Characteristics of Individuals Influencing Adoption Intentions for Portable Internet Service

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This study aims to identify the factors that influence adoption intentions towards portable Internet service, based on the individual characteristics that assist in creating markets and developing strategies. Two types of factors are defined: individual characteristics including demographics, existing services usages, prior knowledge, adoption attitudes, and service evaluations; and adoption intentions including the willingness to subscribe, subscription term, willingness to pay, usage type, and preferred terminal. The results indicate that the importance of demographic variables depends on adoption intentions, and that users of mobile Internet service and wireless LAN are probably targets for portable Internet service. Furthermore, the results demonstrate the need for an enhanced perception of the usefulness and ease of use of service, as well as an intensive marketing activity for potential users and a bearable innovation to stimulate the market for portable Internet service.

Keywords: Portable Internet service, WiBro, adoption intentions, mobile broadband, individual characteristics.

I. Introduction

The telecommunication service industries in Korea have been developed with evolutionary paradigms such as digital convergence. We can now look for new growth by integrating the resources and capabilities of the value chains based on the so called 'IT 8-3-9 Strategy' announced by the Korean Government. Portable Internet service, preserving attributes best represented by broadband networks and multimedia, is now emerging as both the core service capable of leading the paradigms in these changes and as a new engine of growth. Portable Internet service provides wireless users with a high transmission rate whenever and wherever they happen to be, even when moving at intermediate speeds, and it is expected to be the telecommunication media for core services in the next generation. It will exceed the limitations of existing telecommunication services by proposing new business models and by converging telecommunication and broadcasting, telecommunication and transportation, and telecommunication and home appliances [1].

However, even though a number of innovative telecommunication services have emerged in the course of the replacement and evolution of telecommunication technologies, such as movement toward multimedia services, elimination of boundaries between services, and enhanced competition since the mid-1990's, few services have succeeded in securing a reasonable number of subscribers (critical mass) and generating stable profits. Studies report that the main reason for failure is that most of the new telecommunication services have been technology-oriented, and have failed to properly reflect the needs and preferences of users [2]. Thus, the key to the success of new telecommunication services in the market involves business strategies for market creation through

Manuscript received Nov. 29, 2004; revised Aug. 25, 2005.

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providing customer-oriented services. In other words, the development of new customer-oriented services is the most critical factor for market success, which means fulfilling the needs of customers throughout all business stages, from creating an idea through to defining the market, from service positioning and marketing mixes to life cycle management, thereby providing customers with the values of convenience and advantage [3].

This indicates that an understanding of the characteristics of potential customers is a prerequisite for a portable Internet service's newly conceived concept of telecommunication services supplying customer-oriented services. The significance of analyzing the effects of the diverse characteristics of potential customers on the adoption intentions for portable Internet service is as follows [4], [5].

First, understanding the characteristics of potential customers is valuable for defining the markets of portable Internet service and identifying market potential through an analysis of customers' needs and prototyping market profiles.

Second, understanding the characteristics of potential customers is useful for business decision-making when establishing the mass markets and target markets of a portable Internet service.

Third, understanding the characteristics with respect to the preferred conditions and utilization level of a portable Internet service is valuable for selecting the marketing mixes that fulfill a role as the strategic tools of a corporation.

This study sets out to conduct an empirical analysis of the effects of individual characteristics such as demographics, existing services usages, prior knowledge, adoption attitudes, and service evaluations on the willingness to subscribe, subscription term, willingness to pay, usage type, and preferred terminal. While most of the preceding studies have focused on the effects of demographics on subscriptions to new telecommunication services, this study extends the list of independent variables to a recognition of attitudes and assessment, and adds usage type, payment intention level, and preference to the dependent variables in order to systematically enhance justification of the effective model of the adoption intentions for portable Internet service.

