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How Social Impact Affects Smartphone Brand Loyalty

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ABSTRACT

Recently, we have seen strong smartphone brands are associated repeatedly with exceptional sales, such as buyers queuing at Apple Stores on the first day of product release while some others are not. However, what factors influence our decision on choosing a particular brand of smartphone? Finding answers of this question is meaningful to the academic field as well as the sales of smartphones. This study tends to understand how product functions and social aspects have relationships on the emergence of the aforementioned phenomenon through validating a proposed model based on the survey results. A total of 319 valid questionnaires from smartphone and nonsmartphone users in Taiwan were received by this study. Our study found social dimensions namely, convergence, innovation, and network externality were the antecedents for product utility, and these antecedents are indirectly influencing to brand loyalty. Some implications and suggestions for smartphone manufacturers/retailers, governments, and academics are also given.

KEYWORDS

Smartphone; brand loyalty; social impact; product utility

Introduction

Smartphones have become an essential tool in our daily life. Apple, the renowned electronic enterprise, has continued to lead the smartphone market with the iPhone, and has repeatedly achieved exceptional sales results from each new product. This is evident by the large number of buyers queuing at Apple Stores on the first day of product release. By contrast, other smartphone brands fail to gain similar market responses in the same sales environments although they are equipped with similar functions as the iPhone. This phenomenon gives rise to numerous questions, for example, what factors influence our decision on choosing a particular brand of smartphone? Finding answers of this question is meaningful to the academics, manufacturers/retailers of smartphones, and governments.

VonRiesen and Herndon[1] pointed out the possibility of an association between consumer involvement with the product and two different behavioral phenomena—true brand loyalty and spurious brand loyalty. For example, are these discrepancies caused by brand factors or effects related to product functions? Do social aspects influence product popularity? The present study tends to understand how product functions and social aspects have relationships on the emergence of the aforementioned phenomenon based on a product involvement–brand loyalty model.

When products are perceived as "high-risk" by the consumer, the influence of product and brand involvement increases.[2] Smartphones are equipped with more complex functions, are spread across a variety of brands, and are expensive consumer products. Therefore, consumers often compare the functions and brands of different products to gain a level of understanding before determining their choice of product for purchase.[3] When choosing product functions, consumers generally evaluate the hedonic and utilitarian sources of their targets.[4,5] The diverse functionality of smartphones is able to satisfy both requirements, or rather, smartphones are able to satisfy consumers' product utility (PU) requirement. In a more practical sense, many manufacturers exploit consumers' herd mentality, or otherwise known as social impact (SI), to achieve their sales targets. Herd mentality refers to consumers' desire to follow social trends or norms when purchasing popular products.[6,7]

Involvement refers to the extent of consumers' understanding of various brands and product functions prior to the purchase. Knox and Walker[8] asserted that involvement influences all the decision-making process of the consumer during the selection of products and brands. Warrington and Shim[9] stated that individual consumers exhibit varying levels of involvement for different products and in different purchase contexts, which implies that the extent of involvement varies from one consumer to another. Bennett[10] conducted an empirical study on the service industry to elucidate the influences that consumers' level of involvement and satisfaction have on brand loyalty (BL). The findings revealed that when consumers were with a high level of involvement, such involvement became the key determinant of BL.

Based on the involvement combinations proposed by Laurent and Kapferer,[11] Mittal and Lee[12] developed the involvement–brand loyalty model (IBLM). The researchers asserted that consumers essentially consider two types of involvement patterns when engaging in purchase behavior: product involvement (PI) and brand involvement (BI). "PI" refers to the level of interest a consumer has on a specific type of product, whereas "BI" refers to the level of interest a consumer has on the selection of a

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specific brand. A subsequent empirical analysis revealed that PI influences BI, and that PI and BI influence BL. These results suggest that consumer PI and BI influence consumers' level of data collection and BL. Mittal and Lee[12] further indicate that these two types of involvement are affected by their antecedents. PI antecedents include product hedonic value, product symbolism, and PU, whereas BI antecedents include brand hedonic value, brand symbolism, and brand risk. The researchers found that the level of PI increases when the product hedonic value, product symbolism, and PU of a purchase target increase, and the level of BI increases when the brand hedonic value, brand symbolism, and brand risk perceived by the consumer increase.

The aforementioned literature review revealed that various scholars have previously examined the IBLM. However, few have incorporated the effects of PU antecedents and SI into their discussions, particularly regarding smartphone user groups. Therefore, the objectives of the present study were to validate what effects SI and PU have on the IBLM; and investigate the key antecedents of PU in the context of smartphone usage in Taiwan based on a total of 319 valid questionnaires. Section 2 reviews related literature. Section 3 introduces the methodology used in this study, where two groups are established to test the IBLM. Section 4 is the results and discussion section, where the model verification results are discussed. Section 5 concludes the study and provides suggestions.

Literature review

Involvement–brand loyalty model (IBLM)

Mittal and Lee[12] proposed the involvement–brand loyalty model (IBLM) by revising the involvement combinations formulated by Laurent and Kapferer.[11] Knox and Walker and Marshall[13] adopt three grocery products (breakfast cereal, kitchen napkins, and newspaper) to refine the IBLM. These researchers confirmed that PI significantly influences BI. In a smartphone usage context, the present study contends that when consumers require an increased level of involvement in smartphone products, they undoubtedly will demand an increased understanding into product brands. This knowledge is then used for making purchase decisions. Thus, the following hypothesis is proposed:

H1: When selecting a smartphone, PI positively and significantly influences BI.

