A Meta-Analysis of Influencing Factors on Purchase Intention in Social Network Service Environment Utilized Big Data Analysis

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ABSTRACT

This study will find meaningful independent variables for criterion variables that affect influencing on purchase intention in social network service, on the basis of the results of a meta-analysis. We reviewed a total of 29 studies related purchase intention in social network service published in Korea journals between 2005 and 2015, where a cause and effect relationship is established between variables that are specified in the conceptual model of this study. The result of the meta-analysis might be summarized that the highest effect size ($r = .455$) is the path from the satisfaction to the purchase intention. The second biggest effect size ($r = .398$) was found in the path between the word of mouth to the purchase intention. Next, the effect size ($r = .386$) in the path from the trust to the purchase intention showed very lower. Finally, the result of the meta analysis can be concluded that lower effect size ($r = .342$) Further, the predictive variables of this study have power of explanation about $22\%$-$12\%$ or more. Based on these findings, several theoretical and practical implications were suggested and discussed.

Key word : Big data, Social network service, Social commerce, Meta analysis, Purchase intention
I. INTRODUCTION

SNS (social network service) are diffused in all the world as a new business model that combines these began to emerge. Among them is the issue immediately social commerce. The social commerce, traditional e-commerce can be meant for the type of combined with social networking services [1]. Also, social commerce is a kind of e-commerce utilizing social media and online media. The social commerce is a kind of e-commerce as new concept of utilizing social networking services such as Twitter, Facebook, etc. Further, the social commerce as type of social links, social web type, joint purchase and offline linked can be classified into four kinds of forms. The one of the four types such as joint purchasing is recognized as the typically of the social commerce. In particular, such as Facebook and Twitter, etc. based on the social networking services can be seen as the biggest difference among the existing joint purchasing [2]. Typical features of these social commerce were restricted within the number of persons or time to purchase certain products and services. These services must meet the conditions of limited the number of persons to purchase the specific product in an unprecedented discounts provided during the limited time. Thus, these activities as provided of promote products and purchasing information using social media were actively doing [2].

The overview of this study is as follows. In Chapter 2, it tries to review of the previous research of influencing factors on purchase intention in the social network service environment. Next, it tries to summarize the previous studies of the meta-analysis of purchase intention in the e-commerce environment. And, suggested the conceptual model of this study, was proposed the raw data used in the meta-analysis. In Chapter 3, based on the methodology of the meta-analysis, showed a method for calculating the effect size, the homogeneity-test, publication bias, and Fail-safe number. Finally, the effect size between the constructs presented in the conceptual model showed in Table 5, Table 6, Table 7, Table 8, and Table 9. Also, several theoretical and practical implications were conclusion and discussions of this study.

II. PREVIOUS RESEARCH

Looking at the previous research related social network services, the study on “Consumers’ Purchase Intention and Satisfaction of Social Commerce” [2] that showed with the factor affecting on the product purchase which the price discounted than the discount rate when the social commerce usage. The study on “The Effects of Selection Attributes and Purchase Intention by Consumption Tendency of Social Commerce User's” [3] that was reported the net such as establish the plan to further simplify the ordering process and the payment of the social commerce service. In addition, the method for reducing time using the social commerce service was showed more important. The study on “The Motives for Using Social Commerce and Satisfaction, Repurchase Intention” [4] showed that only ‘economy’ and ‘information acquisition’ factors are meaningful on motivation of use which affects satisfaction after using the social commerce. In addition, the effect of social commerce satisfaction on repurchase intention found out to be positive.

The searching of the previous research related meta analysis, The study on “A Meta-analysis of the Relationship between Mediator Factors and Purchasing Intention in E-commerce Studies” [5], supported the weighted mean value with the random effects model that the path from the satisfaction to the purchase intention showed the effect size \( r = .537 \). In addition, the results of the study showed that the weighted mean value of the path from the trust to the purchase intention was the effect size \( r = .542 \), and the weighted mean value of the path from the loyalty to the purchase intention appeared the effect size \( r = .380 \), and the weighted mean value of the path from the commitment to the purchase intention looked the effect size \( r = .536 \).

Thus, the study on “A Meta-Analysis for Exploring
Moderators of the Relationship between Online Trust and Purchase Intention” [6], supported the weighted mean value with the random effects model that the path from the online trust to the purchase intention showed the effect size ($r = .643$). In addition, the results of the study showed that the mean value with the fixed effects model of the path from the online trust to the purchase intention was the effect size ($r = .566$). The study on “A Meta-analysis of Relationship among Satisfaction, Trust, and Loyalty in E-commerce” [7], supported the weighted mean value with the random effects model that the path from the satisfaction to the loyalty showed the effect size ($r = .554$). In addition, the results of the study appeared that the weighted mean value with the random effects model of the path from the trust to the loyalty was the effect size ($r = .552$).