II. Theoretical Background and Objectives of the Study

1. Concepts and Features of Portable Internet Service

With the ever-increasing demand of customers for telecommunication services that provide mobility, increased transmission rate, and multimedia along with affordable charges, the necessity for new telecommunication services capable of overcoming the limitations of the super-highway Internet, wireless LAN, and mobile Internet has emerged. Consequently, a new concept of portable Internet service has appeared that exploits the rapid development of wireless telecommunication technologies, adding mobility to the super-highway Internet and wireless LAN with a faster transmission rate and more affordable charges than those of mobile Internet service. Portable Internet service is designated as WiBro (a combination of wireless telecommunication and broadband network), offering access to wireless Internet at high transmission rates whenever and wherever customers happen to be, even when the customers are actually moving. Portable Internet service guarantees mobility at the speed of typical mass transportation (approx. 60 km/h) in urban areas, and provides services through the wireless super-highway Internet and multimedia with higher transmission rates (uploading link up to 1 Mbps; downloading link up to 3 Mbps) [1].

The most critical features of portable Internet service that differentiate it from other services are the positioning function and availability of various terminals. As described in Table 1, portable Internet service is positioned in the intermediate zone between the super-highway Internet, wireless LAN, and the mobile Internet service. This niche market allows the securing of markets to enhance customer convenience via inter-operation with the existing telecommunication services. Since portable Internet service is available on alternative terminals such as smart phones, personal digital assistants (PDA), handheld PCs (HPC), and notebook computers, this type of Internet has the potential for digital convergence services [1], [6].

The results of the market survey demand for portable Internet service in Korea conducted by the Korea Information Strategy Development Institute estimate that approximately 9.3 million subscribers will generate three trillion, 200 billion won in revenue by the end of the fifth year after the initial commercialization of the services [1]. The results also indicate that stable profits are likely to be generated from portable Internet service by securing a reasonable volume of subscribers.

In the markets of portable Internet service in foreign countries, several recognized service providers such as ArrayCom, Navini, Flarion, and IPWireless have already succeeded in commercialization, and have provided the initial phase of fixed super-highway Internet services to areas showing a relatively poor utilization of super-highway Internet networks, such as Europe, Australia, and the U.S. In Korea, the 2.3 GHz bandwidth employed for wireless service subscribers (narrow-wireless local loop; N-WLL) has been reallocated to portable Internet service, and the Korean Telecommunications Technology Association is driving for the standardization of the technologies needed for such service. Systems for the service have been mainly developed by the Electronics and Telecommunications

Table 1. Comparison between portable Internet service and other conventional services.

	Super-highway Internet	Wireless LAN	Portable Internet	Mobile Internet
Location	Indoor	Indoor & outdoor (hot spot)	Indoor & outdoor	Indoor & outdoor
Transmission rate (per subscriber)	1 Mbps or more	1 Mbps or more	Approx. 1 Mbps or more	Approx. 0.1 Mbps
Mobility	Stationary	Walking	60 km/h or more	250 km/h or more
Terminal	Desktop PC, Notebook PC	Notebook PC, Handheld PC, PDA	Smart phone, PDA, Handheld PC, Notebook PC	Smart phone, PDA
Cell radius	-	Approx. 100 m	Approx. 1 km	1 to 3 km
Price system	Flat rate	Flat rate	Usage-based pricing, Flat rate	Usage-based pricing
Price level	Relatively low	Low	Relatively low	High

Research Institute (ETRI) of Korea and Samsung Electronics, and fully-fledged commercialization is expected in the first-half of 2006 [1]. Also, portable Internet service is expected to have severe competition with high-speed downlink packet access (HSDPA) adopting multiple-input multiple-output (MIMO) technology [7].