Managers can improve brand loyalty by increasing consumers' product involvement. [14,15] Quester and Lim[1] investigated the associative relationships between PI and BL, the findings also confirm that PI positively and significantly influences BL. Bennett[2] adopted user experience as an intermediary variable to examine the influences that consumer satisfaction and involvement have on BL. The findings show that the influence of consumer satisfaction and involvement impose on BL will change according to the services experienced by the customer during the purchases. Chen and Tsai[16] analyzed the consumer behavior of travel product shopping, and found that involvement has a mediating effect on the relationship between product value and consumer loyalty. Hu[17] found that consumer involvement, brand equity, and perceived risk significantly influence consumer loyalty. Ferreira and Coelho[14] also found that PI influences BL, and that this influence is mediated by price perception. In a smartphone usage context, the presents study contends that when consumers show increased involvement in smartphones, their increased understanding of product characteristics may contribute to the development of BL. Thus, the following hypothesis is proposed:

H2: When selecting a smartphone, PI positively and significantly influences BL.

Bennett[10] examined the effects of consumer involvement on BL in the service industry and found that when consumers are in a high level of involvement, level of involvement, in particular, BI, becomes the key determinant of BL. In a smartphone context, the present study contends that when consumers realize that smartphones are able to provide a wide range of functions, they become interested in learning more about the smartphone product. That is, they become more involved. In addition, when smartphone consumers gain increased involvement in a specific brand, they are more able to recognize the features of the brand, which elevates their loyalty towards the brand. Bruwer and Buller[18] studied wine brands of Japanese wine consumers, and the regression analysis on brand loyalty and involvement show a low positive association between them. Thus, the following hypothesis is proposed:

H3: When selecting a smartphone, BI positively and significantly influences BL.

Mittal and Lee[12] indicated that the antecedents of PI and BI are correlated to PU. Bennett[2] found that in a high-risk setting, consumers perceive increased value to PI-related dimensions (i.e., PU) when they are uncertain of the consumption benefits of a product or service. Quester and Lim[1] discovered that the involvement antecedents for different kinds of products are different, and that the level of PI varies from one to another. Therefore, the present study believe that when smartphone consumers make purchase decision, they want to have a deeper understanding of the product, which is a higher involvement, especially when the smartphone contains many functions, namely smartphone product effectiveness. Thus, the following hypothesis is proposed:

H4: When selecting a smartphone, PU positively and significantly influences PI.

Product utility

According to Mittal and Lee[12], the concept of product involvement and brand involvement antecedents are related to the effectiveness of the product. This study tried to find out the antecedents of the product utility. About Product Utility, Mittal and Lee[12] define it as the user experience of perceiving the product value and benefits. Furthermore, Balasubramanian, Raghunathan and Mahajan[19] also pointed out that consumers

tend to be practical value oriented when it is a rational purchase, which is termed the value-rational.

Thus, the present study reviews the literature relating to product utility of smartphones from the viewpoint of product value, and selected three products as an important influence antecedent utility—Convergent, Innovation, and Network Externality. The present study analyzed the PU of smartphones and identified the following three key PU antecedents: convergence, innovation, and network externality.

Convergence

Convergence refers to adding new functions into the set of fundamental ones of a product.[20] Gill and Lei[20] mentioned that new functions are often added to high-technology products to enhance their utility. An analysis into convergent products based on the perceptive of supplementary functionality revealed that when complementary products are used simultaneously with main products, the value of the main product is enhanced.[21] From the microeconomics perspective, the literature indicates that additional utility can be created when using two elements in unison during the production.[22] Dowling, Lechner, and Thielmann[23] found that utility can be increased from the products or services that are able to generate complementary convergence, which increases the market share and creates new demand for these products and services. In recent years, consumer electronics have gradually shifted towards convergence. For instance, smartphones offer various functions, such as communication, music, recording, GPS navigation, search, gaming, and translation. Arruda-Filho and Lennon[24] explained that consumers prefer the iPhone because its integration of various devices and functional applications makes the iPhone an "all-in-one" product. Thus, the present study proposes the following hypothesis:

H5: The convergence of smartphones positively and significantly influences PU.

Innovation

Kotler and Keller[25] defined innovation as any product or service deemed new by the consumer. Innovation refers to products and services that are different from extant products and services. Veryzer and Hutchinson[5] defined innovation as the creation of new products, services, or processes, which can either be a continuity of evolution (i.e., continuous innovation), or a major change in a specific point in time (i.e., noncontinuous innovation). By distinguishing between newly developed products and modified products, Rochford and Rudelius[26] classified product innovation into new-to-the-world products and product modifications based on dimensions of technological innovation. "New-to-the-world products" have greater potential of creating new value for the consumer than extant products. Product modifications, which include improving current functions and techniques or enhancing ease-of-use, are a type of continuous innovation that can also create new value to the consumer.

Innovative products are advantageous in the market because they are able to attract the attention of consumer.[27] The present study contends that the product innovations of smartphones continuously create new value for users and attract new users. Thus, the innovation of smartphones influences users' perceived PU and value. Due to above discussion, the present study proposes the following hypothesis:

H6: The innovation of smartphones positively and significantly influences PU.

Network externality

The theory of network externality explains that users obtain the utility of products or services may not be entirely derived from the product or service itself. Rather, in some cases, utility increases concurrently with an increase in the number of users.[28] Liebowitz and Margolis[29] contended that the influence that our participation has on others are similar to the influence that others' participation has on us. Dranove and Gandal[30] used the competition between the DVD and DIVX formats as an example to demonstrate that when the software and hardware suppliers are collaborated in providing products and services support to the DVD format, the product values and utilization value of DVD consumers were considerably enhanced. This in turn increased DVD sales, and outstripped its competitor. Chung and Yoo[31] found that significant network externality effects exist in a cellular market. The sources of network externality can be classified into direct and indirect network externality. Direct network externality implies that utility is related to the number of current or future users of a single product. When the number of users increases, the value of using the product increases accordingly. Thus, the number of users constitutes part of the product value. In communication network systems, the telephone network expands concurrently with an increase in the number of users. This elevates overall utilization value and consequently attracts other users to purchase or join the network. Conner[32] explained that the size of user groups can be considered as a number of interconnecting nodes in a network, and increasing the number of users elevates the utility of all the users in the network.

