, where rank 1 indicates the most reluctant to using pri-

⟨Table 2⟩ Intolerance order to the government's use of private information

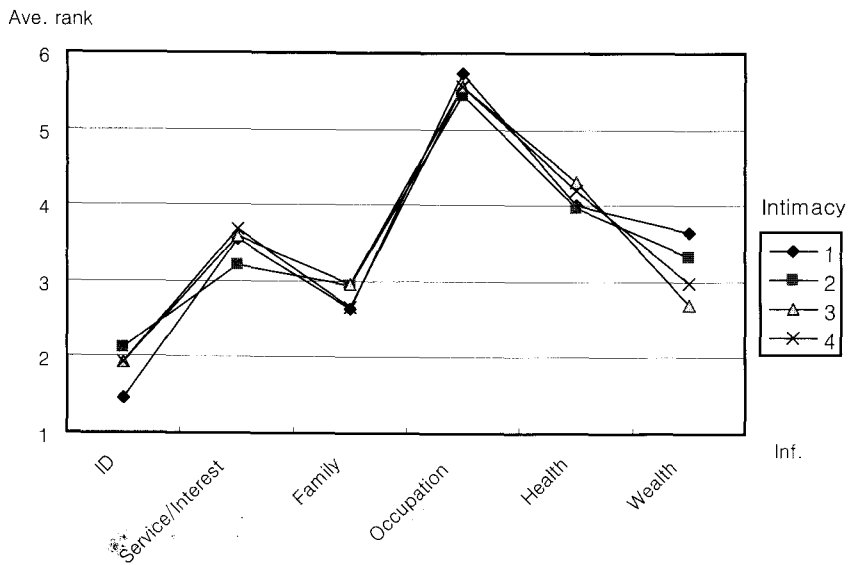| Order	Kind of private information	Average rank	Standard deviation
1	ID information	1.95	1.51
2	Family information	2.84	1.20
3	Wealth and credit information	2.97	1.43
4	Service request and interest information	3.54	1.12
5	Health information	4.19	1.35
6	Occupation information	5.54	0.99

vate information and rank 6 indicates the least reluctant.

<Table 2> shows the survey results. The average rank for ID information is 1.95, which is the highest. It turns out that people are most reluctant for using their ID information for personalization. The second most sensitive group is about the family and wealth/credit. The average ranks for these two categories are not substantially different : 2.84 for family information and 2.97 for wealth/credit information. The rest of other categories were ranked in this order :

service request and interest information, health information, and occupation information.

Out of 230 respondents, 11 answered point 1 (which accounts for 4.78%), 47 answered point 2 (20.43%), 92 answered point 3 (40.00%), and 80 answered point 4 (34.78%). Less than 5% of the respondents showed highly intimate to the electric government. The majority were more or less intimate. It is interesting to note that about a third of people were not intimate at all.

[Figure 3] shows the distribution of intolerance order to the government's use of private information

[Figure 3] Average rank of private information by intimacy

for the four levels of intimacy. Although there is a variation between the four levels of intimacy, the intolerance order of six categories is identical for the four levels of intimacy. [Figure 4] illustrates the distribution of intolerance order to the government's use of private information for the five levels tolerance. A similar fashion can be identified in this graph. The intolerance order of six categories remains unchanged for the five levels of tolerance. The global pattern appeared in <Table 2> can also be captured in [Figure 3] and [Figure 4].
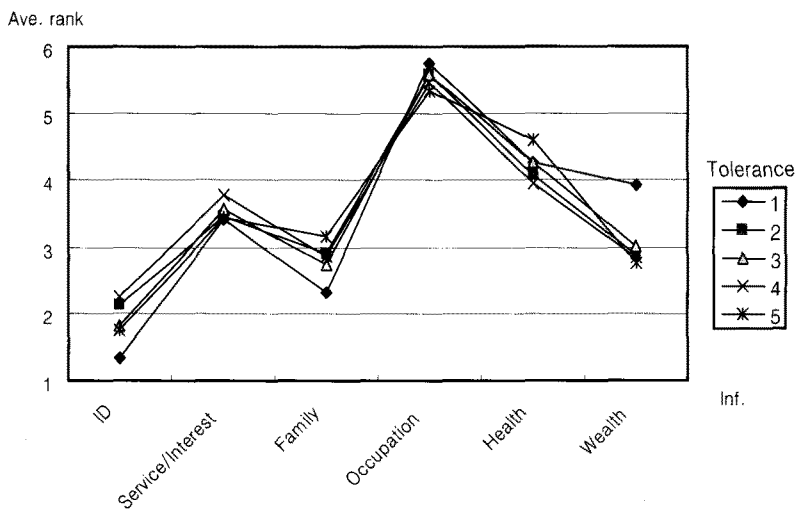
3.2 Distance estimation model

