Identifying Factors Affecting Behavioral Intent of Potential and Existing N-screen Service Users

Bo-Ram Kwon, Sunghan Ryu, and Young-Gul Kim

With recent advances in media technology, the creation of a relatively new service, N-screen, has been realized. N-screen provides seamless connections among various media and enables users to enjoy entertainment content at any time and any location. With such recent advances comes opportunity; therefore, for those N-screen service providers who have established an early edge in the ICT industry, it is imperative that they maintain this and stay ahead of the ensuing competition. In this context, the objective of this study is two-fold; first, we aim to find factors influencing the behavior of existing and potential N-screen service users, and then second, to examine the differences in how these factors operate within the two user types. The results of this study show that the perceived value and subjective norm are important influencers in both user types. However, price fairness and innovativeness are only influential on the attitude and intention of potential users, while some aspects of media usage have only significant influences on the behavior and loyalty of existing users. Based on these results, we provide some implications for both researchers and practitioners who wish to better understand the nature of N-screen users.

Keywords: N-screen, theory of reasoned action, customer loyalty, intent to use, media use.

I. Introduction

The ICT industry has recently been facing a big change. The *smart* revolution, which started with the introduction of smartphones, is spreading into tablets and smart TVs, and the boundaries between broadcasting, telecoms, and Internet industries have disappeared. Consequently, the division among media including TVs, PCs, and mobile devices is becoming obscured. In this situation, with the advance of cloud computing technology, people can simultaneously access the same broadcasting content (for example, a movie) on different devices — such a feat is made possible through a service called N-screen. N-screen distributes the same content across a variety of platforms. For example, Netflix users can enjoy the content that they have paid for through different devices (TVs, PCs, tablet PCs, smartphones, etc.), even at the same time. N-screen represents a media environment where content can be approached and consumed at any time and any location regardless of the device or platform. The introduction of N-screen affects not only the broadcasting sector but also the ICT industry as a whole.

N-screen is still at the expansion phase owing to several shortcomings, such as device specifications, content security, and inadequate storage. However, the outlook on the service is affirmative, and a rapid growth supported by a consistent smart revolution in ICT technology is predicted. People can be expected to become increasingly familiar with having the same content displayed on screens of different sizes [1]. Hence, global IT companies, such as Google and Apple, have recognized the importance of the service and joined the competition, and media and telecom companies are already focusing on this service. In this context, it is critical for N-screen service providers to obtain leadership in acquiring new

customers and to then subsequently build up relationships with their new customers. In the current research, we therefore intend to uncover the important factors influencing the subscription intent and loyalty of potential users toward the service. We will do this by investigating existing users of the service and by using previous studies that have also considered factors influencing the demand for a new technology or service. In addition, for more meaningful suggestions to researchers and stakeholders related to this service, two different research models are possible: a potential user model, and an existing user model. Moreover, the implications from each and a comparison of their results are described in this paper.

II. Literature Review

1. Concept of N-screen Service

The "3-Screen Play" service, which AT&T first introduced in 2007, is the representative antecedent of N-screen. The term "N-screen" originates from the combination of the letter "N," which represents an unknown number, or the abbreviation of the word "network," and the word "screen." For the purposes of the current research, N-screen is defined as a technology or service that enables user to enjoy multimedia content (movies, music, etc.) on various devices (TVs, PCs, smartphones, etc.) through a seamless viewing experience.

Many previous researches, such as Brynjolfsson and others [2]–[3] and Stahl and Mass [4], discuss the impact of device diversity on content usage and purchase behavior. Sweeney and Crestani [5] stressed that the variety of devices available today has increased the need for better user experiences. Smith and Telang [6] show that the variety of screen types available clearly impacts upon the possibility of purchasing paid content online, since users with various screen types have more opportunities to use services, such as those offered by N-screen.

2. Theory of Reasoned Action (TRA)

The TRA, proposed by Fishbein and Ajzen [7], has received significant attention in many research fields where a person's behavior has to be comprehended [8]–[9]. The TRA is based on the premise that a certain behavior (B) of an individual is decided based on the individual's behavior intention (BI), while the BI is determined based on the individual's attitude (A) and the subjective norm (SN) of their behavior.

With modifications of the TRA, Davis and others [10] introduced the Technology Acceptance Model (TAM). Davis and others considered the TRA to be an inapplicable theory to certain belief and behavior standards, especially in the context of new technology adoption. Hence, he proposed the concept of perceived utility and perceived ease of use (PEU) based on an individual's specific belief.

Ajzen [11] also further developed the TRA and proposed the theory of planned behavior (TPB). The concept of perceived behavioral control was included in the TRA, which can be explained as an individual's perception of whether practicing a certain behavior is difficult or easy.

The TRA, through modifications and extensions, has been used in various researches exploring consumer behavior in adopting new services, such as Internet shopping [12] and Internet banking [13].

3. Customer Loyalty

The concept of customer loyalty is largely divided into three perspectives: behavioral, attitudinal, and cognitive [14]. In early research on customer loyalty, the behavioral perspective was conceptualized as a single dimension, such as purchase proportion, repeat purchases, purchasing order, and purchase possibility [15]–[16]. However, it only considers the purchase decision and behavior as factors of customer loyalty; hence, it cannot distinguish spurious customer loyalty from true loyalty [17]–[18].

Attitudinal customer loyalty is defined as the will to refer a service provider to other users, and it represents a positive attitude toward a product or service [19]. This perspective of customer loyalty can be measured based on preference, intent to suggest the service to others, intent to repurchase, willingness to pay a premium, and constancy of preference and has received more attention as an alternative to a behavioral perspective [17]; Pritchard [20] argued it is the most proper way to explain the psychological immersion toward a brand. For a more sufficient explanation of customer loyalty, however, many researchers proposed the concept of a comprehensive perspective including both behavioral and attitudinal perspectives. A.S. Dick and K. Basu emphasized that customer loyalty is meaningful only when both conditions are met [18].