2. Analysis of Individual Characteristics and Review of the Preceding Studies

To secure a competitive edge, survival, and growth in an environment where rapid changes in customer needs and severe competition are the order of the day, a coordination of core corporate competence and support, and the development of new products and services are required. The secret to corporations surviving and growing into world-class and top-ranked companies is to develop new products and services faster and more efficiently than competitors, as well as the deployment of proper business strategies to satisfy the expectations and needs of customers by meeting the challenges from consistent technological evolution [4]. In particular, the success of the new services in a progressive environment with harsh competition and the evolutionary deployment of fixed-mobile convergence in telecommunication services are likely to be necessary for the growth of service providers, as well as for determining the structure of the competition.

However, few new products or services have succeeded in securing a critical mass and generating stable profits. While many new telecommunication services have been introduced based on technological evolution, most of the services have failed in the markets [2].

In order to succeed in these markets, several studies indicate that the new products or services should satisfy customer needs, provide customers with high utility values, and should be innovative and competitive, while their development process should be systematic and well-organized [2]. In addition, such products or services require marketing strategies that are appropriate for customer recognition and purchase decision-making by eliminating customer resistance, while strategies are required to enhance revenue during the introductory stages, thereby accelerating the growth rate and expanding the target markets [8], [9]. Therefore, a customer-oriented service development and business strategies are essential for portable Internet service to succeed in the markets once the services have been recognized as innovative.

Understanding individual characteristics such as demographics, usage behavior, and adoption attitudes is a prerequisite for developing customer-oriented service and defining a business strategy. Identifying customers by understanding their individual characteristics is a starting point for market analysis. Understanding customers is essential for establishing effective market strategies [9] since in general individual characteristics affect decision-making regarding adoption intentions [10], [11]. Together with environments, organizations, and interpersonal relationships, individual characteristics such as age, income, educational background, occupation, and social influence form the attitudes that underlie adoption intentions [12]. Therefore, identifying the personal characteristics of potential customers of portable Internet service is critical to the development of service and market creation. And identifying the characteristics helps the service provider to intensify marketing activity so that it can increase the level of consumer satisfaction [13].

Studies on the individual characteristics that affect adoption intentions have analyzed customer behavior and identified purchasing attitudes, while economics and the consumption of goods and services have also been analyzed, for example, Madden and Simpson [14]. In management information science, individual characteristics are selectively employed as external variables of the technology acceptance model, for

example, Igbaria [15] and Venkatesh and Morris [16]. Analyses of telecommunication service markets have been conducted by a few researchers since the mid-1990's.

For example, Madden and Simpson [14] analyzed the determinants of subscription to super-highway Internet service with respect to such personal characteristics of potential customers as income, occupation, and family size through logit models. Emmanouilides and Hammond [17], also using logit models, found a close relationship between Internet access and subscription term, place of utilization and preference on contents. A logit analysis of the determinants of the super-highway Internet service subscription was performed by Yun and Lee [18]. They indicated that the age of the head of the family, income, educational background, family size, number of teens, and apartment residency all have an effect on subscription. Kim and Lee [19] conducted empirical analysis of the effects of demographics such as age, education, occupation, and the cognitive characteristics of prior knowledge on adoption attitudes for portable Internet service using structural equation models. Park [20] conducted an empirical analysis on the effects of the characteristics of demographics such as age, occupation, educational background, marital status, and lifestyle on the utilization of mobile Internet service. Pagani [21] empirically identified the factors affecting utilization of third-generation mobile telecommunication services through the technology acceptance model, based on perceived usefulness and perceived ease of use.

Studies on the individual characteristics affecting use of portable Internet service have only been conducted recently, based on demographics and existing telecommunication service utilization. Ahn [22] undertook a logit analysis of subscription intentions and preferred terminal for portable Internet service that was based on survey data.

The study indicated the determinants of subscription intentions for portable Internet service including income, gender, occupation, type of terminal, and utilization. Male users, students, and notebook computer users in the Seoul metropolitan area prefer terminals other than mobile phones. An empirical analysis via a bivariate equation model conducted by Yu [23] suggests prior knowledge of portable Internet service, utilization of a mobile phone, gender, educational background, and income as common determinants of willingness to subscribe and the subscription term. Yu and Yang [24] and Kang, Cho and Lie [25] analyzed the willingness to pay for portable Internet service through the contingent valuation method usefully available for measuring demand and service value. And according to the study, the individual characteristics affecting the willingness to pay for portable Internet service are level of education and existing expenses for communication charges.