Indirect network externality implies that the value and demand of a product increases concurrently with the adequate supply or lowered pricing of its complementary products, and consequently attracts more consumers to purchase the product. In business network, manufacturers of main products and complementary products tend to form a product alliance. The advantages of such alliance come from the situation when competitors are unable to acquire equally favorable complementary products or supports. This situation is extremely evident in communication products.[33] Farrell and Saloner[34] also mentioned that when an auxiliary product (accessory, service, or software) becomes more affordable or accessible, the main product gains a greater market size.

The concepts of direct and indirect network externality are applied to the smartphone market. From one perspective, the perceived utilization of smartphones increases concurrently with the number of users. For example, smartphone applications such as "WhatsApp" and "Line" are instant message applications, which support users to send text and audio messages and to

form social groups. The communication functionality, convenience, and affordability of these applications far exceed those basic ones offered by the smartphone. Therefore, these applications elevate the utility of the smartphone. From another perspective, manufacturers and developers are more willing to develop hardware and software for smartphones that possess a broad user base. In terms of the number of applications developed for iOS and Android operating systems, both platforms offer an immense number of applications for users to download and use. Regarding hardware, a diverse number of peripheral products are available to support smartphones based on these operating systems, such as external speakers, sound systems, wireless routers, power banks, and aesthetic and functional smartphone covers. Therefore, the value of products can be effectively improved by increasing the amount of supporting peripheral devices or auxiliary resources, thereby affecting the PU perceived by the user. Thus, the present study proposes the following hypothesis:

H7: The network externality of smartphones positively and significantly influences PU.

Social impact

Social impact (SI) means that consumers' brand experience and selection are influenced by others in the decision-making process.[35] The presents study contends that SI affects PI and BI. Bandura[36,37] revealed that people's cognition, such as personal motivation, attitude, and behavior, influence their social recognition. Fishbein and Ajzen[38] contended that an individual's behavioral intentions are affected by subjective norms and attitude. Additionally, environmental factors, such as social pressures, also exist in the influence. For example, consumers desire to prove that they are part of social trends or norms by purchasing popular products.[6,39] In the era of a vastly changing marketing communications environment, social media and social networking sites (SNS) have become an attractive outlet for brand promotions and advertising.[40] The present study adopted two social dimensions to study users' smartphone usage attitude, subjective norm, and conformity.

Subjective norms

According to the Theory of Reasoned Action,[38] an individual's behavioral intentions are influenced by his/her attitude and subjective norms. Subjective norms represent the opinions of the individual's close relatives and friends pertaining to a specific behavior. Ajzen[41] expanded on the Theory of Reasoned Action and proposed the Theory of Planned Behavior, verifying that the subjective norm positively influences users' behavioral intention. Venkatesh and Morris[42] conducted a research using a technology-acceptance model as their theoretical basis, and verified that users' usage and acceptance of new technologies are influenced by others. Social influence (subjective norm and perceived critical mass combined) was found to be a more important factor in determining IM adoption than perceived usefulness and perceived ease of use. Based on the preceding discussion, the present study contends that subjective norm is a crucial factor influencing users in their selection of smartphones.[43]

Conformity

Bearden and Etzel[35] indicated that in consumers' decision-making processes, brand selection is influenced by others. Park and Lessig[44] identified two factors that influence individuals during the validation of facts, specifically, the information that they acquire through conversing with others, and the observation of others' behaviors. This implies that the value that consumers' attach to products is affected by others in their community.[45,46]

In a social group, individuals' decisions are often strongly affected by others, such as in the pursuit of fashion and aesthetic concepts. In other words, conformity is a behavior where individuals mimic the actions of a larger group. Banerjee[47] indicated that individuals' common daily activities may be influenced by others. Raghuram, Christophe, and Jeonghye[48] asserted that the conformity behavior is caused by the informative and normative influences from the society. One form of influence that has received much attention is "social contagion" which is people's decision to adopt a new product or technology and is affected by the extent to which their peers are already using it. Subsequently, the external factors of a social group may lead individuals to change their behaviors when they can establish a relationship with the group.[49]

Lascu and Zinkhan[50] summarized and analyzed numerous past studies and proposed a conformity behavior model for marketing research. Social psychologists have found that individuals tend to change their views and behaviors to conform with larger groups when they feel pressured by the group.[51] Therefore, these psychologists defined conformity behavior as a behavior influence by society, where the source of such influence is derived from the members of the society.[14] In consumer behavior, conformity behavior is exhibited when consumers mimic the consumption concepts or behaviors of group members to gain group recognition or conform with group expectations.[6] Marketing scholars defined conformity behavior in a consumer context as consumers' change in product value, purchase intention, and consumption behavior due to the influence of the purchase behavior value and intention of a group in order to conform with group expectations.[50]

A review of the preceding literature indicates that SI can change users' behaviors and attitudes. In other words, users' perception and selection of smartphone products and brands are affected by SI (i.e., SI affects user's smartphone PI and BI). Thus, the present study proposes the following two hypotheses:

H8: When selecting a smartphone, SI positively and significantly influences PI.

H9: When selecting a smartphone, SI positively and significantly influences BI.

Based on the preceding discussion, the presented study developed a research model, as illustrated in Figure 1.

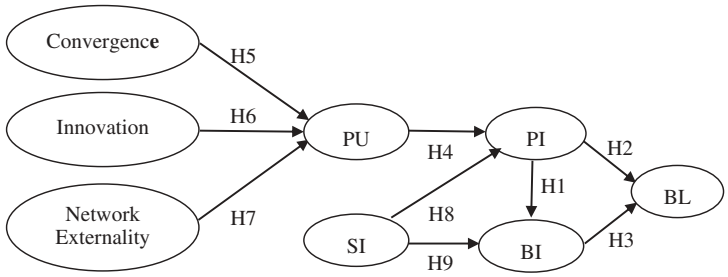

Figure 1. The research model.