Lastly, we come to the cognitive perspective, which has recently been receiving a significant amount of attention. This perspective places emphasis on the product or service that first comes to a customer's mind (among the many alternatives) when making a purchasing decision [21]–[22].

In addition, many researches on customer loyalty have been conducted on new media, including the Internet and mobile services. Anderson and Srinivasan [15] defined e-loyalty as a customer's positive attitude toward an online business, which leads to repeat purchase behaviors. In their study, they verified the relationship between quality, satisfaction, and loyalty. In addition, in another study, which was about an online data

system, they argued that customer satisfaction for the system was dependent upon the quality of the data provided by the system and that such satisfaction enhanced the emotional attachment and loyal behavior (repeat purchases, continual use, and referrals) [23].

III. Hypotheses

As a framework for the research model, the TRA was chosen. Since the context of this study is media consumption, where social influence is critical, it is required to examine the effect of SNs. In the case of perceived behavioral control, however, it's not appropriate to the study because it not only focuses on potential users but also on existing users who have already adopted the service.

In the current study, two research models were set up: a potential user model and an existing user model. The independent variables for both models are similar: SQ, PEU, fairness of price, (expected/perceived) value, innovativeness, and current use of media (PC, smartphone, table PC, and TV). In addition, attitude toward the N-screen service and willingness to subscribe were chosen as dependent variables for the potential user model, whereas usage level and customer loyalty were used for the existing user model.

1. Service Attributes

A. Service Quality (SQ)

SQ refers to the degree in which a user can use a system stably and efficiently. Previous research has repeatedly proven that service quality has a direct impact on customer value [24]–[25].

H1-1: The perceived quality of N-screen has a positive influence on the expected value of potential users.

H1-2: The perceived quality of N-screen has a positive influence on the perceived value of existing users.

B. Ease of Use

PEU is the extent to which a user believes that less physical and mental effort will be spent when using the service [10]. According to past research, services that are easy to use have a higher usage rate compared to those that are not [10]–[11], [26].

H2-1: The PEU of N-screen has a positive influence on the expected value of potential users.

H2-2: The PEU of N-screen has a positive influence on the perceived value of existing users.

C. Price Fairness (PF)

PF is a concept that includes cognitive and emotional evaluations employed by the purchaser to judge whether the asking price is reasonable [27]. Forman and others [28] selected factors determining purchase behavior differences in a traditional multichannel environment from price. In the context of expansion of the paid media, price is an important factor affecting the choice of new services. Hence, PF is thought to be a good indicator of a consumer's evaluation of a service.

H3-1: The perceived PF of N-screen has a positive influence on the expected value of potential users.

H3-2: The perceived PF of N-screen has a positive influence on the perceived value of existing users.

2. Value (VAL)

The expected value is the degree to which an object is regarded as possessing a certain benefit, and thus generating the expected output [29]. The expected value of new technology is an important factor in discovering the demand for the technology [30]. Similarly, the perceived value is a generic concept used when the user judges whether to purchase a product or use a service. It acts as a standard when the user evaluates the need and importance of the product or service.

H4-1: Expected value of N-screen has a positive influence on the attitude of potential users.

H4-2: Perceived value of N-screen has a positive influence on the usage degree of existing users.

3. Innovativeness (INN)

The factors related to personal attributes, such as innovativeness, self-efficacy, and knowledge level, are important influencers in decision making [31]. Among them, innovativeness is one of the most important factors in accepting a new technology because it indicates how quickly an individual accepts a new product or service relative to others [32]. Because people with a high level of innovativeness are risk takers, they have a positive intent on the acceptance of new services, which plays an important role in their decisions [33].

H5-1: The level of innovativeness has a positive influence on a potential user's attitude toward N-screen.

H5-2: The level of innovativeness has a positive influence on an existing user's usage degree of N-screen.

4. Current Use of Media

The use of new media is not an independent behavior, but has a deep relationship with a person's existing media usage [34]. New media may replace existing media [35], complement them [36], or have no impact at all [37]. There has been increasing interest on these relationships and how users utilize such complex media combinations in the era of multi-

media and multiple channels [38]. From this perspective, N-screen is at the center of the multi-media and multi-channel context. Therefore, it can be expected that the usage degree of existing media, such as PCs, smartphones, tablet PCs, and TVs, will have an impact on the use of N-screen.

H6-1: The usage degree of existing media (PC, smartphone, tablet PC, or TV) has a positive influence on a potential user's attitude toward N-screen.

H6-2: The usage degree of existing media (PC, smartphone, Tablet PC and TV) has a positive influence on an existing user's usage degree of N-screen.

5. SN

In a TRA, SN refers to the aspect of social influence on an individual's decision making, whereas TAM only considers a users' internal factors. It argues that the possibility of innovation diffusion increases when people believe that other members in their social group are accepting the innovation [11]–[12]. In particular, Rogers [32] discovered that when late adopters accept a new or unfamiliar product or service, they are heavily influenced by those around them.

H7-1: The SN regarding N-screen has a positive influence on a potential user's intent to adopt N-screen.

H7-2: The SN regarding N-screen has a positive influence on an existing user's usage degree of the service.

6. Attitude (ATT) and Intention

Attitude is a general expression of a positive or negative emotion toward a certain object. In TAM, Davis and others [10] argued that an individual's attitude has a direct influence on their acceptance of a technology, and many subsequent researches based on TRA and TAM have discovered the correlation between attitude and the intent to use (IU) a technology [12]–[13].