3. Study Objectives

This study aims to identify the determinants of adoption intentions for portable Internet service based on the results of the received analysis. Thus, the study empirically analyzes the effects of individual characteristics such as demographics, existing service usages, prior knowledge, adoption attitudes, and service evaluations on willingness to subscribe, subscription term, willingness to pay, type of usage, and preferred terminal of the portable Internet service. The main study objectives are as follows:

Study objective 1: To identify the individual characteristics that influence the willingness to subscribe, subscription term, and willingness to pay for portable Internet service;

Study objective 2: Comparison of the individual characteristics among potential customer groups based on usage type and preferred terminal.

III. Study Method

1. Data

This study analyzes the data obtained from a survey by a professional institute in September, 2004. The questionnaire surveyed 1010 adults aged over 15 and less than 49 residing in cities throughout Korea. The sample included the six metropolitan areas and Jeju Island. Interviews were conducted in a face-to-face method. Sampling was stratified by age group according to national census data in 2000.

As many respondents were not familiar with portable Internet service, and since such service had not been commercialized, respondents were provided with cards describing the service concepts and their important characteristics. The cards contained details of such characteristics as definition, available contents, transmission rate, maximum mobility speed, and areas where the services would be available. In particular, photos of the terminals were attached to the cards for further understanding. The questionnaire is based on standards set by the Korea Information Strategy Development Institute in January, 2004, using standard drafts determined by Korea's Telecommunications Technology Association.

2. Variables

The variables employed in this study are listed in Table 2. The independent variables are classified into the following categories: variables relating to demographic features such as gender (GEN), age (AGE)[1], residency in the Seoul metropolitan area (MET),

1) This paper included age squared (AGS) as an independent variable, and analyzed the factor to identify the non-linearity of the effects of age.

Table 2. Definition and statistics of variables.

Independent variables		Description	Mean	s.d.	Remarks
Demographics	GEN	Male=1, Female= 0	0.49	0.50	
	AGE	Respondent age (year)	31.70	9.21	
	MET	Residence in Seoul metropolitan city=1, Otherwise=0	0.41	0.49	
	MAR	Married=1, Unmarried=0	0.54	0.50	
	EDU	Years of schooling of respondent (year)	12.69	3.02	
	INC	Monthly mean income of household (10k won)	285.78	121.23	
	APT	Residence at apartment=1, Otherwise=0	0.48	0.50	
	SEL	Self-employed=1, Otherwise=0	0.18	0.38	
	SVC	Occupation sales/services=1, Otherwise=0	0.14	0.35	
	WHI	Occupation administrative/clerical/professional=1, Otherwise=0	0.21	0.41	
	UNI	University student(or graduate)=1, Otherwise=0	0.16	0.37	
	HWI	House wife=1, Otherwise=0	0.18	0.38	
Existing services usages	BRO	Super-highway Internet user=1, Otherwise=0	0.87	0.34	
	MOB	Mobile Internet service user=1, Otherwise=0	0.48	0.50	
	WLA	Wireless LAN user=1, Otherwise=0	0.03	0.17	
	CHA	Average communication charge per month (10k won)	14.57	7.10	
Prior knowledge	KNO	Prior knowledge of portable Internet service=1, Otherwise=0	0.32	0.47	
Adoption attitudes	INN	Innovative attitude toward communication services	2.82	0.96	
	SOC	Social influence toward communication services	3.55	0.87	
Service evaluations	USE	Assessment of usefulness of the portable Internet service	3.12	0.45	
	EAS	Assessment of ease of use of the portable Internet service	3.32	0.57	
Dependent variables		**Description**	**Statistics**		**Remarks**
Willingness to subscribe	SUB	Portable Internet service subscribed=1, Otherwise=0	1=36.9%, 0=63.1%		
Subscription term	TERM	Subscription term (month)	Mean=24.45, s.d.=15.46		Only those who are willing to subscribe to portable Internet are surveyed (SUB=1)
Willingness to pay	WTP	Willingness to pay monthly charge (10k won)	Mean=2.97, s.d.=1.53		
Usage type	TYPE	Replace existing Internet service=1, Parallel use=2, New use=3	1=48.4%, 2=44.6%, 3=7.0%		
Preferred terminal	DEVICE	Preferred terminal: Smart phone=1, PDA=2, HPC=3, Notebook PC=4	1=23.9%, 2=36.3%, 3=15.6%, 4=24.2%		