This paper attempts to apply the concept of psychological distance to the relationship between u-government systems and users. People repetitively visit and interact with u-governments to make inquiries, to submit petitions, and to receive feedbacks. As a result, their psychological distance toward u-government systems shortens. As people gradually develop intimate

relationships with the virtual world [45], it is necessary to measure the degree of intimacy (i.e., psychological distance) toward the e-service system. Like the Proxemics, the current study uses the four levels of psychological distances to measure the degree of intimacy. The higher the degree of intimacy, the closer the psychological distance is. Decrease of the distance implies that people feel intimate to the u-government. As the degree of intimacy is weakened, the psychological distance is classified in the order of personal distance, social distance, and public distance.

On the survey, respondents are asked to rate their psychological distance (or intimate feeling) toward the electric government. Since ubiquitous system is in its early developing stage and many are not ready to answer, people's experience with e-government system is investigated. The question used to measure the psychological distance is :

- Q1 : I feel intimate or psychologically close to the electric government in terms of trust, respect and care, communication,

[Figure 4] Average rank of private information by tolerance level

and coping with my request.

We tried to understand psychological distance or intimacy with the dimensions of trust, respect and care, communication, and coping with request, based on the following studies.

- Trust [20, 13]
- Respect and care [13, 46]
- Communication [12, 13, 20, 46]
- Coping with request [13, 18, 46]

Each respondent answered Q1 on a four-point scale : 1 = highly intimate (i.e., intimate distance), 2 = intimate (i.e., personal distance), 3 = somewhat intimate (i.e., social distance), and 4 = not intimate (i.e., public distance).

The research measures if there is a statistical association between people's psychological distance toward e-government and their tolerance to the use of private information. Then, this research seeks a way to estimate the psychological distance of the survey respondent. At this stage, the research uses independent variables that might explain/predict the psychological distance of a user. The research asks the respondents to answer the following questions.

- Q2 : I am tolerant to the government's use of my private information for personalization.
- Q3 : I think that e-government knows about me and my interests.
- Q4 : I think that e-government has a good reputation from citizens.
- Q5 : I think that e-government faithfully responds to my request and complaint.
- Q6 : I want to recommend e-government to

my acquaintances.

- Q7 : Most recent visit/use
- Q8 : Frequency of visit/use
- Q9 : Duration of visit/use
- Q10 : Number of inquiries and interactions during the last quarter
- Q11 : Age
- Q12 : Gender

Questions Q2 to Q10 are measured on a five-point scale : for Q2 to Q6, 1 = strongly agree, 5 = strongly disagree; for Q7 to Q10, 1 = most, 5 = least.

The Pearson's correlation coefficient test is performed on the variables Q1 and Q2. The correlation coefficient of Q1 and Q2 is 0.5323 and its associated p-value is less than 0.0001. Therefore, a positive dependence exists between a user's psychological intimacy toward e-government and his/her willingness to accept the use of private information for personalization.

The next task is to introduce a set of psychological distance predictor variables, Q3 to Q12. The independent variables consist of psychological variables (Q3 to Q6), recency and frequency variables (Q7 to Q10) and demographic variables (Q11 and Q12).

A stepwise logistic regression is carried out to figure out which independent variables are statistically significant in explaining the psychological distance. The overall model is statistically significant with the Chi-Square value for the covariates of 302.394, with the degrees of freedom of 16, and p-value of less than 0.0001. The analysis result shows that four variables (Q3, Q5, Q6, and Q7) are significant (see <Table 3>). Psychological variables are all significant except Q4. If a user's perception about the government is pos-

〈Table 3〉 Analysis result of the stepwise logistic regression

Covariate	Degrees of freedom	Wald Chi-Square	p-value
Q3	4	43.1651	< 0.0001
Q5	4	8.9456	0.0625
Q6	4	45.8701	< 0.0001
Q7	4	22.3161	0.0002

itive with respect to knowing (Q3), response (Q5), and recommendation (Q6), the survey participant's psychological distance is intimate. Among the recency/frequency variables, most recent visit/ use variable (Q7) is the only significant one. Neither of the demographic variables is significant.