Methodology

The presents study employed the survey method to validate the proposed model. Because the number of smartphone users worldwide is rapidly increasing, the actual size of the sampling population of smartphone users is extremely difficult to obtain. To be less biased on sampling, this study chose the samples from Taiwan for three reasons. First, smartphones are prevalent in Taiwan. According to a report from Foreseeing Innovative New Digiservices,[52] there were more than 16 million people who were over 12 years old using smartphones in Taiwan, and it represented 73.4% for the entire population of the country. Second, the people in Taiwan have no favor to the country of origin of smartphones. Thus, most well-known brands of smartphones can be found in Taiwan. Third, the Taiwan government has no protective policy to either local or international brands of smartphones. Choosing samples from Taiwan is appropriate for current study.

The present study adopted a random sampling method for research purpose. The main sampling targets were "experienced smartphone users." To increase the readability to the nonsmartphone users, the questionnaire items were presented in groups. In addition, reverse items were included to help eliminate invalid questionnaires. Moreover, the questionnaires underwent a two-step test to increase its quality. First, a pretest was conducted, in which 10 smartphone users and experts in related fields were invited to complete the questionnaire. The results were used to help increase the clarity of the questionnaire items. Subsequently, a pilot test was conducted to verify the reliability and validity of the questionnaire. Smartphone users were invited for testing at this stage. A total of 77 questionnaires were returned, of which, 7 were invalid questionnaires. The present study reviewed and summarized previous literature to formulate the questionnaire items, as tabulated in Table 1.

The present study adopted the item analysis and factor analysis methods to test validity. When measuring factor loading, items with a coefficient less than 0.6 were eliminated to enhance questionnaire validity. The present study adopted a structural equation model (SEM) to test the research model and the hypotheses, and elucidate the causal effect between variables in the research model. A descriptive statistical analysis was first conducted to observe the distribution of the sample demographics before commencing the second stage of analysis, that is, the measurement model analysis. A confirmatory factor analysis (CFA) was employed to test whether the various observed variables were able to measure the latent variables, whether loading existed in the complex measure items of different latent variables, and whether offending estimates occurred in the model. Finally, reliability and validity tests of the scale were conducted.

During the structural model analysis, the present study developed a model to depict and analyze the causal effects between latent variables. The SmartPLS was adopted to analyze the SEM data and verify the proposed hypotheses.

Results and analysis

The questionnaires were distributed between January to May 2012. A total of 403 questionnaires were returned for the formal survey process with 319 valid questionnaires remaining after deleting invalid one based on the reverse items. The return rate was 79%. In terms of gender, male respondents accounted for 195 of the valid questionnaire respondents (61.1%). Among the respondents, 72.7% and 25% of them were in the ages of 16–25 and 26–35. Students comprised 74.9% of the respondents, and the rest are working ones. Most respondents were undergraduates (54.5%), followed by graduates (37.9%). The research samples were classified into an experimental group, comprising 213 smartphone users, and a control group, comprising 106 nonsmartphone users.

A SEM was adopted to verify the research model and the proposed hypotheses, and to determine the causal relationship of the research model variables. Analysis was conducted in two stages including the measurement item analysis and the path analysis.

Smartphone users

Table 2 indicates that the composite reliability values of all dimensions were greater than 0.8, which are higher than the standard value of 0.6,[55] suggesting that the research model reaches satisfactory level of internal consistency.

Table 3 indicates that average variance extracted (AVE) value of the present study was greater than 0.5, implying that the present study reaches satisfactory level of convergence validity. In addition, comparing the square root value of AVE of each variable with the others, the discriminant validity of the represent study is in the satisfactory level.

Table 4 indicates that the factor loadings of all the latent variables were greater than 0.6. In addition, the factor loadings of each latent variables were greater than the values appear in the categories of the others. Thus, the discriminant validity of the latent variables is high.

Table 1. Questionnaire items and sources.

Variable	Questionnaire Items	Sources
Convergence	PC1. I believe that smartphones can replace many handheld devices. PC2. Do you agree the concept of incorporating extra functions of "other products" for making smartphones as a multifunctional device will elevate the value of using it? PC3. I feel that smartphones satisfy my utilitarian and hedonic requirements for technological products.	23, 20
Innovation	IN1. I feel that new smartphones that are based on the improvement of software and hardware of previous models are easier and better to use. IN2. I am more interested in buying the smartphones with newer technologies rather than older models. IN3. I feel that new smartphones that are based on the improvement of software and hardware of previous models have more value.	26
Network Externality	NE1. I anticipate that more people will use smartphones in the future. NE2. I feel that the utility of my smartphone increases concurrently with the number of smartphone users. NE3. I feel that future manufacturers will reduce the prices of their products or introduce discount plans as the number of smartphone user increases. NE4. I feel that future manufactures will develop more supporting hardware and software as the number of smartphone user increases. NE5. I feel that manufacture's service quality will improve concurrently with the increased number of smartphone users.	53
Subjective Norms	SI1. My classmates, relatives and friends urge me to use a smartphone. SI2. The people around me feel that using a smartphone would benefit me. SI3. The people around me encourage and support me to use a smartphone.	54
Conformity	SI4. My desire to use a smartphone increases when the classmates, relatives, and friends around me use smartphones. SI5. When my classmates, relatives, and friends share interesting information about smartphones to me, I desire to learn more. SI6. My desire to use a smartphone increases when the media reports a lot of smartphone-related news.	49,54
PI	PI1. To me, smartphones are important. PI2. I am extremely interested in smartphones. PI3. I am not concerned as to whether or not I have a smartphone.	12
BI	BI1. I choose smartphone brands extremely carefully. BI2. When purchasing a smartphone, brand is a crucial factor of consideration. BI3. I feel that the smartphones on the market are distinguishable by their brands.	12
PU	PU1. To me, smartphones are beneficial. PU2. To me, smartphones are useful products. PU3. Smartphones make my life more convenient.	12
BL	BL1. I love the smartphone brand I am currently using. BL2. I am loyal to my smartphone brand because I know that it is the best choice for me. BL3. When purchasing a smartphone, I would choose my favorite brand over other brands. BL4. When I am unable to purchase the smartphone of my favorite brand, I will not choose other brands.	12

Table 2. Facets descriptive statistics results (Smartphone Users).