A meta analysis refers to a statistical literature synthesis method from the quantitative results of many known empirical studies. The meta analysis can be described as expressed analysis. The methodological approaches and characteristics of meta analysis are as follows. In terms of quantity, a meta analysis is to use the summary statistics to integrate the data simply. In addition, the effect size is calculated by using different research methods and results to measure. As it can be compared with the integration, the effect size is converted to a common unit. Thus, a meta analysis can be derived conclusion commonly. In addition, a small difference between studies can be neglected for generalization even when different effect sizes are used [8].

This study will find meaningful independent variables for criterion variables that affect influencing on purchase intention in social network service, on the basis of the results of a meta analysis. We reviewed a total of 29 studies related purchase intention in social network service published in Korea journals between 2005 and 2015, where a cause and effect relationship is established between variables that are specified in the conceptual model of this study. The conceptual model is shown in Fig. 1.

The papers included in this study meta-analysis were identified using keywords that are “SNS Purchase Intention”, specifying on RISS, DBpia, eArticle in database articles of social science. A total of 145 research papers was found, consisting of 71 papers from RISS, 28 papers from DBpia and 26 studies from eArticle through the searching.

This study managed with research studies published in Korea academic journals with the study criteria and then targeted a total of 29 papers for this study purpose. The following Table 1, and Table 2 are the list of authors and journals based the raw data for the meta-analysis.

III. META ANALYSIS

Based on the methodology of meta analysis, was utilized the CMA (comprehensive meta analysis) program developed by Biostat was utilized. The homogeneity test in the meta analysis was performed on these research subjects to find that the effect sizes of multiple independent studies are values extracted from the individual population. Statistical null hypothesis for the homogeneity test, showed that no difference between the estimates of the effect size of the results of the individual studies. When the null hypothesis is accepted, a meta-analysis can be performed to obtain an estimate of
the comprehensive the effect size by integrating the estimated the effect sizes. For interpretation of homogeneity test, the \(Q\) values of the test statistics based on chi-square distribution issued. The \(Q\) values are the same with the chi-square distribution. The results of the heterogeneity test are shown in Table 3.

| N  | Authors                                           | Sam. |
|----|---------------------------------------------------|------|
| 1  | H. Y. Kang & B. S. Kim (2013)                     | 264  |
| 2  | A. R. Go & S. H. Kim (2014)                       | 329  |
| 3  | B. S. Goak (2013)                                 | 196  |
| 4  | G. S. Kim and J. H. Lee (2012)                    | 167  |
| 5  | D. J. Kim & D. U. Hwang (2012)                    | 322  |
| 6  | S. H. Kim et al. (2011)                           | 307  |
| 7  | J. M. Nam & S. Y. You (2013)                      | 169  |
| 8  | S. H. Park et al. (2011)                          | 307  |
| 9  | J. W. Park & P. S. Song (2015)                    | 148  |
| 10 | J. Y. Park & H. J. You (2014)                     | 300  |
| 11 | G. H. Bae & H. Y. Moon (2012)                     | 208  |
| 12 | S. S. Seo & J. H. Lee (2011)                      | 259  |
| 13 | M. H. Shin et al. (2012)                          | 210  |
| 14 | D. H. Ahan & G. J. Han (2011)                     | 407  |
| 15 | M. H. Oh & I. Kim (2014)                          | 250  |
| 16 | Y. Wang & S. D. Kwon (2012)                       | 140  |
| 17 | S. H. Lee & M. S. Kim (2012)                      | 312  |
| 18 | Y. J. Lee & N. H. Jho (2014)                      | 205  |
| 19 | J. H. Lee (2013)                                  | 168  |
| 20 | J. H. Lee (2013)                                  | 160  |
| 21 | H. S. Lee (2012)                                  | 199  |
| 22 | H. S. Lee & G. Y. Nam (2014)                      | 525  |
| 23 | Y. J. Jho & H. S. Yang (2012)                     | 400  |
| 24 | Y. J. Jho & S. W. Seo (2013)                      | 128  |
| 25 | H. K. Jin (2014)                                  | 357  |
| 26 | J. G. Cha & C. H. Jin (2014)                      | 317  |
| 27 | S. L. Han et al. (2012)                           | 363  |
| 28 | E. K. Han et al. (2011)                           | 295  |
| 29 | S. N. Hong & H. J. Lee (2014)                     | 264  |
| Sum of Samples | | 7,676 |

