

A Study on Behavioral Intention of Sharp (#) Mail Potential Users Focused on Non-Repudiation Function

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Abstract

As a rapid change has taken place around 2010 in existing media, they have expanded into smart media through next-generation networking by adopting reinforced computing functions and platforms. Such a timely, new emerging paradigm has brought out new technology and service in the field of electronic document. Out of the electronic document systems, a new emerging one that is valid is Sharp(#) Mail, which is different from existing e-mail systems. As explosive growth is expected in Sharp(#) Mail since 2013, many providers have started their business with Sharp(#) Mail solution and service, which, however, is low in the practical use of them, contrary to expectations in Sharp(#) Mail. This study herein aims to provide data and implications in which theories can be used in business by drawing a conclusion that can invigorate Sharp(#) Mail from a theoretical perspective through analysis on individual-targeted acceptance factor for individuals' Sharp(#) Mail. Unified Theory of Acceptance and Use of Technology (UTAUT) was conducted for the study, which has much used in the research on users' acceptance factor recently. For the subject of study, data were collected through the questionnaire survey developed to measure the use intention targeted for potential users who have an intention to use Sharp(#) Mail, research models and hypotheses were developed by using the PLS Path Modeling Approach to verify research hypotheses, and statistical analysis was conducted by using SMART PLS 2.0 analysis tool.

Results derived from the study are as follows. Measurement results analyzed that as suggested in UTAUT, performance expectancy and social influence were a positive effect on potential users' use intention of Sharp(#) Mail. However, contrary to what is suggested in UTAUT, effort expectancy factor was analyzed as the outcome dismissed on significant effect relation with the use intention of Sharp(#) Mail users. As suggested in analysis results, this indicates that there is no significant effect of individuals' effort expectancy factor in that Sharp(#) Mail is a business-based solution used in a policy-wise, business-wise manner.

Keywords: #-Mail, Electronic Document, Authorized Electronic Address, UTAUT, Security

1. Introduction

As a rapid change has taken place around 2010 in existing media, they have expanded into smart media through next-generation networking by adopting reinforced computing functions and platforms. Smart media provide more convenient, useful values to users through speedy, intelligent interaction and opening, which creates new business opportunities to companies [1]. This timely, new emerging paradigm has brought out new technology and service in the field of electronic document. The electronic document stands for digital documentary expressed so that both machine and human being can understand it for information

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distribution [2]. Out of the electronic document systems, a new emerging one that is valid is Sharp(#) Mail, which is different from existing e-mail systems. Sharp(#) Mail is a new mail system and function based on authorized electronic address, which can be a new paradigm of new emerging mail solution and service as electronic explosion said by Alvin Toffler, and will lead to a bigger change compared to PC revolution in the past. As explosive growth is expected in Sharp(#) Mail since 2013, many providers have started their business with Sharp(#) Mail solution and service, which, however, is low in the practical use of them, contrary to expectations in Sharp(#) Mail. As shown in Figure 1 in terms of the size of the market, the Sharp(#) Mail solution market will be 754 hundred million won industry by 2017, which is more than 4 times larger compared to the size of the market in 2013, 138 hundred million won industry, meanwhile the Sharp(#) Mail service market is expected 1.6 trillion won by 2017, 5 years later from the size of the market in 2013, 591 hundred million won industry.