Note: s. d.=standard deviation

marital status (MAR), education (EDU), income (INC), apartment residency (APT), and occupation (SEL, SVC, WHI, UNI, HWI)[2]; variables relevant to the utilization of existing telecommunication services, including fixed broadband Internet service (BRO), mobile Internet (MOB), wireless LAN (WLA), and the average communication charge per month (CHA); variables indicating recognition of portable Internet service including prior knowledge (KNO), and adoption attitudes such as innovation (INN) and social influence (SOC); and service evaluations indicating perceived usefulness (USE) and perceived ease of use (EAS).

The dependent variables in this study consist of willingness to subscribe (SUB), subscription term (TERM), willingness to pay (WTP), usage type (TYPE), and preferred terminal (DEVICE). Discrete variables were employed for SUB in order to determine the willingness to subscribe to portable Internet service. Respondents were asked about the TERM after commercialization of portable Internet service, and their willingness to pay in terms of monthly subscription charges with regard to their willingness to subscribe to the services (SUB = 1). The usage type was classified into replacement of existing Internet services, parallel use with the existing services, and new use by customers; and the preferred terminal was classified into smart phone, PDA, HPC, and notebook computer.

2) The original survey data classifies the variables of occupation into nine categories; however, this paper employed five dummy variables with the highest response frequency from the respondents: self-employed (SEL), sales/services (SVC), administration/management, professionals, and clerical jobs (WHI), university students (UNI), and housewives (HWI).

Table 3. Analysis of willingness to subscribe, subscription term, and willingness to pay.

Dependent variables / Independent variables		Willingness to subscribe (SUB)		Subscription term (TERM)		Willingness to pay (WTP)	
		Binomial logit model		Multiple regression model		Multiple regression model	
		β	S.E	Standardized β	t-value	Standardized β	t-value
Demographics	GEN	0.11	0.19	-0.03	-0.68	-0.03	-0.66
	AGE	-0.12	0.08	0.52	1.44	0.21	0.57
	AGS	0.00	0.00	-0.50	-1.44	-0.22	-0.60
	MET	0.35	0.18**	0.02	0.39	-0.01	-0.19
	MAR	-0.27	0.29	-0.12	-1.65	-0.05	-0.62
	EDU	0.07	0.03**	0.02	0.44	-0.07	-1.46
	INC	0.00	0.00	-0.01	-0.18	0.19	3.79***
	APT	0.13	0.17	0.05	1.19	-0.05	-1.13
	SEL	-0.05	0.31	0.01	0.11	-0.07	-1.29
	SVC	0.48	0.32	-0.03	-0.48	-0.08	-1.42
	WHI	-0.08	0.31	-0.03	-0.52	-0.09	-1.42
	UNI	-0.09	0.30	-0.15	-2.67**	-0.11	-1.91*
	HWI	-0.58	0.35	0.04	0.78	-0.06	-1.02
Existing services usages	BRO	0.15	0.30	0.08	1.52	0.10	1.87*
	MOB	0.68	0.19***	0.01	0.20	-0.03	-0.66
	WLA	1.19	0.52**	-0.13	-2.89***	0.09	2.04**
	CHA	-0.12	0.01***	0.04	0.88	0.00	-0.02
Prior knowledge	KNO	0.42	0.17**	-0.03	-0.79	0.06	1.42
Adoption attitudes	INNO	0.29	0.09***	-0.12	-2.50**	-0.12	-2.52**
	SOC	-0.06	0.10	-0.02	-0.49	-0.03	-0.62
Service evaluations	USE	2.27	0.26***	-0.41	-8.79***	0.41	8.46***
	EAS	0.65	0.16***	-0.20	-4.41***	0.17	3.53***
Log likelihood , R^2		-933.51 (Log likelihood)		0.35 (R^2)		0.29 (R^2)	
Chi-Square value, F-value		394.84*** (Chi-Square value)		9.90*** (F-value)		7.87*** (F-value)	