Variables	Items	CR	Means	STD	AVE
BI	3	0.906	4.09	0.671	0.764
BL	4	0.860	3.588	0.708	0.607
IN	3	0.886	3.990	0.667	0.722
NE	4	0.806	4.213	0.519	0.510
PC	3	0.865	4.275	0.571	0.681
PI	2	0.904	3.922	0.721	0.825
PU	3	0.910	4.178	0.583	0.771
SI	6	0.894	3.852	0.592	0.587

Table 3. Validity test results (smartphone users).

Variables	BI	BL	IN	NE	PC	PI	PU	SI
AVE	0.764	0.607	0.722	0.510	0.681	0.825	0.771	0.587
BI	0.874							
BL	0.477	0.779						
IN	0.391	0.236	0.849					
NE	0.385	0.245	0.463	0.714				
PC	0.404	0.327	0.374	0.441	0.825			
PI	0.459	0.396	0.402	0.426	0.424	0.908		
PU	0.458	0.419	0.504	0.546	0.629	0.632	0.878	
SI	0.493	0.407	0.410	0.508	0.505	0.594	0.615	0.766

The bootstrapping procedure of SmartPLS was used for path analysis. Results showed that all nine hypotheses proposed in present study were supported, as illustrated in Figure 2. The variance explanatory power (R2) of PU, PI, BI, and BL were 52.4%, 46.7%, 28.6%, and 26.7%, respectively.

Nonsmartphone users

As shown in Table 5, all composite reliability values were greater than 0.8, suggesting the dimensions exhibited excellent convergence validity.

Table 4. Confirmatory factor analysis and cross load (smartphone users).

	BI	BL	IN	NE	PC	PI	PU	SI
BI1	0.907	0.404	0.369	0.408	0.400	0.463	0.421	0.464
BI2	0.923	0.473	0.375	0.331	0.405	0.419	0.476	0.528
BI3	0.787	0.364	0.267	0.259	0.222	0.306	0.270	0.254
BL1	0.329	0.770	0.193	0.195	0.347	0.402	0.341	0.336
BL2	0.356	0.860	0.239	0.206	0.378	0.379	0.405	0.436
BL3	0.451	0.798	0.184	0.233	0.239	0.264	0.365	0.330
BL4	0.346	0.678	0.108	0.113	0.004	0.168	0.162	0.127
IN1	0.355	0.253	0.792	0.341	0.348	0.314	0.397	0.316
IN2	0.339	0.178	0.892	0.420	0.303	0.377	0.447	0.362
IN3	0.307	0.178	0.863	0.417	0.308	0.332	0.442	0.344
NE1	0.315	0.205	0.247	0.692	0.395	0.303	0.428	0.376
NE2	0.241	0.170	0.443	0.759	0.363	0.418	0.425	0.452
NE3	0.159	0.100	0.286	0.666	0.156	0.221	0.324	0.296
NE4	0.373	0.214	0.342	0.738	0.312	0.254	0.370	0.291
PC1	0.328	0.215	0.200	0.307	0.799	0.288	0.411	0.340
PC2	0.338	0.327	0.285	0.421	0.864	0.312	0.545	0.394
PC3	0.335	0.257	0.412	0.355	0.813	0.433	0.575	0.467
PI1	0.416	0.413	0.360	0.389	0.389	0.927	0.628	0.608
PI2	0.421	0.298	0.374	0.388	0.383	0.891	0.510	0.460
PU1	0.384	0.386	0.488	0.491	0.542	0.567	0.889	0.583
PU2	0.389	0.391	0.439	0.514	0.579	0.587	0.908	0.563
PU3	0.439	0.324	0.403	0.433	0.538	0.508	0.837	0.471
SI1	0.261	0.325	0.274	0.373	0.255	0.358	0.432	0.658
SI2	0.299	0.361	0.230	0.306	0.326	0.410	0.397	0.709
SI3	0.295	0.373	0.267	0.331	0.277	0.396	0.399	0.722
SI4	0.465	0.298	0.398	0.389	0.482	0.488	0.547	0.830
SI5	0.420	0.251	0.313	0.460	0.421	0.517	0.494	0.791
SI6	0.465	0.314	0.340	0.436	0.442	0.527	0.536	0.866

Table 6 shows that all AVE values were greater than 0.5, suggesting the dimensions' convergence validity is high. In addition, the square root of AVE was greater than all the coefficients of the latent variables. Overall, the results of current study achieved satisfactory level of discriminant validity.