H8-1: A potential user's attitude toward N-screen has a positive influence on their intent to adopt the service.

7. Usage (USE) and Loyalty (LOY)

Users can strengthen or alter their attitude toward a new technology based on information acquired through their experience with the technology. In addition, the psychological motivation derived from the usage experience plays an important role in the attitude and behavior after the acceptance [39]. Previous research discovered that the usage degree of a certain service has a positive relationship with the intent to continually use the service [40].

H8-2: An existing user's usage degree of N-screen has a positive influence on their loyalty to the service.

IV. Methodology

1. Data

For this research, two separate surveys targeting potential users and existing users of N-screen were conducted. For the survey of potential users of the service, researchers polled only those graduate students and members of the general public who had had no previous experience with N-screen. The subjects were collected through social media and online messengers under the assumption that they were potential subscribers. The other survey, on existing users, was executed using subjects selected from an online panel service and who are current users of N-screen. Prior to the main survey, pilot tests with ten subjects for each survey were conducted to correct inaccurate expressions and check the need for further explanations.

2. Measurement

The definition and measurement method of each variable used in the current research is described in Table 1. The measurement items for variables were adapted from related references and then modified to suit the purpose of the research. In addition, other information, including service name, usage period, media of use, payment record, and viewing genre, was also collected to better understand the behavior of existing users.

V. Results

1. Sample

A. Potential Users

A total of 303 subjects participated in the survey, and among them, responses from three participants were eliminated owing to a lack of data quality. Hence, the analysis was conducted based on a dataset comprising the 300 subjects. The largest age group of the dataset was the group representing those who were in their 20s (74.7%). The second-largest group was that which represented those who were in their 30s. There were 13 teenage (aged between 10 and 19 years) participants (3.3%) and ten participants in their 40s (3.3%). The proportion of those in their 20s and 30s is high not only because the population of the survey was made up of mainly undergraduate students, graduate students, and users of a social media network, but also because this age group is made up of heavy users of smart devices who have a high interest in new media. There were 169 male participants (56.3%) and 131 female participants (43.7%). Over 50% of the participants were undergraduate/graduate students, following the demographics of the population, followed by those with administrative/

Table 1. Definitions and measurements of variables.

Variable	Operational definition	Measure item(s)	Sources
SQ	Extent to which the delivered service level matches a customer's expectation.	Video quality (clarity, seamlessness) Loading rate	A. Parasuraman et al. (1985)
PEU	Extent to which a person believes that using the service will be effortless.	Easy to sign up Easy to use the service Easy to pay	F.D. Davis (1989)
PF	Degree to which a consumer evaluates a price as reasonable to accept	PF of monthly pay PF of each VOD purchase	L. Xia et al. (2004)
VAL	Individual's perceived benefit of performing a particular behavior	Elimination of time constraints Elimination of place restriction Joyfulness Device shifting Diversity of channel selection	P. Palmgreen and J.D. Rayburn (1982), J.J. Galloway (1981)
INN	Extent to how quickly an individual accepts a new product or service relative to others	Acceptance of new technology Interest in new technology	E.M. Rogers (2010)
PC usage (PU)	Degree to which a consumer uses a PC	Average hours of PC use per day	R. Fidler (1997), K. Van Rees and K. Van Eijck (2003)
Smartphone usage (SU)	Degree to which a consumer uses a smartphone	Average number of apps used daily	
Tablet usage (TU)	Degree to which a consumer uses a tablet	Average hours of tablet use per day	
TV viewing (TV)	Degree to which a consumer watches TV	Average hours of TV viewing per day	
SN	Individual's perception about a particular behavior, which is influenced by the judgment of significant others	Use of referent group Possibility to use upon recommendation Trend following	I. Ajzen (1991), E.M. Rogers (2010)
ATT	Individual's positive or negative evaluation of self-performance of a particular behavior	Preference for service Interest in service	F.D. Davis (1989), V. Venkatesh et al. (2003)
IU	Strength of an individual's behavioral intention about using N-screen service	Possibility to sign up Possibility to sign up and have access to content	F.D. Davis (1989), V. Venkatesh et al. (2003)
USE	Degree to which a consumer uses N-screen service	Average hours of N-screen service use per day Average days of N-screen service use per week	A. Bhattacherjee (2001), R. Agarwal and J. Prasad (1998)
LOY	Strength of a consumer's preference for a particular brand and a commitment to repeatedly purchase that brand in the face of other choices	Intention to suggest to others Intention to continually use	A.S. Dick and K. Basu (1994)

managerial jobs and then professionals/freelancers.

B. Existing Users

Data on 311 subjects was collected, and all datasets were judged to be usable. The largest age group was that which represented those who were in their 20s. The second-largest group was the "30-39" group. There were 66 participants in their 40s (21.2%) and 24 participants in their 50s (7.7%). The participants' gender and age-group ratios reflected those of real N-Screen service users, and teenage participants were excluded owing to limitations in the survey. There were 181 male participants (58.2%) and 130 female participants (41.8%). Most of the participants have administrative/managerial jobs, following the demographics of the population, the majority of

whom are in their 20s and 30s, followed by professionals/freelancers and undergraduate/graduated students.

2. Test of Measurement Model

An analysis for checking the reliability and validity of the instrument was conducted to examine whether the survey items are appropriate and in accordance with the purpose of the research. The reliability was evaluated using Cronbach's alpha (α) and composite reliability. In the case of Cronbach's alpha, all variables scored a high value of over 0.7, with a composite reliability of over 0.8; thus, the reliability of the measurement tools was verified [41]. The validity was evaluated from a confirmatory factor analysis and average variance expected (AVE). Through the analysis, items with a factor loading of less

Table 2. Reliability and validity analysis results (potential user model).