Notes: * Significant at p<0.10, ** Significant at p<0.05, *** Significant at p<0.01.

IV. Results

1. Factors Affecting Willingness to Subscribe, Subscription Term, and Willingness to Pay

According to the results of the binary logit model reported in Table 3, the willingness to subscribe to portable Internet service depends on whether the respondents reside in the Seoul metropolitan area and whether they are more educated. Demographics such as age, marital status, income, residency type, and occupation are not important. Those currently using mobile Internet or wireless LAN, or those paying lower subscription charges for existing telecommunication services, are more likely to subscribe to portable Internet service. Prior knowledge or innovative adoption attitudes, an evaluation of service usefulness, and ease of use significantly affect the willingness to subscribe to the services. Use of fixed broadband Internet service and the adoption attitudes affected by social influence are not statistically significant.

The results of the survey imply that marketing activities that enhance cognition of usefulness and ease of use from prior knowledge of the services are appropriate as fundamental strategies for the creation of markets for portable Internet service, and should target potential customers with higher educational backgrounds residing in the Seoul metropolitan area who currently use Internet service in wireless environments and possess innovative adoption attitudes.

A multiple regression analysis of the subscription term indicates that university students, wireless LAN users, and

Table 4. ANOVA by use of the portable Internet service.

Independent variables		Replacement use (A)	Parallel use (B)	New use (C)	F-value	LSD
Demographics	GEN	0.59	0.57	0.38	2.05	A>C**, B>C*
	AGE	28.97	29.54	37.00	9.13***	A<C***, B<C***
	MET	0.35	0.49	0.12	8.72***	A<B***, A>C**, B>C***
	MAR	0.42	0.45	0.73	4.62**	A<C***, B<C***
	EDU	13.10	13.56	10.33	14.13***	A>C***, B>C***
	INC	292.78	288.55	257.69	0.91	-
	APT	0.54	0.48	0.27	3.44**	A>C**, B>C**
	SEL	0.11	0.14	0.37	3.76**	A<C***, B<C**
	SVC	0.22	0.12	0.08	3.73**	A>B**, A>C*
	WHI	0.23	0.25	0.12	1.09	-
	UNI	0.21	0.22	0.04	3.06**	A>C**, B>C**
	HWI	0.05	0.11	0.38	15.15***	A<B**, A<C***, B<C***
Existing services usages	BRO	0.99	1.00	0.00	4461.25***	A>C***, B>C***
	MOB	0.78	0.48	0.00	44.08***	A>B***, A>C***, B>C***
	WLA	0.07	0.05	0.00	1.13	-
	CHA	12.61	11.27	10.19	3.73**	A>B**, A>C**
Prior knowledge	KNO	0.37	0.43	0.38	0.82	-
Adoption attitudes	INNO	3.02	3.11	2.23	10.86***	A>C***, B>C***
	SOC	3.53	3.55	3.50	0.07	-
Service evaluations	USE	3.40	3.34	3.34	0.41	-
	EAS	3.49	3.53	3.66	0.89	-

Notes: * Significant at p<0.10, ** Significant at p<0.05, *** Significant at p<0.01.

those bearing innovative adoption attitudes and showing a higher service evaluation level are more likely to subscribe in an earlier period to portable Internet service.

