

Study on the Antecedents of Mobile Wallet Use : Value-Based Perspective

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Abstract

Mobile wallet which manages mobile coupon and membership card in an integrative way is a sort of mobile service which grows fast thanks to its convenience and economic usefulness. However, despite of its fast growth, the increase in short-term users who don't continue to use mobile wallet has become a critical problem for mobile wallet service providers to create profit.

In this paper, to draw major considerations to extend the service use period for mobile wallet users, VAM (Value-based Adoption Model) was applied to verify the factors which affect continuous intent to use. Mobile wallet users feel emotional costs, for example facial consciousness, while using the service, VAM which considers both benefit and sacrifice seems an adequate methodology to study users' behavior intent.

This study aims to classify the factors which affect mobile wallet users' perceived value into benefit and sacrifice for comprehensive analysis. Then, the impact of perceived value on continuous intent to use was found. For the purposes, 200 users were asked to fill mobile wallet, survey to verify hypotheses.

As a result of study, usefulness in terms of benefit, value-expression, perceived security, and enjoyment appeared to have affected perceived value significantly. In terms of cost, the technicality affected perceived value significantly. In addition, perceived value has significant relation with continuous intent to use. By using the findings of this study, mobile wallet service provider is expected to consider functional and emotional aspects together for service improvement and marketing for short-term users.

Keywords—Mobile Wallet, VAM(Value-based Adoption Model), Continuous Intention to Use

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I. Introduction

Mobile wallet which provides discount for purchasing products or services through its integrative control of mobile coupon and membership card spreads fast in the market due to its convenience and economic usefulness. According to 'Smart Trend' report by DIGIECO, mobile wallet users have increased from 1,590,000 in 2012 to 6,910,000 in 2013 by 336%. Not only mobile communication companies but general card companies provide with mobile wallet service competitively in order to extend previous service and obtain new income models.

However, despite of its fast growth, short-term users who don't continue to use mobile wallet reached 35% [20]. It is top problem for to solve for its successful business to create profit. Therefore, mobile wallet service providers must identify the factors which induce constant use and apply them to service improvements and marketing actively, which is important.

In this study, the factors which affect continuous intent to use were tried to be checked by applying VAM (Value-based Adoption Model) theory. Mobile wallet users can feel emotional cost like shame when they suggest mobile coupon. Therefore, in addition to the benefit factor acquired by using service, cost factors must be considered together. Therefore, VAM considering the entire precedent factors of perceived value, benefit and sacrifice can be said suitable for this study.

In previous mobile wallet study was confined to technical such as introduction of the technologies applied to mobile wallet and realizing information protection. [12] [11] There was little study about mobile wallet user behaviors. Therefore, this study is meaningful in that it applied VAM theory for the first time and analyzed mobile wallet user's continuous intent to use. And the result of this study is expected to suggest users' emotion in addition to function of mobile wallet when drawing improvements to extend the use period. And the findings are expected to suggest the considerations of not only mobile wallet function but user's emotion in the section to come out with the improvements to extend short-term user's use period. Furthermore, for dormant customers, it will be used to induce them to reuse mobile wallet.

Therefore, this study aims to verify "First, what factors in terms of benefit and sacrifice affect perceived value of mobile wallet?" and "Second, do perceived value of mobile wallet continue to affect intent to use?"

II. Theoretical Background

A. Mobile Wallet

Mobile wallet is an integrative service to control paper coupon or plastic membership card by virtual application. [1] Therefore, mobile wallet users can accumulate points and get discount conveniently when they purchase and use products and services. Mobile wallet doesn't provide with service to users. But since it manages mobile coupon and membership card at once, users may enjoy the unique features, economic value and value-expression. And like NFC (Near Field Communication: NFC), mobile-imbedded payment system itself and 'mobile credit card' which replaces previous plastic credit card with mobile payment are not included in mobile wallet category which is confined solely to accumulation and discount service.

[Table 1] Mobile Coupon and Mobile Membership Card Definition

Section	Definition	Precedent Study
Mobile Coupon	Mobile-based service providing paper coupon in barcode	Jung, Sung-min 2011 ; Chandon et al. 2000; Ashworth et al. 2005;
Mobile Membership Card	Service displaying membership card on screen in barcode	Choi, Dae-seon 2011

B. VAM (Value-based Adoption Model)

In the study on TAM or UTAUT theories-applied new technology acceptance, only benefit from service use was considered. However, the values that users may acquire by accepting technologies have sacrifice in addition to benefit. Both of them must be considered. Kim et al. (2007) suggested VAM (Value-based Adoption Model) which takes both benefit and sacrifice which occur while using new IT technologies into account based on perceived value by Zeithamal (1988).