	CR	CA	AVE	PU	TV	TU	SU	PF	IU	VAL	PEU	SQ	SN	ATT	INN
PU	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TV	–	–	–	–0.0260	–	–	–	–	–	–	–	–	–	–	–
TU	–	–	–	0.1021	0.0440	–	–	–	–	–	–	–	–	–	–
SU	0.9416	0.9072	–	0.1518	–0.0257	0.2132	–	–	–	–	–	–	–	–	–
PF	–	–	0.9172	0.1663	–0.0728	0.0187	–0.0011	0.8878	–	–	–	–	–	–	–
IU	0.9172	0.8628	0.9600	0.0776	–0.0700	0.0507	–0.0446	0.2492	0.9258	–	–	–	–	–	–
VAL	0.9111	0.8768	0.9111	0.1358	–0.1208	0.0413	–0.0355	0.3677	0.5473	0.8207	–	–	–	–	–
PEU	0.8998	0.8334	0.8998	0.0986	–0.1806	0.0888	0.1273	0.2189	0.4081	0.5545	0.8659	–	–	–	–
SQ	0.9331	0.8566	0.9331	–0.0493	–0.0620	0.0531	–0.0948	0.1239	0.3634	0.4306	0.3529	0.9352	–	–	–
SN	0.8816	0.7992	0.8816	–0.0273	0.0012	0.0200	–0.0374	0.3228	0.5623	0.3525	0.2197	0.3000	0.8444	–	–
ATT	0.9637	0.9247	0.9637	0.1616	–0.0837	–0.0344	–0.0269	0.3208	0.5366	0.7213	0.4892	0.3883	0.2441	0.9643	–
INN	0.9600	0.9444	0.9416	0.2327	–0.1853	0.1446	0.1728	0.1098	0.3535	0.3221	0.4383	0.1548	0.2153	0.3581	0.9183

Table 3. Reliability and validity analysis results (existing user model).

	CR	CA	AVE	PU	TV	TU	SU	PF	USE	PEU	SQ	SN	VAL	LOY	INN
PU	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TV	–	–	–	0.1866	–	–	–	–	–	–	–	–	–	–	–
TU	–	–	–	0.2388	0.2399	–	–	–	–	–	–	–	–	–	–
SU	0.9235	0.8345	–	0.0402	0.2373	0.2467	–	–	–	–	–	–	–	–	–
PF	–	–	0.8507	0.0157	0.0980	0.2503	0.0668	0.9223	–	–	–	–	–	–	–
USE	0.9447	0.9140	0.7390	0.3133	0.2875	0.3088	0.1903	0.2536	0.8597	–	–	–	–	–	–
PEU	0.9236	0.8966	0.7683	0.0955	0.1169	0.1257	0.2177	0.2106	0.1686	0.8765	–	–	–	–	–
SQ	0.9086	0.8492	0.8578	0.2390	0.1615	0.1972	0.1708	0.2911	0.2668	0.5693	0.9262	–	–	–	–
SN	0.9097	0.8538	0.7564	0.1127	0.2065	0.3871	0.2012	0.4777	0.4004	0.2738	0.2745	0.8697	0.9097	–	–
VAL	0.9030	0.8412	0.7077	0.2118	0.1566	0.1176	0.1967	0.1656	0.2946	0.6725	0.5738	0.3161	0.8412	–	–
LOY	0.8498	0.6489	0.8654	0.2300	0.1865	0.2048	0.2993	0.2424	0.4249	0.5541	0.5361	0.4496	0.7494	0.9303	–
INN	0.9278	0.8459	0.7705	0.1668	0.1855	0.1792	0.3594	0.1710	0.2896	0.5027	0.4668	0.2640	0.5656	0.6385	0.8778

than 0.6 and those that are attributable to other factors, are excluded. AVE exceeds the 0.5 threshold suggested by Fornell and Larcker [42], and the square root of each factor's AVE is higher than the correlation coefficient value of the other factors. Therefore, the convergent validity and discriminant validity were both verified [42]. Tables 2 and 4 and Tables 3 and 5 show the results of the reliability and validity analysis in each research model, respectively.

3. Structural Model

In this research, the partial least square (PLS) is used for the path analysis. Since the PLS is assumed according to the method of approach based on the components, the requirements of the sample size and residual distribution are relatively more lenient, which enables simultaneous evaluations of the structural and measurement models [43]. PLS is appropriate where a causal relationship exists between the measurement item and the construct, and it is widely employed as an analysis tool for researches in information technology [41].

The t-value is derived from a subsample from the bootstrap provided by the PLS; bootstrap is a technique that extracts replicated samples that include *n* observed values from the actual sample. The recommended number of subsamples is more than 200 [44] or more than and 1,000 [45], and in this research, 1,000 were carried out.

Table 4. Factor loading results (potential user model).