\(Q\)-values in paths SAT \(\rightarrow\) PI, TRU \(\rightarrow\) PI, INT \(\rightarrow\) PI, REP \(\rightarrow\) PI, and WOM \(\rightarrow\) PI is 148.3, 130.4, 46.7, 20.3, 2.9 if and \(p = .5\), chi-squared critical value were 23.7, 14.1, 11.7, 9.5, 9.5 respectively. Consequently, the \(Q\) values were bigger than the limit value, the null hypothesis of homogeneity were rejected. Because it was not extracted from the same population, it could establish estimation as consisting of heterogeneous data set. In other words, the sizes of effects for all paths are regarded as being over the standard error. In this heterogeneous case, we calculate the average the effect size by using calibrated inverse variance weighting values with the random-effects model, not the fixed-effects model [9, 10].

| N  | Journals                                           | Variables |
|----|---------------------------------------------------|------------|
| 1  | The K. J. of S.                                   | Rep., Int., I. Q. |
| 2  | The R. J. C. C.                                   | Intention   |
| 3  | Nor. A. T. R.                                     | Trust, Flow |
| 4  | J. the K. C. A.                                   | Satisfaction |
| 5  | J. of T. R.                                       | Satisfaction, I. Q. |
| 6  | J. of Business R.                                 | Sat., Trust etc. |
| 7  | K. A. of Arts M.                                  | Sat., W. of M. etc. |
| 8  | J. of Business R.                                 | Trust, Int. etc. |
| 9  | I. J. T. & H. R.                                  | Rep., Int., I. Q. |
| 10 | J. of Human E.                                    | Satisfaction |
| 11 | J. of T. & L. R.                                  | Interaction |
| 12 | The E-business S.                                | Sat., Trust |
| 13 | J. the K. C. A.                                   | Sat., Interaction |
| 14 | J. F. M. S. of K.                                | Sat., Reputation |
| 15 | J. K. S. of F. D.                                 | Intention |
| 16 | J. I. T. A. & M.                                 | Satisfaction |
| 17 | J. I. of T. & L. R.                              | Satisfaction |
| 18 | The R. J. C. C.                                  | Trust, Flow |
| 19 | The E-business S.                                | Satisfaction |
| 20 | K. R. A. of D. I.                                | Satisfaction, Trust |
| 21 | J. of the K. C. A.                               | Trust, Interaction |
| 22 | K. A. S. of H. A.                                 | Use Intention |
| 23 | J. of K. S. C. & T.                              | Sat., Intention |
| 24 | J. of the K. S. C.                               | Usefulness |
| 25 | I. of S. C. E. & D.                              | Word of Mouth |
| 26 | J. the K. C. A.                                   | Sat., Int. etc. |
| 27 | J. of Product R.                                 | Information Search |
| 28 | K. J. A. & P. R.                                 | Satisfaction |
| 29 | K. S. for I. I.                                  | Satisfaction |
In summarizing the results of previous studies in the specific field, a matter of publication bias or the file drawer problem can be occurred when the normalization of the sample does not include all of the previous studies in the field, but it only represents part of the previous studies. This implies that papers published in journals have a high likelihood of positive results as compared to unpublished studies. The result of calculating Fail-safe number is shown in Table 4.

### Table 3 Results of homogeneity test

| Paths       | df | Critical region | Q   | p     |
|-------------|----|-----------------|-----|-------|
| SAT → PI    | 14 | 23.7            | 148.3 | .000  |
| TRU → PI    | 7  | 14.1            | 130.4 | .000  |
| INT → PI    | 5  | 11.7            | 46.7  | .000  |
| REP → PI    | 4  | 9.5             | 20.3  | .000  |
| WOM → PI    | 4  | 9.5             | 2.9   | .000  |

**Q**: Q statistics, **df**: degree of freedom

### Table 4 Results of calculator for fail-safe number

| Paths       | N     | d, r  | Nfs   | dc  |
|-------------|-------|-------|-------|-----|
| SAT → PI    | 15    | .455  | 19.13 | .2  |
| TRU → PI    | 8     | .386  | 7.44  | .2  |
| INT → PI    | 6     | .345  | 4.26  | .2  |
| REP → PI    | 5     | .371  | 4.28  | .2  |
| WOM → PI    | 5     | .398  | 4.95  | .2  |

**N**: number of studies, **d, r**: effect size, **Nfs**: number fail-safe, **dc**: determination coefficient

### IV. CONCLUSION and DISCUSSIONS

This study reanalyzed the research papers with the purpose to classify the results of the previous studies that causal relationships among satisfaction, trust, interaction, reputation and word of mouth in the social network service environment utilized big data analysis published Korea academic journals. A total of 29 research papers was filtered with the study criteria from five databases and examined the causal relationships among in the social network service proposed the conceptual model of this study. As shown in the collected data set (see Table 5, Table 6, Table 7, Table 8, Table 9), the values of the effect size using the inverse weighted mean as method approach with the random-effects model are provided in the paths from SAT to PI, from TRU to PI, from INT to PI, from REP to PI, and from MOM to PI.