According to the findings by Zeithamal (1988), perceived value refers to all the benefits and sacrifices (effort and time) that customers might acquire when they purchase products or services not confined to finance. Therefore, perceived value can be said the sum of sacrifice that consumers must take when they use benefits of product and service purchased.

VAM model classifies precedent variables of perceived value into benefit and sacrifice. In terms of benefit, it consists of 'usefulness' and 'enjoyment'. In terms of sacrifice, it consists of 'technical effort' and 'recognized cost'. Usefulness means users' faith level for IT technologies usability that they use. Since users can manage coupon and membership card in an integrative way through mobile wallet, they recognize them very useful. [17][5] Enjoyment refers to pleasure level that users feel while they use IT technologies. The users can feel enjoyment and pleasure by using virtual products provided in the form of virtual barcode on mobile rather than by using tangible items, for example paper or plastic products. [2]

Technical effort means the level of physical and mental effort required to users while using IT technologies. It is similar to the technicality that users might feel when they use new system. This type of complexity is a representative factor which requires time and mental effort from users. [6][13] The perceived fee refers to required cost when users use IT technologies. However, most of mobile wallet is provided for free. So, it was not into consideration.

And for the special service, mobile wallet, users' perceived value considering both benefit and sacrifice affects intent to accept. According to the findings on users' purchasing behaviors by McDougall and Levesque (2000), perceived value was found affecting users' intent to purchase significantly.

Therefore, since this paper aims to study mobile wallet users' continuous use, continuous intent to use was employed rather than intent to accept.

C. Major Factors which Affect Mobile Wallet Value

As precedent factors which affect perceived value of mobile wallet, economic value, value-expression, and perceived security must be into consideration. When users purchase products or service through mobile coupon, they can get instant discount, which is economic benefit. [19] Economic value is a critical factor for mobile wallet perceived value. In addition, users can save time and effort by suggesting mobile coupon instantly when purchasing products or services. They can get additional emotion value to be seen as wise customers. [2][15] This emotion value is called value-expression. Even in mobile wallet, value-expression is a critical affecting factor for perceived value. Mobile wallet collects personal information to provide with user-customized information. [4] And when users provide with information, safety recognition in terms of security is considered as critical in using IT technologies. [21] Therefore, when users use mobile wallet, 'perceived security' that protects personal information safely comes to affect perceived value.

As additional factors for sacrifice which affect perceived value of mobile wallet, privacy concern and facial consciousness must be considered. When users have to provide with their own personal information to service provider, their worries about privacy infringement may get greater. [14][1] Therefore, for individual-customized information provision, and privacy concern affects perceived value negatively in mobile wallet which collects personal information to provide.

III. Research Model

A. Precedent factors for VAM-imbedded constant use intent

VAM theory is applied to the study which aims to find users' intent to accept diverse information technologies,

centered in perceived value. Kim, Dong-ho et al. (2012) verified the impact of VAM model on the intent to adopt Cloud in their study on the factors of adopting Cloud Computing service. Han, Jun-hyeong et al. (2013) found that four independent variables of VAM model and two subordinate variables were significantly related in the study on smart phone's continuous intent to use and perceived value. Based on the finding, the following hypotheses could be established.

H2. Usefulness affects perceived value of mobile wallet positively.

H5. Enjoyment affects perceived value of mobile wallet positively.

H7. Technicality perceived value of mobile wallet negatively.

H9. Perceived value affects constant intent to use mobile wallet positively.

B. Additional Factors for Benefit (Economic value, Value-expression, Perceived security)

Economic value refers to be financially better off by price benefit from coupon as one may recognize. [19] According to the findings by Shimp and Kavas (1984), consumers who feel high level of economic benefit to maximize their own economic value, are more likely to use coupons.

Value-expression refers to make customers look wiser by increasing productivity and saving less time and effort while using coupon. [2] Lichtenstein et al. (1990) found that value-expression like self-confidence affected perceived value significantly.

The perceived security refers to secured feeling level when individuals deliver critical information. [21] Na, Yoon-gyu and Seo, Hyeon-seok (2007) found that one of the features of internet shopping mall sites, security affects the perceived shopping value significantly. Kim, Bon-su and Bae, Mu-un (2010) found that perceived security in internet open market affect perceived value significantly. Therefore, the following hypotheses could be established.