Table 7 indicates that the factor loadings of all the latent variables were greater than 0.6. In addition, the factor loadings

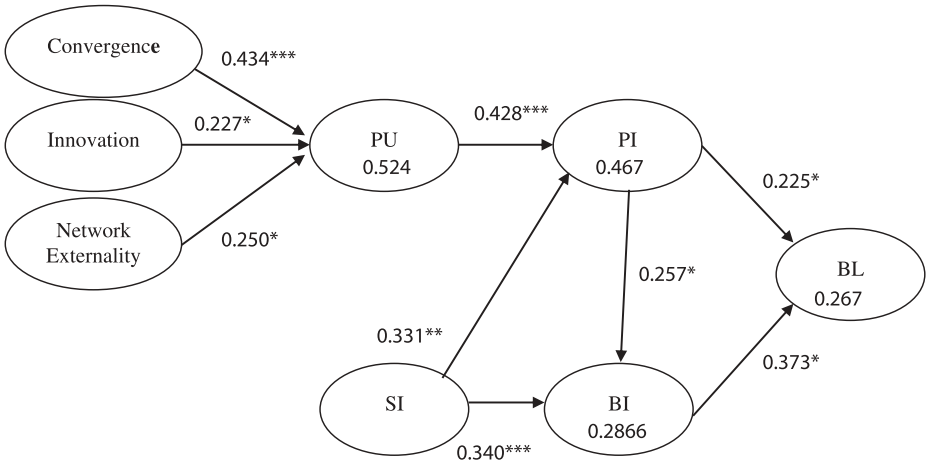

Figure 2. Path analysis of the research model (smartphone users)
*: $P < 0.05$; **: $P < 0.01$; ***: $P < 0.001$.

Table 5. Facets descriptive statistics results (nonsmartphone users).

Variables	Items	CR	Means	STD	AVE
BI	3	0.938	4.166	0.732	0.835
BL	4	0.879	3.477	0.710	0.647
IN	3	0.889	3.897	0.674	0.729
NE	4	0.813	4.380	0.477	0.524
PC	3	0.867	4.312	0.580	0.687
PI	2	0.903	3.612	0.721	0.824
PU	3	0.926	3.962	0.755	0.808
SI	6	0.919	3.734	0.737	0.658

Table 6. Validity test results (nonsmartphone users).

Variables	BI	BL	IN	NE	PC	PI	PU	SI
AVE	0.835	0.647	0.729	0.524	0.687	0.824	0.808	0.658
BI	0.913							
BL	0.274	0.804						
IN	0.221	0.358	0.853					
NE	0.254	0.159	0.530	0.723				
PC	0.162	0.184	0.514	0.499	0.828			
PI	0.248	0.516	0.517	0.355	0.376	0.907		
PU	0.352	0.433	0.528	0.470	0.322	0.773	0.898	
SI	0.188	0.467	0.453	0.444	0.369	0.731	0.707	0.811

of the in-dimension latent variables were greater than those of the between-dimension latent variables. Thus, the discriminant validity of latent variables is high.

For the nonsmartphone users group, the present study contends that nonsmartphone users have not developed brand loyalty, and thus H2 and H3 were excluded from analysis. The path analysis results are illustrated in Figure 3. H5 and H9 were rejected, and the remaining hypotheses were supported.

Results discussions

This present study verified a proposed model developed from the IBLM. The results of hypothesis testing are shown in Table 8.

By testing it among the smartphone users, the result from H1 shows that PI positively and significantly influences BI, which is an indication that the product involvement does affect the brand's involvement. Results of H2, PI positively and significantly influences BL, which is an indication that the product involvement does affect brand loyalty. Results of H3,

Table 7. Confirmatory factor analysis and cross load (nonsmartphone users).

	BI	BL	IN	NE	PC	PI	PU	SI
BI1	0.889	0.215	0.154	0.199	0.091	0.161	0.232	0.159
BI2	0.942	0.248	0.217	0.277	0.212	0.286	0.399	0.236
BI3	0.909	0.283	0.223	0.210	0.125	0.215	0.309	0.115
BL1	0.219	0.772	0.255	0.125	0.181	0.428	0.355	0.417
BL2	0.196	0.894	0.303	0.110	0.144	0.465	0.352	0.400
BL3	0.316	0.815	0.294	0.102	0.165	0.387	0.369	0.361
BL4	0.147	0.728	0.302	0.184	0.096	0.376	0.316	0.316
IN1	0.309	0.238	0.777	0.401	0.419	0.364	0.365	0.344
IN2	0.228	0.282	0.883	0.463	0.445	0.465	0.417	0.342
IN3	0.080	0.374	0.897	0.487	0.456	0.484	0.543	0.457
NE1	0.389	−0.042	0.302	0.662	0.347	0.125	0.282	0.195
NE2	0.103	0.222	0.480	0.832	0.426	0.437	0.470	0.490
NE3	−0.030	0.114	0.361	0.623	0.256	0.195	0.255	0.231
NE4	0.317	0.105	0.363	0.762	0.395	0.172	0.293	0.279
PC1	0.052	0.123	0.297	0.377	0.696	0.209	0.160	0.283
PC2	0.054	0.188	0.416	0.387	0.896	0.324	0.262	0.269
PC3	0.244	0.146	0.517	0.473	0.881	0.366	0.335	0.361
PI1	0.164	0.561	0.499	0.298	0.329	0.912	0.662	0.680
PI2	0.290	0.372	0.440	0.348	0.353	0.904	0.743	0.647
PU1	0.237	0.439	0.515	0.405	0.286	0.745	0.876	0.644
PU2	0.333	0.397	0.462	0.426	0.238	0.721	0.943	0.683
PU3	0.390	0.323	0.444	0.439	0.353	0.607	0.877	0.573
SI1	−0.105	0.346	0.149	0.218	0.239	0.340	0.376	0.689
SI2	0.058	0.397	0.269	0.234	0.272	0.535	0.533	0.770
SI3	−0.041	0.371	0.186	0.214	0.262	0.444	0.432	0.743
SI4	0.245	0.365	0.486	0.417	0.379	0.684	0.642	0.876
SI5	0.255	0.415	0.455	0.454	0.282	0.671	0.650	0.864
SI6	0.260	0.403	0.470	0.483	0.337	0.724	0.683	0.905

BI positively and significantly influences BL, indicates that the brand involvement does affect brand loyalty. Above results were evident in both research groups—the smartphone and nonsmartphone users, and these results obtained are supported by Bennett[10] which shows that PI will affect BI, and both of which can affect BL.

According to Quester and Lim,[1] consumers have different extents of involvement to different utility products, which was a foundation for us to develop H4. The results of present study in both the smartphone and nonsmartphone users groups support such inference, which indicates that when the smartphone has more functions, more product involvement from the user side is needed.