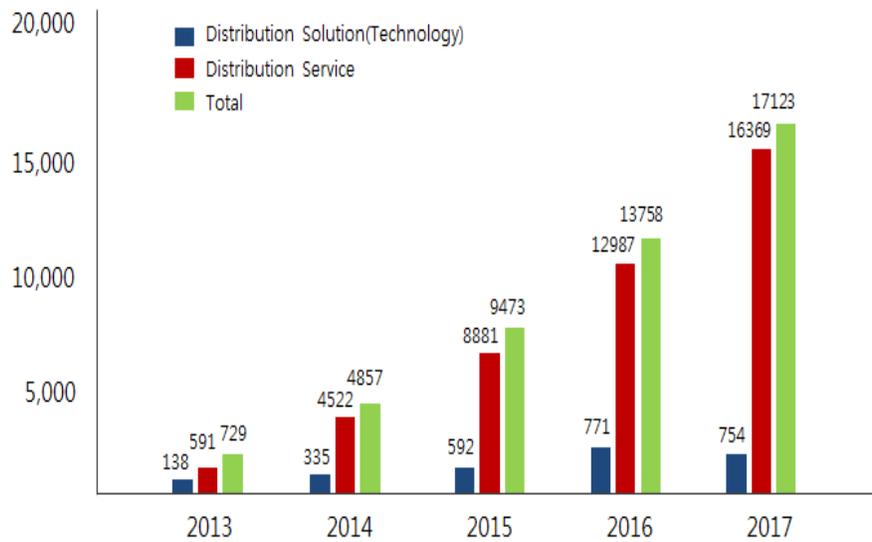


Figure 1. Size of the Sharp(#) Mail Distribution Market (Unit: Hundred Million Won)

However, contrary to expected data of the optimistic market, as the number of Sharp(#) Mail users is currently very low, many experts raise issues in availability of the Sharp(#) Mail as a government-led new technology model.

Therefore, this study herein analyzes what factors are required so that the Sharp(#) Mail can be settled as a solution and service that does not disappear in not only public sector but also private sector, and suggests implications. To achieve this, the study herein aims to provide data and implications that can be used in business by deriving acceptance factor in which the Sharp(#) Mail can be invigorated from a theoretical perspective through analysis targeted for individuals who recognize the Sharp(#) Mail on their acceptance factor of it.

As such, the purpose of this study is to consider potential users' acceptance factor for the Sharp(#) Mail where its service has just begun in South Korea and it has no or few existing research, which is based on results different depending on context and culture as implications suggested in the research of [3].

2. Related Studies

2.1. Definition of Sharp(#) Mail

The Sharp(#) Mail is defined as authorized electronic mail that can transmit and receive electronic document by using authorized electronic address, which is a service that confirms users' identification and verifies electronic document contents transmitted or received. As the Sharp(#) Mail guarantees exact transmission or reception of electronic document, the mail can transmit and receive document in a safe manner through encryption of it, and has benefit in that it ensures legal force of transmission and reception of electronic document and document transmitted and received.

2.2. Understanding of UTAUT

Unified Theory of Acceptance and Use of Technology (UTAUT) was announced in Venkatesh, *et al.*, article in MIS Quarterly in 2003. With a theoretical background of UTAUT aiming to explain the use intention and use behavior of information system users, the theory considers 8 models related to technology acceptance, suggesting 4 core construct concepts (*i.e.*, performance expectancy, effort expectancy, social influence, and facilitating conditions) by integrating 32 construct concepts revealed significant in the existing research out of 8 models [4].

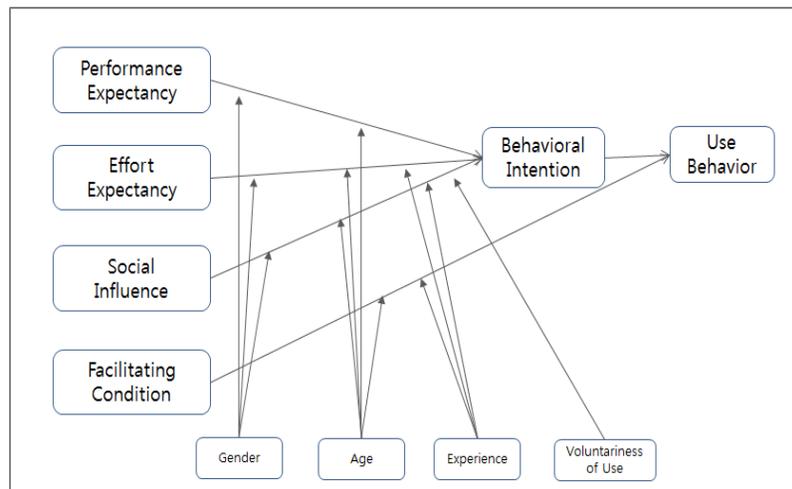


Figure 2. A Research Model of UTAUT

2.3. Study in Relation to UTAUT

UTAUT is applied to many different areas such as information technology and ICT areas. Related research integrated into new technology and trends becoming a hot topic is much conducted as follows: A Study of Acceptance Factors on ICT use at university [5], A Study of Acceptance on Process Management Software [6], A Study of Blog Technology Use [7], A Study of Acceptance Factor on Mobile Search [8], A Study of Acceptance Factor on Internet Phone [9], A Study of Acceptance Factor on Ubiquitous Computing [10], and A Study of Acceptance Factor on e-Mail Use [11]. Although many different preceding research on information technology and service using UTAUT models, no or few research[12, 13] was conducted regarding Sharp(#) Mail.