H1. Economic value affects perceived value of mobile wallet positively.

H3. Value-expression affects perceived value of mobile wallet positively.

H4. The perceived security affects perceived value of mobile wallet positively.

C. Additional Factors of Sacrifice (Privacy concern, facial consciousness)

Privacy concern refers to worries about potential personal information infringement during mobile wallet acceptance. [14] Cespedes and Smith (1993) stated that mobile wallet may infringe personal privacy in forms of personal information collection and use. If one is sensitive to privacy, one doesn't

want to provide personal information to others. In other words, when privacy infringement is worried, users may not accept service.

Facial consciousness tells us how one may consider prestige as important. [18] In the study on the intent of mobile wallet use by Ashworth et al. (2005), prestige loss which occurs by suggesting coupon was suggested very critical emotional variable. User's prestige loss and desire to control his/her image were verified critical variables to affect intent of use. Therefore, the following hypothesizes can be established.

H6. Privacy concern will affect perceived value of mobile wallet negatively.

H8. Facial consciousness will affect perceived value of mobile wallet negatively.

IV. Study Methodologies

A. Data Collection and Sample Traits

Survey in this study targeted individuals more than 20s who are using mobile wallet at the moment was conducted through internet. The data from total 200 participants were used for analysis. Among demographic traits from samples used in the results analysis, in gender, male occupied 36% and female 64%. In age, participants in 20s occupied most 75%. In addition, in job, students occupied by 55% and workers 33%. In mobile wallet use period, less than 6 months occupied most 45% and 29% less than one year. In addition, in terms of the frequency of mobile wallet use, the users who use once every 2 to 3 day occupied by 30%. Users who use more than once a week occupied 28%.

V. Data Analysis & Hypothesis Verification

A. Analysis of Measured Items

SPSS 18.0 for Windows is applied to analyze conceptual validity of measuring tools and executive factor analysis in this study. Generally, when factor loading is more than 0.6 and cross loading is more than 0.4, the measured items are considered valid in conceptual aspect. [8]

The determinant validity should generally have higher factor loading of measured items than cross loading. The square root of average variance extracted in each study should be higher than coefficient of correlation with other concepts. [3] [16]

Convergent validity is evaluated by factor loading, AVE, and composite reliability [3] Generally, factor loading and average variance extracted has convergent validity when they are more than 0.5. When composite reliability is more than 0.6, it can be considered that it acquired of internal consistency and convergent validity. [9]

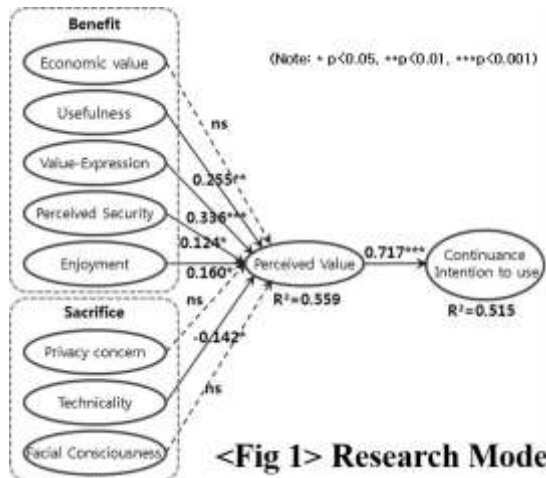
[Table 2] Descriptive Statistics, Reliability and Validity of Research Constructs

	Mean	S.D	ECO	USE	VEX	PSE	ENJ	PRC	TEC	FAC	PVA	CIU
ECO	4.39	1.46	0.96									
USE	5.03	1.14	0.33	0.88								
VEX	4.61	1.27	0.47	0.61	0.93							
PSE	4.04	1.16	0.26	0.38	0.37	0.94						
ENJ	4.19	1.36	0.29	0.43	0.55	0.27	0.92					
PRC	5.25	1.33	0.02	0.07	0.08	-0.26	0.05	0.89				
TEC	3.69	1.13	-0.07	-0.02	-0.12	-0.15	-0.09	0.18	0.87			
FAC	2.53	1.38	0.15	-0.03	0.09	0.03	0.19	0.10	0.32	0.92		
PVA	4.80	1.13	0.34	0.61	0.64	0.41	0.49	-0.01	-0.23	0.02	0.94	
CIU	5.06	1.43	0.31	0.67	0.59	0.41	0.41	-0.07	-0.19	-0.07	0.72	0.98