Item	PF	IU	VAL	PEU	SQ	SN	ATT	INN
PF1	0.942	0.209	0.339	0.183	0.117	0.268	0.277	0.074
PF2	0.942	0.245	0.368	0.215	0.103	0.277	0.294	0.097
PF3	0.768	0.211	0.262	0.186	0.115	0.334	0.291	0.131
IU1	0.254	0.940	0.556	0.427	0.343	0.510	0.569	0.371
IU2	0.190	0.929	0.458	0.355	0.361	0.529	0.429	0.345
IU3	0.231	0.927	0.510	0.374	0.334	0.542	0.473	0.298
IU4	0.244	0.907	0.497	0.351	0.310	0.503	0.509	0.294
VAL1	0.319	0.458	0.867	0.432	0.339	0.292	0.578	0.255
VAL2	0.303	0.444	0.865	0.442	0.390	0.287	0.584	0.272
VAL3	0.324	0.555	0.877	0.516	0.403	0.385	0.673	0.323
VAL4	0.298	0.344	0.762	0.501	0.278	0.150	0.607	0.252
VAL5	0.260	0.436	0.719	0.366	0.355	0.331	0.498	0.206
PEU1	0.140	0.430	0.497	0.892	0.366	0.242	0.448	0.319
PEU2	0.245	0.352	0.518	0.882	0.296	0.163	0.485	0.517
PEU3	0.180	0.266	0.417	0.822	0.249	0.164	0.323	0.284
SQ1	0.094	0.321	0.408	0.345	0.937	0.256	0.390	0.118
SQ2	0.138	0.360	0.397	0.315	0.933	0.305	0.336	0.172
SN1	0.257	0.433	0.247	0.123	0.195	0.832	0.143	0.178
SN2	0.274	0.467	0.304	0.209	0.306	0.832	0.215	0.136
SN3	0.285	0.519	0.335	0.217	0.255	0.868	0.251	0.227
ATT1	0.307	0.476	0.694	0.450	0.361	0.219	0.962	0.322
ATT2	0.312	0.557	0.697	0.493	0.387	0.251	0.966	0.367
INN2	0.105	0.349	0.315	0.387	0.167	0.205	0.303	0.906
INN3	0.106	0.322	0.277	0.410	0.114	0.213	0.329	0.935
INN4	0.092	0.306	0.297	0.409	0.147	0.177	0.351	0.914

Table 5. Factor loading results (existing user model).

Item	PF	VAL	PEU	SQ	USE	SN	LOY	INN
PF1	0.952	0.191	0.235	0.295	0.276	0.467	0.267	0.216
PF2	0.935	0.132	0.169	0.257	0.243	0.424	0.218	0.150
PF3	0.878	0.116	0.159	0.243	0.160	0.425	0.164	0.073
VAL1	0.122	0.873	0.586	0.456	0.224	0.203	0.591	0.464
VAL2	0.070	0.840	0.550	0.425	0.211	0.205	0.610	0.463
VAL3	0.172	0.866	0.617	0.539	0.324	0.266	0.701	0.545
VAL4	0.144	0.814	0.526	0.458	0.228	0.315	0.634	0.465
VAL5	0.181	0.811	0.542	0.525	0.240	0.340	0.608	0.433
PEU1	0.170	0.578	0.875	0.487	0.145	0.282	0.484	0.410
PEU2	0.178	0.593	0.886	0.531	0.123	0.196	0.490	0.441
PEU3	0.206	0.596	0.869	0.479	0.175	0.243	0.483	0.470
SQ1	0.274	0.552	0.520	0.932	0.252	0.259	0.507	0.449
SQ2	0.264	0.510	0.535	0.920	0.242	0.249	0.485	0.414
USE1	0.278	0.208	0.125	0.231	0.884	0.361	0.343	0.209
USE2	0.148	0.307	0.169	0.228	0.835	0.326	0.393	0.297
SN1	0.413	0.280	0.206	0.214	0.302	0.847	0.383	0.262
SN2	0.405	0.336	0.302	0.270	0.396	0.887	0.456	0.266
SN3	0.435	0.177	0.183	0.224	0.335	0.875	0.304	0.135
LOY1	0.262	0.662	0.509	0.518	0.411	0.472	0.944	0.633
LOY2	0.182	0.742	0.525	0.477	0.378	0.354	0.916	0.548
INN1	0.247	0.470	0.429	0.409	0.303	0.296	0.547	0.882
INN2	0.100	0.522	0.451	0.433	0.222	0.226	0.578	0.890
INN3	0.067	0.508	0.450	0.387	0.220	0.148	0.563	0.861

A. Potential Users

The path coefficients and hypothesis test results of potential users are shown in Table 6 and Fig. 1, respectively. The SQ, ease of use, and PF have an influence on the expectancy value of the potential users of N-screen. Among the independent variables, the innovativeness and expectancy values had significant influences on attitude toward N-screen with a significance level of 0.01. The use of a tablet is significant at a level of 0.05, but the use of a smartphone or TV does not have much influence. Finally, hypotheses on the influence of attitude and SN on the intention to subscribe were accepted at a 0.01 significance level.

B. Existing Users

The path coefficients and hypothesis test results of existing users are shown in Table 7 and Fig. 2, respectively. The SQ and

Table 6. Path coefficients (potential user model).

Path	Coefficients	S.E.	T statistics
SQ → VAL	0.255	0.094	2.712**
PEU → VAL	0.411	0.087	4.669**
PF → VAL	0.246	0.083	2.940**
INN → VAL	0.151	0.097	1.549**
VAL → ATT	0.673	0.082	8.117**
PU → ATT	0.047	0.077	0.610
SU → ATT	–0.017	0.075	0.225
TU → ATT	–0.087	0.071	1.205*
TV → ATT	0.030	0.069	0.433
ATT → IU	0.425	0.081	5.266**
SN → IU	0.459	0.075	6.035**