Furthermore, a multiple regression analysis of willingness to pay by potential customers reveals that income and use of fixed broadband Internet service or wireless LAN are positively correlated with willingness to pay. However, university students and those with innovative adoption attitudes showed a lower willingness to pay.

Overall, the results indicate the possibility of achieving a critical mass for portable Internet service, and suggest a niche market, the execution of systematic business strategies for niche markets, and positioning for effective market creation and expansion. In particular, in-depth analysis is required to cultivate potential customer groups by using wireless LAN to demonstrate the new services to target customer groups. In addition, strategic pricing policies and discount systems may be necessary. Furthermore, demonstrations and subsidized terminal costs could be applied in order to cultivate university students as a customer group.

2. Comparison of Groups with Different Utilization and Terminal Preference

The relevant results of both a one-way analysis of variance (ANOVA) and post-hoc procedures by least significant difference[3] (LSD) for comparing individual characteristics between categorized groups based on preferred choice of terminal and usage type were as shown in Tables 4 and 5. A potential replacement and parallel use for the customer base of portable Internet service are the service business users of wireless Internet service with higher willingness to pay residing in the Seoul metropolitan area. New potential subscriptions are higher amongst females, elderly customers, residents outside the Seoul metropolitan area, married persons, those with a low-educational status, non-apartment residents, housewives, non-

3) In understanding the difference between multiple groups by ANOVA, it is impossible to identify the occurrence of any significant difference from a particular group. Therefore it is possible to apply post-hoc tests, which is one of the multiple comparison methods by LSD. LSD is a method to compare the difference between two sub-level groups belonged to the entire large-level group [26].

Table 5. ANOVA by portable Internet service terminal.

Independent variables		Smart phone	PDA	HPC	Notebook PC	F-value	LSD
Demographics	GEN	0.47	0.50	0.64	0.72	5.34***	A < C**, A, B < D***, B < C*
	AGE	28.88	29.92	29.97	30.38	0.43	-
	MET	0.30	0.38	0.53	0.43	2.88**	A < C***, A < D*, B < C**
	MAR	0.40	0.48	0.41	0.48	0.62	-
	EDU	12.96	13.26	12.78	13.24	0.48	-
	INC	280.90	280.37	311.21	293.33	0.99	-
	APT	0.51	0.50	0.41	0.53	0.70	-
	SEL	0.16	0.11	0.17	0.13	0.56	-
	SVC	0.11	0.19	0.21	0.14	1.19	-
	WHI	0.26	0.19	0.24	0.27	0.88	-
	UNI	0.20	0.21	0.19	0.21	0.37	-
	HWI	0.14	0.11	0.08	0.05	1.42	A > D**
Existing services usages	BRO	0.88	0.93	0.97	0.94	1.72	A < C**, A < D*
	MOB	0.62	0.59	0.60	0.57	0.18	-
	WLA	0.04	0.05	0.05	0.09	0.64	-
	CHA	12.02	11.93	12.33	11.21	0.56	-
Prior knowledge	KNO	0.42	0.42	0.38	0.36	0.40	-
Adoption attitudes	INNO	2.92	2.98	3.17	3.03	0.94	-
	SOC	3.58	3.46	3.72	3.50	1.75	B < C**, C > D*
Service evaluations	USE	3.31	3.37	3.38	3.41	0.35	-
	EAS	3.47	3.55	3.48	3.53	0.42	-

Notes: * Significant at $p < 0.10$, ** Significant at $p < 0.05$, *** Significant at $p < 0.01$.

university students, and non-subscribers to existing Internet services, as well as those with non-innovative adoption attitudes.