As a result of extracting factors from major factor analysis which uses very max rotation method by using SPSS 18.0, factor loading of all measuring items appeared more than 0.6. Like [Table 2], the average variance extracted of all the study variables was more than 0.5. Cronbach's α also exceeds 0.7. Convergent validity and reliability were checked. And the square root of average variances extracted in each study variable was greater than coefficients of correlation with other concepts like [Table 2]. Therefore, the determinant validity was checked. In addition, the determinant validity was tested again by verifying multicollinearity. VIF should be less than 10 in multicollinearity verification. The state index should be less than 30 to secure the determinant validity. [3][16] As a result of identifying multicollinearity, all the variables used in this study were checked they had the determinant validity since VIF and the state index met the standard values.

B. Hypothesis Verification and Results

As a result of verifying the hypotheses in this study, usefulness, value-expression, perceived security, enjoyment, and technicality in terms of benefit and sacrifice appeared to affect perceived value significantly. Economic value, privacy concern, and facial consciousness were rejected (not-significant). Finally, it was found that perceived value have significant relation with continuous intent to use. In addition, R-square value for the potential variables in this study model exceeds 0.10 like [Fig. 1]. It is judged descriptive. Reliability in each potential variable has 56% descriptive ability in perceived value and 52% in continuous intent to use.



VI. Conclusion and Issues

This study reviewed the previous precedent factors in new viewpoint of precedent factors such as benefit and sacrifice through VAM model which affects users' continuous intent to use and perceived value for mobile wallet which controls coupon and membership card in an integrative way in consideration of current circumstance, conversion of internet-oriented life style into mobile-oriented one. **The findings of this study can be summarized as follows.** First, the factors; usefulness, enjoyment, value-expression, and perceived security in terms of benefit were found affecting perceived value significantly. Second, in terms of sacrifice, only technicality was found affecting perceived value significantly. Finally, it was found that perceived value, one of the major disputable issue in this study affects continuous intent to use. **The academic issues in this study are as follows.** First, in terms of mobile wallet values, VAM (Value-based Adoption Model) was adopted for the first time which takes benefits and sacrifice aspects into account. In previous studies, only the benefits of use were taken into account but in this study, sacrifice aspects were also considered to provide with the methodologies of comprehensive analysis of users' opinion on mobile wallet. Second, the factors which affect the intent of mobile wallet use were checked. Particularly, unlike previous studies which focused only on economic and emotional satisfaction aspects, this study considered users' internal factors as well such as enjoyment, value-expression, facial consciousness, etc. **The practical issues of this study are as follows.** First, the usefulness of mobile wallet was checked significantly-affecting perceived value. Therefore, it is necessary to empathize managing and using coupon and membership card in an integrative way is more useful. For example, as a method of facilitate dormant customers for membership card, the usefulness of mobile wallet can be taken into account as a critical marketing material. Second, as the value-expression of mobile wallet was checked affecting significantly perceived value was checked, it needs to intensify users' image as wise consumers when using mobile wallet. For example, by displaying total discount amount received from membership card and coupons, users can deliver wise consumption habits. Third, mobile wallet's perceived security was verified that it has a significant relation with perceived value. Therefore, it is important for users to have the recognition that the collected personal information is protected safely. It is one of the ways for users to check the

relevant service security state by applying it to mobile wallet UI whenever they use services. Fourth, enjoyment of mobile wallet was checked affecting perceived value significantly. Therefore, when users use mobile wallet, they need to consider personal enjoyment as a functional factor. For example, by applying design factors which can insert pictures, decorations, etc. that users want to traditional linear barcode forms, pleasant experiences can be provided which are different from previous services. Finally, it was verified that the technical complexity of mobile wallet had negatively significant relation with perceived value. So, considering user convenience, UI or installation manuals should be provided. As more consumption adopting mobiles occurs, coupon and membership card in mobile wallet increase as well. So, the technicality can be reduced by placing coupon and membership card to the top automatically.

There are some limits in this study. First, for more specific analysis of factors that affect mobile wallet values comparative analysis on significant factors is required. By comparing each variable weight, plans and designs to test and respond the factors which affect perceived value will be able to be drawn. Second, survey targets were mainly students in 20s and 30s. Considering mobile wallet is used by different age groups and career groups, in prospective researches, the broader age classes and career groups need to be into consideration.

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