To further investigate the effect of independent variables on the dependent variable, factor analysis is carried out. The result of factor analysis is summarized in <Table 4>. Three factors are identified with the eigenvalues of greater than 1.0. Variables Q3, Q4, Q5, Q6, and Q9 are factored with factor 1. All variables except Q9 are psychological variables. Among these variables, Q3, Q5, and Q6 are significant in explaining the psy-

〈Table 4〉 Factor analysis result for the independent variables

	Factor 1	Factor 2	Factor 3
Eigenvalue	3.5682	1.1840	1.0207
Q3	0.6416	0.3189	-0.0616
Q4	0.6797	0.1265	0.0798
Q5	0.6161	0.2423	-0.2478
Q6	0.7556	0.2873	0.0671
Q7	0.4339	0.6690	0.0215
Q8	0.3922	0.6768	-0.0675
Q9	0.6938	-0.0340	0.0385
Q10	0.2129	0.6101	-0.2316
Q11	0.0711	-0.0506	0.9407
Q12	-0.3653	0.5833	0.1978

chological distance. Factor 2 includes variables Q7, Q8, Q10, and Q12. However, the factor loading of gender (Q12) is a little bit low. The second factor might be named as the recency/frequency variables. Q11 (age) is the only variable factored with Factor 3. Since we are interested in explaining a user's intimacy toward electric government system, the significant independent variables are mostly related to psychological variables. Whether a user feels psychologically close to the e-environment can be predicted by the above three psychological questionnaire and most recent visit/use.

The correct classification ratio of the proposed logistic regression model is computed. <Table 5> summarizes the actual distance and the estimated distance of the 230 survey respondents. The correct classification ratio of the estimated model is 76.96% (177/230), which is about three times more accurate than 25% (1 out of 4 levels) in case of total random judgment. With the four statistically significant independent variables, we

〈Table 5〉 Contingency table for the four levels of psychological distance

		Estimated distance			
		1	2	3	4
Actual distance	1	8	3	0	0
	2	3	33	11	0
	3	0	7	75	10
	4	0	0	19	61

can reasonably estimate the psychological distance of a user toward e-government.

3.3 Distance-based personalization model

In the previous section, a user whose psychological distance toward e-government is close is likely to be more tolerable to the government's use of his/her private information for offering customized services. Concerning this, government should differentiate the level of personalization by taking into account the estimated psychological distance. By initiating a short survey or asking a few questions about the government, people's perception about the government with respect to knowing, response, and recommendation can be measured. Besides, the most recent visit/use can be simply checked. With these four variables, we can reasonably estimate a user's psychological distance toward the government.
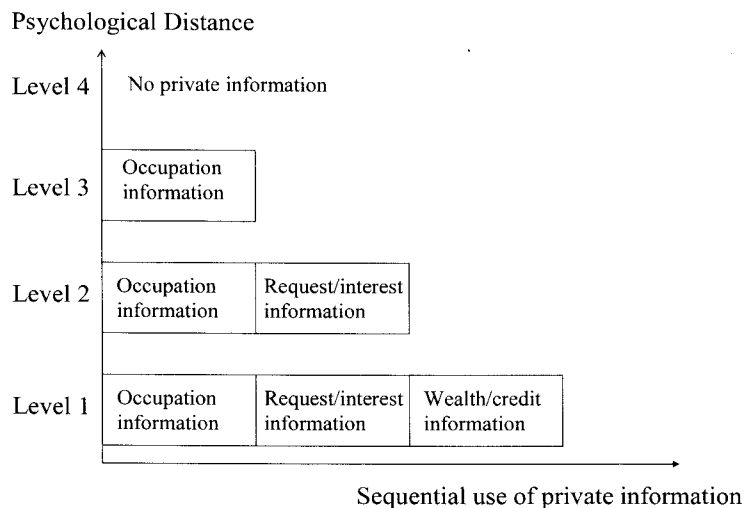
Now, we propose a distance-based personalization model for u-government system. Depending on the four levels of psychological distance, the amount and the kinds of private information used for customized service must be adjusted. [Figure 5] illustrates the sequential use of private information in the personalized government service.

For a person like a first time visitor/user whose psychological distance is estimated the lowest level (level 4), only public information should be used. Personalization is not applied for this group of people because they may perceive the use of private information as a serious privacy violation. They may feel uncomfortable and embarrassed if the government pretends to know about themselves and approach to them very closely, which is unanticipated at all. Thus, they are likely to keep a certain distance from the government service.

For the users with distance level 3, personalization should be applied with a minimum use of private information. An adequate approach might be offering a customized service using the least intolerable information such as occupation or health information (recall <Table 2>).

As the distance becomes more intimate like in

Psychological Distance

[Figure 5] Sequential use of private information in personalized government service

the level 2, two types of private information can be jointly used for personalization. For example, by referring to the information about inquiries/requests, the government can conjecture the interests and main concerns of a specific citizen. With the least intolerable private information, this type of request/interest information is jointly applied to design personalized services.

For the group with distance level 1, three kinds of private information can be used based on the analysis of the needs of both government and citizens. For example, wealth/credit information might be used additionally for personalization. For the people whose psychological distance is close, we can enhance the satisfaction level by offering exactly what they are in need of. In so doing, the use of private information is essential in analyzing the needs/wants of a person.