3. Research Model and Research Design

3.1. Conceptual Research Model

To resolve research problems such as What are the factors affecting Sharp(#) Mail potential users' use intention of Sharp(#) Mail Solution and Service, and What a causal relationship between them?, a research model was set up as Figure 3, based on UTAUT suggested by Venkatesh, *et al.*, [14].

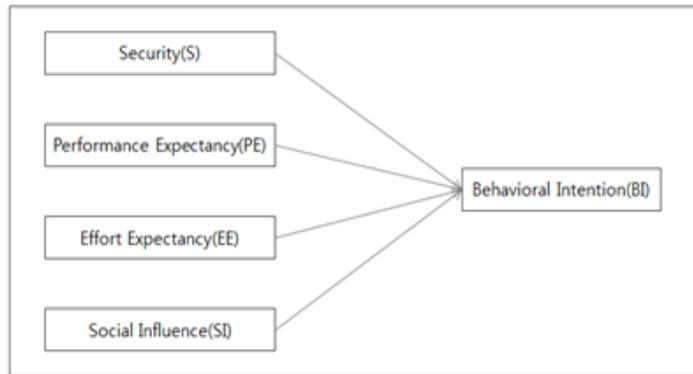


Figure 3. A Research Model for Use Intention Analysis on Sharp(#) Mail

3.2 Hypotheses

A model hypothesis to be verified in this chapter of the study was composed of 5 factors by adding Security factor that can influence the behavioral intention suggested in [14]. to achieve the purpose of the study, apart from 3 UTAUT factors (*i.e.*, performance expectancy, effort expectancy, and social influence).

H1. Performance Expectancy has a positive effect on the use intention of Sharp(#) Mail solution and service.

H2. Effort Expectancy has a positive effect on the use intention of Sharp(#) Mail solution and service.

H3. Social Influence has a positive effect on the use intention of Sharp(#) Mail solution and service.

H4. Security Factor has a positive effect on behavioral intention of Sharp(#) Mail solution and service users.

3.3 Definition of Research Variables

A For the construct concepts used and measured in this study, measuring items were used, where reliability and validity are verified in existing preceding research, and performance expectancy, effort expectancy, social influence, and security were set up as an independent variable in the paragraph to analyze relationship between specific variable status and variable.

Table 1. Research Variables

Variable	Measured Variables	Measuring Item Source
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Performance Expectancy	Usefulness Improved Work Productivity Easy Work Process Usefulness of Evidence	Venkatech, <i>et al.</i> , (2003) Oye, N. D., <i>et al.</i> , (2012)
Effort Expectancy	Adaptability Easy Cognition of Use Work Applicable Convenience Easy Learning Based Technology Availability	Venkatech, <i>et al.</i> , (2003) Oye, N. D., <i>et al.</i> , (2012)
Social Influence	Recommended Intention Extent of Convenience Awareness Awareness of Availability Use Intention and Desire Popular Generality	Venkatech, <i>et al.</i> , (2003)
Security	Privacy Protection Safety Safety of Internet Security Safety of Information Infringement Safety for Data Leakage Work Performance Safety	S. H. Jeon, <i>et al.</i> , (2011) H. Jo and S. G. Lee (2012) Buelling and Woeter (2004)
Behavioral Intention	Use Intention Level Unconscious Use Awareness Future Use Planning Expendability Acceptance Level	Venkatech, <i>et al.</i> , (2003) Oye, N. D., <i>et al.</i> , (2012)

3.4. Data Collection and Samples

The object of this study investigation, to get survey results that are substantial and valid for the characteristics of acceptance factor research and the purpose of study, a questionnaire survey was carried out twice, intended for individuals who can use the Sharp(#) Mail solution and service. To collect data, the first questionnaire survey was carried out for 117 individuals appropriate for this study. Further, the secondary questionnaire survey was carried out for members of professional research companies since mid-October in 2013, which was conducted for individuals who exactly recognized a concept of Sharp(#) Mail and understood the concept of it as what was conducted in the first survey. Through this process, collected were 198 samples that can be used for analysis of the study.