H5 was confirmed by the results from the sample group of smartphone users, and this is in consistent with the findings from Batra and Ahtola[4] and Wertenbroch and Dhar[56] which

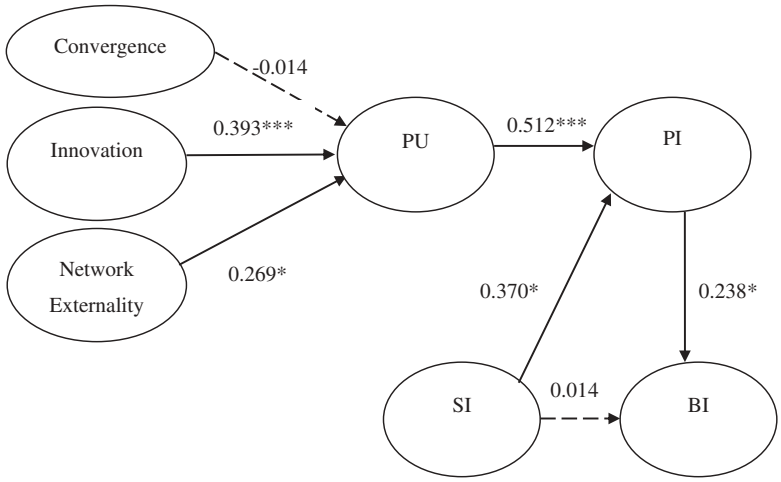

Figure 3. Path analysis of the research model (nonsmartphone users).
*: $P < 0.05$; **: $P < 0.01$; ***: $P < 0.001$.

Table 8. Results of hypothesis testing.

NO.	Description of Hypothesis	Smartphone Users Nonsmartphone Users
H1	When selecting a smartphone, PI positively and significantly influences BI.	Supported Supported
H2	When selecting a smartphone, PI positively and significantly influences BL.	Supported Not supported
H3	When selecting a smartphone, BI positively and significantly influences BL.	Supported Not supported
H4	When selecting a smartphone, PU positively and significantly influences PI.	Supported Supported
H5	The convergence of smartphones positively and significantly influences PU.	Supported Not supported
H6	The innovation of smartphones positively and significantly influences PU.	Supported Supported
H7	The network externality of smartphones positively and significantly influences PU.	Supported Supported
H8	When selecting a smartphone, SI positively and significantly influences PI.	Supported Supported
H9	When selecting a smartphone, SI positively and significantly influences BI.	Supported Not supported

suggest that higher utility products are those with more integrated functions. However, such finding is not supported from the sample of nonsmartphone users. The reason may be that nonsmartphone users lack usage experiences and are unable to understand the integrated functions, and they are consequently unable to have high product utilities.

H6 and H7 were shown supported in both sample groups, suggesting that innovation and network externality were valued by consumers as the antecedents of creating product utilities, and this finding is in consistent with Rogers'[27] study. Furthermore, this reveals that innovative products are advantageous in the market because they are able to attract the attention of consumer.

Similarly, H8 was shown supported in both sample groups, typifying that the social impact has influence on the user's product involvement regardless the user's usage experience, and this finding is the same with Lascu and Zinkhan's[50] finding which show users may change their product involvement when they want to be conformed with the other peer members in a social group.

However, H9 was supported differently by the data from both sample groups. It was supported from the users group, which means that social impact has influence on the user's brand involvement. Bhattacherjee and Premkumar[57] also found that the user's perception are very likely affected by experts or their peers. By contrast, the brand image was not significantly influenced by the social impact in the nonsmartphone users group, implying that although nonsmartphone users receive brand information from other users, such information may not be strong enough to change their image on the brand.

Conclusion

Since the smartphone has been adopted world widely, we have seen buyers queuing at stores (e.g., Apple Stores) on the first day of certain brands of product release. The present study tends to identify what key factors have influences on buyers' decision on choosing a particular brand of smartphone based on the product involvement–brand loyalty model (IBLM). Bennett[10] asserted that customer involvement is a key factor influencing BL, where PI influences BI when customer involvement is high. Our research findings confirm that the PI of smartphone and nonsmartphone users significantly and

positively influence BI, and PI and BI significantly and positively influence BL when customer involvement is high.

Moreover, from a literature review, the present study identified user value dimensions. Three antecedents were identified for PU, namely, convergence, innovation, and network externality. The present study also confirmed that these three antecedents influence PU, which indirectly implies that these antecedents are influential factors of BL. In addition, the influence that SI has on IBLM is also supported.

For the nonsmartphone users group, two hypotheses proposed in the present study were rejected, H5 and H9. These rejections may be due to the "inexperience" of the samples in this group. This may imply that nonsmartphone users cannot relate to or have not considered the selection of products and brands, and thus lack the understanding of convergence or have yet to be involved in the process of making purchase decisions. However, the PU perceived by the nonsmartphone users group was influenced by innovation and network externality, which explains that although these users do not own smartphones, they value innovative products. The influence of network externality further suggests that nonsmartphone users also perceive that network value is created when more users use the same product.

The distinction of the present study from other relevant studies is the type of extrinsic variables employed. The majority of extant studies focus on perceptive and cognitive dimensions with less emphasis on user value, particularly with regards to antecedents. The present study categorized mobile phone users into groups of smartphone and nonsmartphone users for investigation. This approach not only broadened the evaluation of the research framework, but also uncovered the underlying opinions of consumers, facilitating the researchers in understanding crucial hidden information.