### Table 5 The effect size in path SAT and PI

| SAT → PI | No | N | Corr | L-L | U-L | Z-v | P-v | Q   |
|----------|----|---|------|-----|-----|-----|-----|-----|
|          | 4  | 167 | .19  | .04 | .34 | 2.52 | .01 | 261 |
|          | 5  | 322 | .43  | .34 | .52 | 8.28 | .00 | 261 |
|          | 6  | 307 | .30  | .19 | .40 | 5.36 | .00 | 261 |
|          | 7  | 169 | .41  | .28 | .53 | 5.67 | .00 | 261 |
|          | 10 | 300 | .33  | .23 | .43 | 5.99 | .00 | 261 |
|          | 12 | 259 | .70  | .63 | .76 | 13.81 | .00 | 261 |
|          | 13 | 210 | .42  | .31 | .53 | 6.49 | .00 | 261 |
|          | 14 | 407 | .42  | .34 | .50 | 9.07 | .00 | 261 |
|          | 16 | 140 | .51  | .38 | .63 | 6.65 | .00 | 261 |
|          | 17 | 312 | .23  | .13 | .34 | 4.17 | .00 | 261 |
|          | 19 | 168 | .76  | .69 | .82 | 12.74 | .00 | 261 |
|          | 20 | 160 | .47  | .34 | .59 | 6.46 | .00 | 261 |
|          | 26 | 317 | .31  | .21 | .41 | 5.74 | .00 | 261 |
|          | 28 | 295 | .58  | .50 | .65 | 11.37 | .00 | 261 |
|          | 29 | 264 | .52  | .42 | .60 | 9.20 | .00 | 261 |
|          | Random(r) | .46 | .37 | .53 | 9.17 | .00 | 261 |

### Table 6 The effect size in path TRU and PI

| TRU → PI | No | N | Corr | L-L | U-L | Z-v | P-v | Q   |
|----------|----|---|------|-----|-----|-----|-----|-----|
|          | 3  | 196 | .24  | .10 | .36 | 3.33 | .00 | 6.45 |
|          | 6  | 307 | .30  | .19 | .35 | 6.26 | .00 | 6.45 |
|          | 8  | 307 | .23  | .19 | .32 | 7.44 | .00 | 6.45 |
|          | 12 | 259 | .75  | .09 | .66 | 2.47 | .01 | 6.45 |
|          | 18 | 205 | .38  | .15 | .61 | 3.04 | .00 | 6.45 |
|          | 20 | 160 | .37  | .19 | .58 | 3.55 | .00 | 6.45 |
|          | 21 | 199 | .52  | .24 | .57 | 4.28 | .00 | 6.45 |
|          | 23 | 400 | .15  | .21 | .54 | 4.20 | .00 | 6.45 |
|          | Random(r) | .39 | .21 | .54 | 4.20 | .00 | 6.45 |

First, the result of the meta analysis suggests that the higher the effect size (r = .455) is the path from the satisfaction to the purchase intention. Therefore, it is clear that the satisfaction factor is the antecedent of the purchase intention factor and shows an explanatory power of 22%. The effect size in the path from the
satisfaction to the purchase intention showed similar and slightly lower with the effect size in the research of Nam et al. [5], and S. Y. Baek [6]. Second, the effect size in the path from the word of mouth to the purchase intention looked the effect size \( r = .398 \), no similar studies could not be compared. Thus, it is clear that the word of mouth factor is the antecedent of the purchase intention factor and lists an explanatory power of 17%. Next, the effect size \( (r = .386) \) in the path from the trust to the purchase intention showed very lower than the effect size in the research of Nam et al. [5], and reports an explanatory power of 16%. Consequently, this result is probably due to differences in e-commerce research environment.

Third, the effect size in the path from the reputation to the purchase intention showed the effect size \( (r = .371) \), no similar studies could not be compared. Therefore, it is clear that the reputation factor is the antecedent of the purchase intention factor and shows an explanatory power of 15%. Finally, the result of the meta analysis can be concluded that lower effect size \( (r = .342) \) in the path from the interaction to the purchase intention. The interaction factor is the antecedent of the purchase intention factor and reports an explanatory power of 13%. By the way, no studies with similar the meta analysis such as this study in Korea journals, cannot be compared for interaction, reputation and word of mouth of the effect size.

Further, the predictive variables of this study have power of explanation about 22%-12% or more. In conclusion, the result of the study is significant in that we can estimate the effect sizes on the basis of path constructs. Theoretical and practical implications of this study are as follows. Consumer satisfaction was listed to have the highest explanatory power on purchasing intention in social network service environment. Increasing the satisfaction of the consumer can be seen the increase in the purchasing behavior. Consumer of the word of mouth, trust, and the corporate reputation have been determined the increase in the purchasing behavior. Thus, increasing the attitude of these factors can be seen in the increase of purchasing behavior. In addition, we expect that the results of by this study would be touchstones to researchers in similar studies.

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