4. Test and Analysis

4.1. Characteristics of Sample Data

The respondents of 198 samples of the valid questionnaire survey made up 58.6% of male and 41.4% of female by gender, and 8.6%, 44.4%, 33.3%, and 13.6% of 20s, 30s, 40s, and 50s by age group, respectively. The respondents in their 30s and 40s account for 77.7% of total respondents. By educational background, high school graduates, two-year college graduates, four-year college graduates, and graduate school graduates account for 11.1%, 14.1%, 63.1%, and 11.6% of the respondents, respectively. By occupation, company employees, professionals, teachers or lecturers, self-employed business, government employees, and others account for consist of 22.2%, 8.6%, 11.1%, 3.5%, 52.0%, and 2.5% of the respondents, respectively. By occupational group, planning, research, judicial/contract affairs, sales, personnel, financial/accounting, and others account for 20.2%, 26.8%, 3.0%, 14.6%, 3.0%, 10.1%, and 22.2%, respectively.

4.2. Data Analysis Approaches

In this study herein, Partial Least Square Regression (PLS) Path Model, one of the structural equation models, was used to verify research hypotheses regarding the effect between the factor affecting the use intention, as independent variable, and the use intention. For analysis tool, the SmartPLS 2.0 program was used. Unlike structural equation models (e.g., Linear Structural RELation (LISREL), AMOS, etc.) based on common factors, the PLS Path Model stands for a structural equation model based on principal component that is total dispersion, which is a technique which can evaluate Measurement or Outer Model measuring a validity of variable and Structural or Inner Model representing path and explanatory power of variable [18].

4.3. Measurement Model Analysis

In this study, Confirmatory Factor Analysis (CFA) was conducted to analyze measurement models, whose results are derived from analysis on the PLS Measurement Model. To analyze measurement models, evaluated were Convergent Validity, Internal Consistency, and Discriminant Validity on measuring items, and identified was the suitability of them [19].

4.3.1. Convergent Validity

Convergent Validity can be grasped through the reliability of individual measuring items. For individual measuring items with reliability, as the individual measuring items and equivalent variables should have higher shared variance compared to error variance, required are standardized loading values that should be 0.7 ideally, and 0.6 at minimum [18].

Confirmatory Factor Analysis (CFA) conducted is shown in Table 2, which shows result values derived from eliminating an explanatory value (EE5:0.35) of Effort Expectancy short of threshold in the first analysis and verifying Convergent Validity.

Table 2. Result of Confirmatory Factor Analysis(Loadings/Cross Loadings)

Measuring Item	Behavioral intention	Effort Expectancy	Performance Expectancy	Security	Social Influence
BI1	0.881	0.661	0.700	0.567	0.724
BI2	0.816	0.529	0.570	0.527	0.643
BI3	0.884	0.581	0.603	0.503	0.654
BI4	0.885	0.611	0.597	0.553	0.667

EE1	0.650	0.838	0.629	0.504	0.693
EE2	0.535	0.844	0.533	0.510	0.631
EE3	0.599	0.818	0.775	0.498	0.682
EE4	0.465	0.809	0.501	0.436	0.580
PE1	0.719	0.662	0.889	0.515	0.766
PE2	0.608	0.623	0.875	0.420	0.683
PE3	0.600	0.669	0.904	0.457	0.698
PE4	0.535	0.646	0.803	0.508	0.624
SEC1	0.527	0.523	0.472	0.862	0.526
SEC2	0.432	0.433	0.365	0.839	0.420
SEC3	0.561	0.555	0.504	0.932	0.552
SEC4	0.579	0.506	0.480	0.919	0.548
SEC5	0.625	0.587	0.572	0.884	0.581
SI1	0.729	0.693	0.729	0.536	0.893
SI2	0.638	0.661	0.697	0.453	0.870
SI3	0.598	0.670	0.627	0.561	0.850
SI4	0.678	0.703	0.692	0.566	0.838
SI5	0.642	0.613	0.651	0.420	0.791

As shown in Table 2, all the individual measuring items show a value 0.7 or above, and all the measuring items exceed 0.791 or above. Thus, all the measuring items used in this study are valid to measure equivalent variables in an individual manner, which indicates that all the measuring items secure Convergent Validity.