**p < 0.01 *p < 0.05

ease of use have an influence on the expectancy value with a significance level of 0.01, but PF did not have an influence.
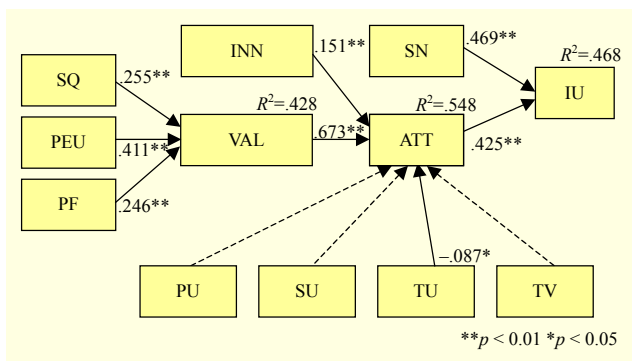
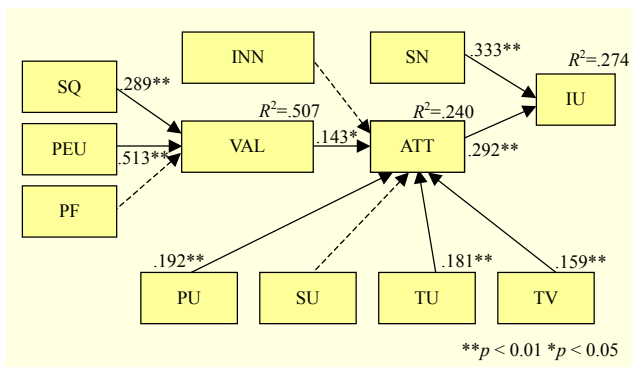Fig. 1. Structural model analysis (potential user model).

Fig. 2. Structural model analysis (existing user model).

Table 7. Path coefficients (existing user model).

Path	Coefficients	SE	T statistics
SQ → VAL	0.289	0.132	2.187**
PEU → VAL	0.513	0.125	4.099**
PF → VAL	−0.0267	0.079	0.337**
INN → VAL	0.102	0.116	0.877**
VAL → USE	0.143	0.120	1.191*
PU → USE	0.192	0.118	1.622**
SU → USE	0.035	0.100	0.354
TU → USE	0.181	0.105	1.730**
TV → USE	0.159	0.111	1.427**
USE → LOY	0.292	0.098	2.961**
SN → LOY	0.333	0.093	3.561**

**$p < 0.01$ *$p < 0.05$

Among the independent variables, the perceived values for the use of a PC, tablet, or TV have an influence on the use of N-screen at a significance level of 0.01 to 0.05, but the innovativeness and use of a smartphone did not have an influence. Finally, hypotheses on the influence of usage and SN on loyalty were accepted at a 0.01 significance level.

VI. Conclusion

Several researches have figured out that there is a difference in the expectation of a service before and after its use [46]–[47]. Our research discovered factors that impact upon the use of N-screen and revealed the differences in how these factors affected potential and existing users of the service. In terms of the value and impact of N-screen upon users, we could see clear differences between existing and potential users. Existing users having had some time to learn about and get used to the new service tended to then change their perceptions of the service. For example, price fairness (PF) of the service was no longer an influential factor for existing users, since they have agreed to the service's price structure, yet this was something that still mattered to potential users.

Two meaningful academic implications can be drawn from this research. First, there are significant differences between potential users and existing users in their reasons for using N-screen. The results showed that PF and innovativeness (INN) are only influential on the attitude and intent of potential users, whereas some aspects of media usage only have a significant influence on the behavior and loyalty of existing users. This suggests that there is a psychological and attitudinal change before and after adopting a new technology or service.

Second, this research revealed that the current use of media has a greater influence on an existing user's use of service than on the formation of a potential user's attitude. The results show that the use of a PC, tablet, or TV has an influence on the use of existing users, while only tablet use had an influence on the attitude of potential users. Recall that N-screen is a new service utilizing pre-existing media rather than a new medium on its own. Hence, it is necessary to analyze the phenomenon from a service perspective rather than from a medium perspective.

Aside from its scientific significance, practical implications can be drawn from this research as well. From the fact that there are differences in the main reasons for the use of N-screen by potential and existing users, strategies can be formulated to entice the subscription of potential users and enhance the loyalty of existing users.

First, based on the fact that PF, among other influencing factors, has a different influence on the values of potential and existing users, promotional activities based on price are more effective when targeted toward potential users. The key is to provide the service at a price level that the potential user finds appropriate. On the other hand, existing users no longer consider PF, but place more emphasis on service quality and ease of use. Therefore, the results of this research suggest that it is more effective to compete with an emphasis on superior quality and service over other providers.

Second, strategies can be established by applying the fact

that INN has different influences on the attitudes of potential users and the usage level of existing users. The results show that INN is irrelevant to the use of a service by existing users, while it has a significant influence on the attitude of potential users toward N-screen, which leads to an intent to adopt the service. The results indicate that promotional activities targeting potential users with a high level of INN will increase the number of new subscribers.

There are two limitations to this research: the use of survey data, and not actual data, and the use of different dependent variables for the two applied research models.

For a deeper understanding of the behavior of existing users, the researcher added survey items such as the usage time, subscription period, media used, and payment record. However, these items were excluded owing to an inaccuracy in the results. Future research may be more meaningful if additional items based on actual data are available, including time and location data.

The adoption of different dependent variables for the two research models is the second limitation. We used the attitude toward the service and intent to subscribe as dependent variables for the potential user model, while the degree of use and loyalty to the service were used for the existing user model owing to the nature of this context. Based on this difference, a direct comparison is not possible. Hence, future research can provide a more meaningful comparison and analysis if a proper dependent variable can be proposed–one that can equally measure the attitude and behavior of potential and existing users.

References

[1] B. Reeves et al., "The Effects of Screen Size and Message Content on Attention and Arousal," *Media Psychology*, vol. 1, no. 1, 1999, pp. 49–67.