Groups preferring smart phones and PDAs for portable Internet service have different individual characteristics to those using HPCs and notebook computers. Male customers residing in the Seoul metropolitan area who are fixed broadband Internet service customers dominate the groups preferring HPCs or notebook computers. A greater percentage of housewives appear in the group preferring smart phones to notebook computers.

In short, there is no significant difference among the groups as far as the choice of terminal is concerned, and the groups showing a preference for smart phones and PDAs also show similarity. Furthermore, the groups preferring HPCs and notebooks are also closely related to each other. A possible reason for this result could be that the functions and convenience of the terminals have not been fully recognized since the PDA and HPC have not yet been popularized.

V. Conclusions and Further Research

1. Summary and Suggestions of Study

This study identifies the individual characteristics and determinants of adoption intentions for portable Internet service. The results suggest the following:

First, factors affecting adoption intentions towards portable Internet service include demographics, prior knowledge, existing services usages, adoption attitudes, and evaluations of the service. It is necessary to consider customer characteristics in order to establish business strategies such as identifying potential customers, analyzing customer needs and desired convenience, developing killer applications, and expanding markets [4].

Second, individual characteristics influence the willingness to subscribe, subscription term, willingness to pay, usage type, and terminal preference. This suggests that the portable Internet service markets are heterogeneous. Thus, strategic positioning in

accordance with market phases is required [27]. In particular, a niche market should be developed in a more systematic manner to reflect the demographics, utilization, adoption attitudes, prior knowledge, and service evaluations of potential customers.

Third, among existing Internet services, users of mobile Internet and wireless LAN are the core customer base for portable Internet service. In particular, wireless LAN users have a relatively high likelihood of early subscription during the introduction and growth phases. As such, it is important to review the satisfying factors and identify the causes of any complaint. For this group it is necessary to understand the factors relating to the location of use, time, and applications.

Fourth, prior knowledge of portable Internet service affects adoption intentions. Prior knowledge is a prerequisite for forming adoption attitudes and behaviors, and this study empirically analyzes this hypothesis. To accelerate the market expansion of portable Internet service, cognition and knowledge of the users for service characteristics, service differentiation, ease of use, usefulness, and convenience can be enhanced through advanced marketing and advertisement.

Fifth, Goldsmith, and Hofacker [28] stress that innovation significantly affects the acceptance rate of a new service. Accordingly, since portable Internet service has not yet been commercialized, marketing efforts should analyze with greater precision the characteristics and needs of potential customers with innovative attitudes [29].

Finally, evaluations of the usefulness and ease of use of new telecommunication services describing the technology acceptance model are also applied to portable Internet service.

2. Further Study

Understanding potential customers is a prerequisite for creating markets and establishing business strategies for portable Internet service. This study analyzes and suggests the individual characteristics of potential customers for portable Internet service in a multi-dimensional manner, and is meaningful in terms of its practicality since it can be utilized for defining the core concept of the services, strategic positioning, measures for cultivation of the main customer groups, market diversification, expansion strategies by phases in life cycle, defining strategic footholds, service deployment strategies, and securing niche markets.

This study introduced several individual characteristics that particularly influence the decision to subscribe including adoption attitudes, prior knowledge, and service evaluations. Furthermore, this study systematically defines the relationship among individual characteristics, adoption intentions, and utilization through explanatory variables. In particular, this study analyzes the innovative behavior and social influence on the adoption of new telecommunication services.

Direction for further study indicates the following:

First, individual characteristics affecting adoption intentions require further analysis in a more diversified approach. In particular, social psychology and lifestyle are needed to identify potential needs, behaviors, and relevant services.

Second, further study should identify the effects of non-satisfaction and improvement of the existing telecommunication services on the decision to subscribe to portable Internet service.

Finally, in a future study a comparison analysis of the pre/post-commercialization of service will contribute to an efficient prediction of new telecommunication market development.

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