4.3.2. Internal Consistency

As internal consistency is a level of validity in which a latent variable set of specific observed variable reflects latent variable, Cronbach's Alpha, Average Variance Extracted (AVE), and Composite Reliability were used to analyze the internal consistency of measuring model. Generally, it has reliability if it is 0.6 or above in Cronbach's Alpha [20], and if it is 0.5 or above in AVE value [21], and it has internal consistency if it is 0.7 or above [22] in Composite Reliability.

As the internal consistency shown in Table 3, all the items exceed the above-stated threshold, which secures internal consistency.

Table 3. Good of Fit of the PLS Path Model

	AVE	Composite Reliability	R Square	Cronbach's Alpha	Communality	Redundancy
Performance Expectancy	0.755	0.925		0.891	0.755	
Effort Expectancy	0.684	0.897		0.847	0.684	
Social Influence	0.721	0.928		0.903	0.721	
Security	0.788	0.949		0.933	0.788	
Behavioral Intention	0.751	0.924	0.660	0.889	0.751	0.077

Good of Fit: 0.699

4.3.2. Discriminant Validity

Discriminant Validity is a level discriminating a concept of a specific latent variable from a concept of other latent variables, which was evaluated in the study with the two following conditions suggested by [23]: first, loadings should be higher compared to cross loadings in other factors to secure discriminant validity, and second, a variable has validity if it uses a square root value of mean dispersion extracted value of all the extracted variables, and an

AVE square root value is higher compared to correlation coefficient and 0.7 or above to analyze discriminant validity in a general manner.

Table 4. Analyzed Results of Discriminant Validity of Latent Variable

	Behavioral Intention	Effort Expectancy	Performance Expectancy	Security	Social Influence
Behavioral Intention	0.87				
Effort Expectancy	0.69	0.83			
Performance Expectancy	0.72	0.75	0.87		
Security	0.62	0.59	0.55	0.89	
Social Influence	0.78	0.79	0.80	0.60	0.85

As shown in Table 4, a square root value of AVE is expressed in a diagonal axis of correlation coefficient between variables, where the lowest value, Effort Expectancy, is 0.83, and all the factors are more than 0.7, compared to the AVE value to which square root is applied. Further, the AVE values exceed correlation coefficient between variables of 5 factors, which indicating they have discriminant validity.

4.4. Structural Model Analysis

Applicability of structural model evaluates variance explanation power (R2) of structural concept, and also evaluates significance of path coefficient (β) expressing causal relationship information between two variables through structural equation analysis.

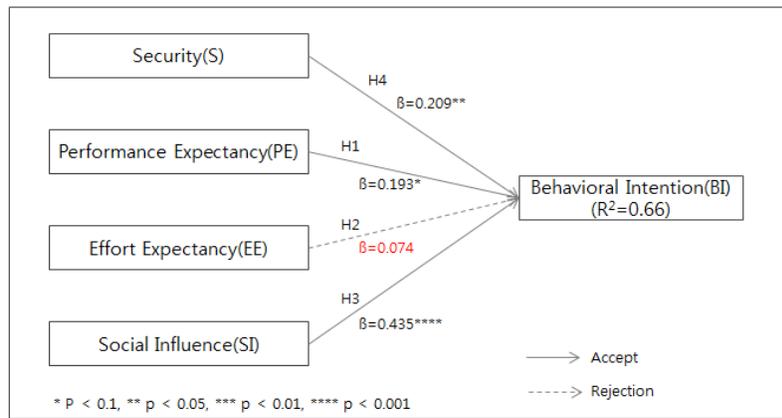


Figure 5. Structural Model Analysis Results

[Hypothesis 1] Resulting from the hypothesis verified that performance expectancy has a positive effect on the use intention of Sharp(#) Mail solution and service, the path coefficient between performance expectancy and behavioral intention variables is 0.193(t=1.787, p < 0.1), supported by the 0.1 significance level. Thus, Hypothesis 1 was adopted. The result indicates that performance expectancy factor verified in existing preceding research is significant in the model of this study. Further, performance expectancy factor also affects the use intention of Sharp(#) mal users.