[2] E. Brynjolfsson, Y. Hu, and M.S. Rahman, "Battle of the Retail Channels: How Product Selection and Geography Drive Cross-Channel Competition," *Manag. Sci.*, vol. 55, no. 11, 2009, pp. 1755–1765.

[3] E. Brynjolfsson, Y. Hu, and D. Simester, "Goodbye Pareto Principle, Hello Long Tail: The Effect of Search Costs on the Concentration of Product Sales," *Manag. Sci.*, vol. 57, no. 8, 2011, pp. 1373–1386.

[4] F. Stahl and W. Maass, "Adoption and Diffusion in Electronic Markets: An Empirical Analysis of Attributes Influencing the Adoption of Paid Content," *Electron. Markets*, vol. 16, no. 3, 2006, pp. 233–244.

[5] S. Sweeney and F. Crestani, "Effective Search Results Summary Size and Device Screen Size: Is there a Relationship?," *Inf. Process. Manag.*, vol. 42, no. 4, July 2006, pp. 1056–1074.

[6] M.D. Smith and R. Telang, "Competing with Free: The Impact of Movie Broadcasts on DVD Sales and Internet Piracy 1," *MIS Quarterly*, vol. 33, no. 2, June 2009, pp. 321–338.

[7] M. Fishbein and I. Ajzen, "*Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*," Reading, MA, USA: Addison-Wesley, 1975.

[8] G.-W. Bock et al., "Behavioral Intention Formation in Knowledge Sharing: Examining the Roles of Extrinsic Motivators, Social-Psychological Factors, and Organizational Climate," *MIS Quarterly*, vol. 29, no. 1, Mar. 2005, pp. 87–111.

[9] J. Weisberg, D. Te'eni, and L. Arman, "Past Purchase and Intention to Purchase in E-Commerce: The Mediation of Social Presence and Trust," *Internet Res.*, vol. 21, no. 1, 2011, pp. 82–96.

[10] F.D. Davis, R.P. Bagozzi, and P.R. Warshaw, "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models," *Manag. Sci.*, vol. 35, no. 8, 1989, pp. 982–1003.

[11] I. Ajzen, "The Theory of Planned Behavior," *Organizational Behavior Human Decision Process.*, vol. 50, no. 2, Dec. 1991, pp. 179–211.

[12] L.R. Vijayasarathy, "Predicting Consumer Intentions to Use on-Line Shopping: The Case for an Augmented Technology Acceptance Model," *Inf. Manag.*, vol. 41, no. 6, July 2004, pp. 747–762.

[13] B. Alsajjan and C. Dennis, "Internet Banking Acceptance Model: Cross-Market Examination," *J. Business Res.*, vol. 63, no. 9, 2010, pp. 957–963.

[14] J. Bloemer, K. De Ruyter, and M. Wetzels, "Linking Perceived Service Quality and Service Loyalty: A Multi-dimensional Perspective," *European J. Marketing*, vol. 33, no. 11–12, 1999, pp. 1082–1106.

[15] R.E. Anderson and S.S. Srinivasan, "E-Satisfaction and E-Loyalty: A Contingency Framework," *Psychology Marketing*, vol. 20, no. 2, Feb. 2003, pp. 123–138.

[16] P. Rauyruen and K.E. Miller, "Relationship Quality as a Predictor of B2B Customer Loyalty," *J. Business Res.*, vol. 60, no. 1, Jan. 2007, pp. 21–31.

[17] G.S. Day, "A Two-Dimensional Concept of Brand Loyalty," *J. Advertising Res.*, vol. 9, no. 3, 1969, pp. 29–35.

[18] A.S. Dick and K. Basu, "Customer Loyalty: Toward an Integrated Conceptual Framework," *J. Academy Marketing Sci.*, vol. 22, no. 2, 1994, pp. 99–113.

[19] A. Chaudhuri and M.B. Holbrook, "The Chain of Effects from Brand Trust and Brand Affect to Brand Performance: The Role of Brand Loyalty," *J. Marketing*, vol. 65, no. 2, 2001, pp. 81–93.

[20] M.P. Pritchard, "*Development of the Psychological Commitment Instrument (PCI) for Measuring Travel Service Loyalty*," Ph.D. dissertation, University of Oregon, 1992.

[21] R.L. Oliver, "Whence Consumer Loyalty?," *J. Marketing*, vol. 63, 1999, pp. 33–44.

[22] F.F. Reichheld, "*The Loyalty Effect: The Hidden Force behind*

Growth, Profits, and Lasting Value," Boston, MA, USA: Harvard Business Press, 2001.

[23] W.H. Delone and E.R. Mclean, "Measuring E-Commerce Success: Applying the Delone & Mclean Information Systems Success Model," *Int. J. Electron. Commerce*, vol. 9, no. 1, 2004, pp. 31–47.

[24] A. Parasuraman, V.A. Zeithaml, and L.L. Berry, "A Conceptual Model of Service Quality and Its Implications for Future Research," *J. Marketing*, vol. 49, no. 4, 1985, pp. 41–50.

[25] Y.-F. Kuo, C.-M. Wu, and W.-J. Deng, "The Relationships among Service Quality, Perceived Value, Customer Satisfaction, and Post-Purchase Intention in Mobile Value-Added Services," *Comput. Human Behavior*, vol. 25, no. 4, July 2009, pp. 887–896.

[26] V. Venkatesh et al., "User Acceptance of Information Technology: Toward a Unified View," *MIS Quarterly*, vol. 27, no. 3, Sept. 2003, pp. 425–478.