Management implications and suggestions

Some implications and suggestions for smartphone manufacturers/retailers, governments, and academics are given as follows. In terms of sample groups, our results confirm that convergence, innovation, and network externality influence the PU perceived by smartphone users. The convergence antecedent of PU refers to the level of integration of product functions, where PU increases concurrently with the number of convergent functions. However, increased function integration also increases technological complexity. This raises questions as to whether the increase in complexity reduces PU, and whether a balance can be found between convergent functions and technological complexity. In addition, the influence of convergence was less evident in the nonsmartphone users group. The present study infers the reason to be the users' lack of experience in using smartphones. In future, manufacturers should focus on nonsmartphone users, or the potential consumers, to facilitate their understanding and experiencing the superior convergence that smartphones are able to provide, consequently elevating their perceived PU.

Regarding the innovation dimension, our research results suggest that smartphone manufacturers should continue to development innovative functions to help users identify with PU. Government institutions should provide appropriate support and incentive, such as funding or incentive for academic–industry cooperation. In terms of product sales, increased network externality represents a larger market size. An increased number of users is more likely to attract the involvement of more users. Increased involvement consequently attracts peripheral equipment and software developers to create more types of accessories for the product. Thus, network externality promotes positive product growth. If government websites can be designed to include smartphone usage into the promotion of a digital government, and when smartphone can be used for engaging in government activities, the network externality of smartphones would increase exponentially, consequently stimulating the perceived PU of smartphone users. The present study further suggests that industries should continue to observe how smartphone products create utility and value for users, thereby increasing users' smartphone PI.

Regarding SI, users are more likely to trust larger brands. Users become more confident in a brand when the brand is praised by others. Conversely, less-popular brands are less likely to gain user trust. User confidence in brand is also easily shaken by others, even when they feel optimistic of the brand. Mobile phone manufacturers and retailers should comprehensively examine the effects of elevating SI. In addition to understanding the influence that SI has on smartphone users, manufacturers and retailers should develop multiple channels for interacting and serving consumers, such as exhibitions, in-store services, or temporary activities. In addition, manufacturers and retailers should endeavor to enrich service activities when interacting with consumers, such as by providing detail explanations for products along with displays. Regardless of consumers' purchase intentions, actively introducing product functions and features indirectly elevates the PI of the consumer being served. This consumer consequently becomes an influencer for the mobile phone manufacturer.

Moreover, the government should focus on the competitive development of domestic mobile phone brands and encourage the media to report the positive development of domestic mobile phone brands, thereby increasing users' understanding of smartphones and the influence that SI has on PI. The interactive effects between SI and BI show that smartphone and nonsmartphone users respond differently, with smartphone users exhibiting significant responses. That is, SI affects consumer BI. This affect amplifies concurrently with the popularity of the known brand. Therefore, mobile phone manufacturers and retailers must value the dissemination effect that SI has on their brand.

Alternative results show that the performance of the nonsmartphone users group was nonsignificant, suggesting that although consumers gain brand information through others' experiences, such information fail to increase the users' BI. A possible reason may be the users' lack of related experiences, and this is consistent with what Rahman[58] suggested. The present study suggests that the development of relevant consumer experience strategies should be reinforced, and such strategies should be promoted to one of the key competitive methods. For example, reinforcing experiential services, such as promoting a free-trial period and organizing workshops, can actively attract consumers to the product, help consumers

familiarize themselves with the product, and achieve ease-of-use. These activities also serve experienced consumers, who then affects other potential or inexperienced consumers. Therefore, the present study suggests that mobile phone manufacturers and retailers should focus on domestic and international exhibitions and conferences to create more opportunities for consumers to experience their products. Furthermore, the government should provide assistance to mobile phone manufacturers and retailers by arranging or creating environments suited for international trade shows for showcasing domestic mobile phone products, helping these products gain international popularity.

Limitations and future research

The questionnaires administered in the present study were directed at smartphone users in Taiwan, and did not include those of other countries. Advanced countries such as Europe and the United States comprise larger user groups and more cultural diversity in regard to user population. Thus, analyzing these user groups may produce different results. The respondents in the present study were largely students from undergraduate and graduate programs, with only a small number of other groups. In future, researchers can endeavor to expand the survey scope for a more in-depth analysis and to facilitate marketing adjustments. The present study only analyzed the PU antecedents in the involvement–brand loyalty model. Future researcher can endeavor to conduct a comprehensive investigation into all six antecedents proposed by Mittal and Lee.[12] Bhattacherjee and Premkumar[57] contended that the user beliefs and attitudes toward system usage change over time. Thus, future researchers can also consider investigating consumers' pre- and postpurchase changes.

Regarding suggestions for future academic research, first, a balance should be found between function integration and technological complexity. Although PU increases concurrently with the number of integrated functions, likewise, technological complexity also increases concurrently with the number of integrated functions, which reduces PU.

Second, future research can be conducted to verify whether the influence that convergence, innovation and network externality have on PU is similar in different countries, under different levels of consumption, and across different cultures. Third, a comprehensive analysis on the demographics of smartphone users can be conducted to fully outline the social contours, such as the age distribution of smartphone users, the interactive effects of various age groups, and the behaviors and relative proportion of the population that use smartphones to engage in digital government activities and c-commerce. Fourth, the respondents of the present study were largely students. Younger people could be more likely to be affected by SI, and the effects of SI may vary with respect to age and occupation. Therefore, future researchers can determine whether user age and occupation pose a mediating effect on the relationship between SI and PI. Fifth, future researcher can verify the applicability of the proposed model to different industries, and determine whether the model produces similar results.

Finally, previous studies have stated that consumers with purchase intention generally apply the usage experience of others into their purchasing strategies. However, findings of the present study indicated that consumers without purchase intention are not affected by SI. In other words, the degree of influence that others have on the perceived BI of nonsmartphone users is insignificant. The reason for this remains to be determined. Moreover, it is essential to investigate methods to enhance the BI of nonsmartphone users. Manufacturers and retailers should consider adjusting their marketing strategies to encompass both user and nonuser groups. They can further categorize nonusers into those with and without purchase intention to effectively market their products to all consumer groups.

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