[Hypothesis 2] Resulting from the hypothesis verified that effort expectancy has a positive effect on the use intention of Sharp(#) Mail and solution, the path coefficient between effort expectancy and behavioral intention variables is 0.074(t=0.824), which is not supported by

the 0.1 significance level. Thus, Hypothesis 2 was rejected. The result can be interpreted that effort expectancy factor has a significant effect on the use intention of Sharp(#) Mail, contrary to existing preceding research.

[Hypothesis 3] Resulting from the hypothesis verified that social influence has a positive effect on the use intention of Sharp(#) Mail and solution, the path coefficient between social influence and behavioral intention variables is 0.435($t=3.402$, $p < 0.001$), supported by the 0.1 significance level. Thus, Hypothesis 3 was adopted. This result indicates that the social influence verified in existing preceding research is also significant in the model of this study. Further, the social influence affects the use intention of Sharp(#) Mail users.

[Hypothesis 4] Resulting from the hypothesis verified that the security factor has a positive effect on the use intention of Sharp(#) Mail and solution, the path coefficient between security factor and behavioral intention variables is 0.209 ($t=2.410$, $p < 0.05$), supported by the 0.05 significance level. Thus, Hypothesis 4 was adopted. This result indicates that the security factor verified in existing preceding research is also significant in the model of this study. Further, the security factor affects the use intention of Sharp(#) Mail users.

Security serves as influence factor since the Sharp(#) Mail is based on internet environment, and recently internet users rate highly security such as privacy protection and hacking [24]. Further, this is in line with the research inquiring into the influencing relationship between security factor and use intention in the research of cloud computing acceptance factor in public sector conducted by [15].

Further, this is in line with a result suggested that the security factor has a significant effect on the use intention as A Study on Factors Affecting the Usage of the Digital Copyright Exchange in Knowledge Service Convergence Era conducted by [25]. Summarized results of the hypotheses verified are shown in Table 5.

Table 5. Summarized Results of the Hypotheses Verified

Hypothesis	Path Coefficient	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics	Adopted/ Rejected
H1 Performance Expectancy -> Behavioral Intention	0.193*	0.1907	0.108	0.108	1.787	Adopted
H2 Effort Expectancy -> Behavioral Intention	0.074	0.0889	0.095	0.095	0.824	Rejected
H3 Social Influence -> Behavioral Intention	0.435*****	0.4342	0.128	0.128	3.402	Adopted
H4 Security -> Behavioral Intention	0.209**	0.2031	0.086	0.086	2.410	Adopted

5. Conclusion

As shown in Table 5, the results of the hypotheses verifying the use intention of Sharp(#) Mail show that there is a little difference between what is suggested by [14] and factors affecting the behavioral intention.

This indicates that Sharp(#) Mail is a business-based solution strategically promoted, which is derived from the characteristics of it based on internet environment.

First, as Sharp(#) Mail can affect business performance as it is mostly used for contract- or judicial-related mail in organizations, it has limitation to explain relevancy of individual effort.

Second, as Sharp(#) Mail is used under internet environment with increased security incidents such as hacking becoming a big social issue and users' enhanced security awareness, the security factor serves as factor affecting the use intention, contrary to the research conducted by [14]. Further, as stated in research results of [24]'s A study on longitudinal differences in website user's trust factors, this is inferred from change in importance of acceptance factor regarding users' new service and solution, contrary to the time when Venkatesh, *et al.*, conducted research about 10 years ago. This inference is in line with conclusion and context in which results can be different depending on context and culture as implications suggested in the research of [3].

The growing use of Sharp(#) Mail is resulting from policy- or business-wise necessity, rather than individual interest. Thus, as herein suggested in the hypothesis verified by this study, for the use of Sharp(#) Mail in which social influence can have the most effect on the use intention, one of the most important, necessary factors that can invigorate new-emerging Sharp(#) Mail is how the use of Sharp(#) Mail can create social atmosphere on the early use of it by considering timely-important factors including the security factor that users consider important.

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