[27] L. Xia, K.B. Monroe, and J.L. Cox, "The Price is Unfair! A Conceptual Framework of Price Fairness Perceptions," *J. Marketing*, vol. 68, no. 4, Oct. 2004, pp. 1–15.

[28] C. Forman, A. Ghose, and A. Goldfarb, "Competition between Local and Electronic Markets: How the Benefit of Buying Online Depends on where You Live," *Manag. Sci.*, vol. 55, no. 1, 2009, pp. 47–57.

[29] P. Palmgreen and J.D. Rayburn, "Gratifications Sought and Media Exposure an Expectancy Value Model," *Commun. Res.*, vol. 9, no. 4, Oct. 1982, pp. 561–580.

[30] J.J. Galloway, "Audience Uses and Gratifications: An Expectancy Model," *Commun. Res.*, vol. 8, no. 4, Oct. 1981, pp. 435–449.

[31] J.G. March and H.A. Simon, "*Organizations*," Oxford, UK: Wiley, 1958.

[32] E.M. Rogers, "*Diffusion of Innovations*," New York, NY, USA: Simon and Schuster, 2010.

[33] J. Lu, J.E. Yao, and C.-S. Yu, "Personal Innovativeness, Social Influences and Adoption of Wireless Internet Services via Mobile Technology," *J. Strategic Inf. Syst.*, vol. 14, no. 3, Sept. 2005, pp. 245–268.

[34] R. Fidler, "*Mediamorphosis: Understanding New Media*," Thousand Oaks, CA, USA: Pine Forge Press, 1997.

[35] J.M. Kayany and P. Yelsma, "Displacement Effects of Online Media in the Socio-Technical Contexts of Households," *J. Broadcast. Electron. Media*, vol. 44, no. 2, 2000, pp. 215–229.

[36] C. Haythornthwaite, "Strong, Weak, and Latent Ties and the Impact of New Media," *Inf. Soc.*, vol. 18, no. 5, 2002, pp. 385–401.

[37] T. Hennig-Thurau et al., "The Impact of New Media on Customer Relationships," *J. Service Res.*, vol. 13, no. 3, 2010, pp. 311–330.

[38] K. Van Rees and K. Van Eijck, "Media Repertoires of Selective Audiences: The Impact of Status, Gender, and Age on Media Use," *Poetics*, vol. 31, no. 5, 2003, pp. 465–490.

[39] A. Bhattacherjee, "Understanding Information Systems Continuance: An Expectation-Confirmation Model," *MIS Quarterly*, vol. 25, no. 3, Sept. 2001, pp. 351–370.

[40] R. Agarwal and J. Prasad, "A Conceptual and Operational Definition of Personal Innovativeness in the Domain of Information Technology," *Inf. Syst. Res.*, vol. 9, no. 2, 1998, pp. 204–215.

[41] W.W. Chin, B.L. Marcolin, and P.R. Newsted, "A Partial Least Squares Latent Variable Modeling Approach for Measuring Interaction Effects: Results from a Monte Carlo Simulation Study and an Electronic-Mail Emotion/Adoption Study," *Inf. Syst. Res.*, vol. 14, no. 2, 2003, pp. 189–217.

[42] C. Fornell and D.F. Larcker, "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error," *J. Marketing Res.*, vol. 18, no. 1, Feb. 1981, pp. 39–50.

[43] K.G. Jöreskog and H. Wold, "The ML and PLS Techniques for Modeling with Latent Variables: Historical and Comparative Aspects," *Syst. Under Indirect Observation: Causality, Structure, Prediction*, vol. 1, 1982, pp. 263–270.

[44] B. Efron and R. Tibshirani, "*An Introduction to the Bootstrap*," Boca Raton, FL, USA: CRC Press, 1993.

[45] J.F. Hair et al., "*Multivariate Analysis*," Upper Saddle River, NJ, USA: Pearson Prentice Hall, 2006.

[46] B. Kim, M. Choi, and I. Han, "User Behaviors toward Mobile Data Services: The Role of Perceived Fee and Prior Experience," *Expert Syst. Appl.*, vol. 36, no. 4, Apr. 2009, pp. 8528–8536.

[47] P. Van Schaik and J. Ling, "Modelling User Experience with Web Sites: Usability, Hedonic Value, Beauty and Goodness," *Interacting Comput.*, vol. 20, no. 3, 2008, pp. 419–432.

Bo-Ram Kwon is a researcher at the Creative Future Research Laboratory, Electronics and Telecommunications Research Institute, Daejeon, Rep. of Korea. She received her MS degree in management engineering from the Korea Advanced Institute of Science and Technology, Seoul, Rep. of Korea. Her research interests include user acceptance of information technologies and IT strategy. Her current research focuses on open and user-driven innovation.
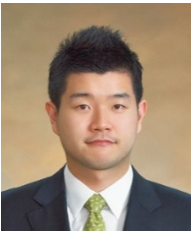
Sunghan Ryu is a researcher at the Convergence Research Policy Center, Korea Institute of Science and Technology, Seoul, Rep. of Korea. He earned his PhD degree in IT management from the School of Management Engineering, Korea Advanced Institute of Science and Technology, Seoul, Rep. of Korea. His research interests include IT innovations in entertainment and media industries and effective knowledge management practices in the entrepreneurial context. His current research interests revolve around user behaviors in two-sided platforms; in particular, in terms of the dynamics of crowdfunding platforms.

Young-Gul Kim received his PhD degree in business from the University of Minnesota, USA, in 1990. Currently, he is working as a professor at the Business School, Korea Advanced Institute of Science and Technology, Seoul, Rep. of Korea. His current research interests include entertainment industry analysis, customer relationship management, and knowledge management.