Today many successful web communities have been adopting the concepts similar to psychological intimacy. People can join or form a private network by signing a certain friend membership agreement. Web communities, like myspace.com, allow members to set up unique personal profiles that are linked together through networks of friends. By joining a member of a certain group, one can display his/her own information and, at the same time, he/she is allowed to see other's personal information. In another site, cyworld.com, personal information is available between the group members who are registered as next-of-kin members.

The personalized service offering inevitably conveys privacy violation problem, but the absence of web personalization might cause inconvenience and tremendous transaction cost. Citizens can reduce the transaction cost with personalized government system because they can easily figure out and use the service that they want with less searching effort and time. Therefore, it is worthwhile to offer customized services with the acceptable use of private information.

4. Conclusions and Discussion

This study suggested a solution for the privacy violation problem that might be a major obstacle in implementing customized service in the u-government environment. As Bailenson et al. [5] and Scott, Mottarella, and Lavooy [45] noted, human beings naturally develop a psychological distance toward an online environment that they feel comfortable. This paper attempts to model this psychological distance by applying Hall's Proxemics [17], in which the distance is classifiable into four levels. The research empirically identified that people have different levels of psychological intimacy toward e-government service. Since it is not practical to directly ask every single visitor/user about his/her psychological distance toward the government, this paper developed the distance estimation model based on some key factors. Finally, the paper suggested the distance-based personalization model. The customized services should differentiate the amount and the types of private information in the personalization process depending on the psychological distance.

The contribution of this study is threefold.

First, the paper listed up the various types of private information and classified them into six main categories. Through an empirical survey, the paper rank ordered the people's intolerance to the government's use of private information. Like the assertion by Pieterson, Ebbers, and van Dijk [38], privacy concerns are hindering the use

of personalized e-government services as a user obstacle. People perceive more privacy and want to keep secret about private information in this order : ID information, family information, wealth and credit information, service request and interest information, health information, and occupation information.

Second, we defined the psychological distance or intimacy toward e-government with respect to trust, respect and care, communication, and coping with requests. Like the Proxemics, the paper measures the psychological distance using four levels. The empirical survey indicated that a user's psychological distance toward e-government can be reasonably estimated by considering a few psychological questions and activities associated with visit/use. Phelps, Novak, and Ferrell [37] claimed that people concern more about disclosing private information as they realize that data about their behavior is being collected without their knowledge and agreement. Certainly, these privacy concerns restrict the benefits that personalized systems deliver to users. The empirical survey results support the idea that using private information step by step based on user's psychological distance reduces the reluctance to personalization and thus enhance potential benefits to users.

Our findings are somewhat consistent with Chellappa and Sin [9]. They discovered that online users' concern for the privacy of their information is negatively correlated with factors that build trust in the vendor offering personalization services. The authors also reported that online users' intention to use personalization services and willingness to share information is positively correlated with factors that build trust in the vendor offering personalization services.

In the current study, trust is one of the dimensions that constitute psychological distance. Thereby, psychological distance must be treated as an important factor that affects privacy concern and intention to use personalization services.

Third, since a significant correlation is identified between people's psychological distance and their tolerance to the use of private information, the key feature of distance-based personalization model would be properly mixing public and private information. If the proper distance is not kept in the course of communication and interaction between two parties, people tend to step back to keep a certain distance. A premature customization might push citizens away from becoming regular customers to the government. Service providers often present surprising and seemingly intelligent results to the people who are not accustomed to computers and information technology [25]. Therefore, the customized services in the u-government environment must consider each citizen's psychological distance toward the government and differentiate the amount and types of private information in personalization.

The limitations of the present study are related to the introduction of psychological distance or intimacy that people might have toward the government system. In order to differentiate the amount and types of private information for personalization, we need to segment citizens into several groups based on their reluctance to the government's use of their information. For this purpose of segmentation, we introduced psychological distance by applying the concept of distances in Proxemics. One might argue that the four levels of psychological distance are somewhat arbitrary. In the future studies, we might

find a more appropriate reference model and seg-ment people in different ways. Although, the psychological distance is measured using a single questionnaire in this study, it can be measured more systematically using multiple items such as caring, communication, comfort, and commitment.

One of the possible future studies might be to develop strategies to encourage people to ac-tively participate in personalization system under the u-government environment. Customers are willing to share and disclose their private in-formation only if they recognize that they can re-ceive some benefits in returns. The potential benefit includes monetary benefits as well as in-tangible benefits [28]. Prior studies indicated that building online trust is essential in implementing personalization. Trust building is made by sev-eral ways such as improving government's im-age and engaging in activities with trusted third parties [14]. Since it is apparent that personalized government systems are mutually beneficiary to both citizens and governments, it would be worth-while to develop personalization encouragement strategies for the u-government.

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