Research Article

The Effect of Information Deception in Price Comparison Site on the Consumer Reactions: An Empirical Verification

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1. Introduction

From tabs (iPhones, etc.), pads (iPads, etc.), and boards (interactive whiteboards, etc.) [1], to dust (embedded nanosized devices) [2], skins (nonplanar material that can be used to cover natural and artificial objects), and clay (programmable synthetic matter) [3], the ubiquitous sensor networks enable synchronously gathering the context-aware data [2, 4], converting these data to the information, and providing the task-relevant information to distributed system users. Though the distributed system could guarantee the integrity of data, each computer has its own authorised part of views on information [5]. The information distortion could be exposed by the information intermediaries as their own interesting parties [6]. Therefore, challenges in the ubiquitous networks deployment are to guarantee the information transparency for the distributed system users, being free from the information distortion [7].

As the competition in online market grows harder, online sellers could be tempted to deceive consumers into buying their products. For example, some online sellers had been hit by malicious rumours because they had tried to make up the imaginary positive stories on their product, to conceal the negative stories by recruiting the compensated reviewers in Amazon mechanical Turk, and so forth. This fraud of information deception (below “ID”) could result in not only the financial damage and psychological distrust, but also the consumer's withdrawal from e-marketplace [8]. In spite of the severity of ID consequences, few studies had introduced this subject in the research area and had investigated it in the ID consequences. Prior studies mainly focused on the discovery of ID in stores, and they could not directly conduct the negative effects in marketplaces. They expected that ID could increase the transaction risk, distrust, and psychological contract violation in the store and decrease the purchase intention and price premium on the product [9, 10]. Recently a remarkable challenge had been performed in summarizing the prior studies, classifying the types of ID, and empirically validating the impact on consumer reactions [8]. However, the result is not significant enough to validate hypothesis. They manipulated two types of ID situation by the order and the direct distortion in contents, but the difference between control group (i.e., no order and contents manipulations) and manipulated group had not
been significant. Only the effect of warning mechanism to the potential ID had been significantly approved [8]. Along with online seller, online price comparison site (below “PCS”), who was traditionally considered as the essentially trusted third party [9], recently could manipulate ID for earning more brokerage fees from sellers in practice. It could be more critical for consumers to shop online because the ID by PCS could not be easily detected and because it could fundamentally prevent consumers from selecting the best alternatives in online marketplace by the selective exposure of information about online store and product.

Therefore, I challenge to empirically verify the impacts of ID by PCS on consumer betrayal behaviours. I introduced two different types of PCSs in this study. One PCS is the related company of the online seller, and the other PCS is the neutral company founded by the online consumer communities. I challenged to summarize the prior literature about ID and to develop the hypothesis based on the literatures of the information transparency, institution-based trust, and psychological contract violation to explain the impact of ID on the online consumer reactions.

2. Theoretical Background

Two faces of PCS had been captured in this study. PCS is regarded as the source of market information, and also it is regarded as the essentially trusted third party beside the dyadic relationship between consumers and sellers in online marketplace. I adopted the information transparency literature to explain the impacts of abundant, highly qualified market information provision to consumers. And, I also adopted the institution-based trust and psychological contract violation literature to capture the impact of ID by PCS in the trust broken situation. Then, I summarize the literature of consumer behaviour to investigate the impact of it on consumer reactions.

Different from the offline marketplace, which allows product demonstration and usage trial, consumers cannot help expecting the values of product and judging about product based only on the information presented in websites; it leads to increasing uncertainty with product qualification and seller identification [9, 11]. Information transparency refers to the extent of availability and accessibility of market information which is essential to transaction success of online consumers in e-marketplace [11]. Information transparency is the intentional information disclosure by sellers to meet the benefits of consumers; it means the more and the highly qualified information disclosure in product, price, inventory, cost, and process to help consumers [11]. For example, http://www.groupon.com/ could disclose such information elements as the “market value, discount, you save” in price, as the “deal name and detail descriptions, dealer reputation and location” in product, as the “stock limit and remains” in inventory, as the “delivery cost and conditions” in cost, and as the “transaction process in detail description” in process to meet the benefits of consumers. When the information transparency could have been guaranteed, consumers could think of the quality of the market information as being high because their own shopping decision making would be effective. At the same time, information transparency could be the source of risk reduction in transaction and the source of trust on sellers. Information transparency means the controllability of consumers both in process and consequences of transaction. When information transparency could have been guaranteed, consumers could confirm the transaction to be in order and to be successful [12]. Then consumers could trust sellers because sellers are such information providers. Like two sides of coin of information transparency, e-commerce technologies enable firms to develop selling mechanisms that reveal, conceal, and manipulate market information [8, 11]. ID refers to deliberate manipulation of information perpetrated by online sellers to mislead consumers in order to induce desired attitudinal and behavioural changes in consumers—changes that are detrimental to consumers and beneficial to the sellers [10]. Three types of ID had been classified as concealment, equivocation, and falsification [8]. Website could intentionally conceal the negative information, provide vague information about cost or about complaining process, and provide the false information as imaginary positive stories of products [10]. When ID had been detected by consumers, ID could increase the perceived risk of transaction and distrust of sellers [8, 11, 12], and then it could form the unfavorable attitude and could decrease purchase intention [8, 12–14].

Traditionally, PCS, as the online intermediary which could guarantee the information transparency in e-marketplace, had been regarded as the essentially trusted third party because it is believed as being the neutral institution beside the dyadic relationship between consumers and sellers. Institution-based trust literature had successfully captured the trust-generation process and the trust transference process of consumers on sellers and intermediary in e-marketplace. Generally, e-marketplace environment has innate limitations to generate the trust between consumers and sellers because the regulations and legal mechanisms in e-marketplace are generally weak and of plausible structure [9]. A seller could behave opportunistically because he believed that he would have no guidelines or penalties on his opportunism in this weak structure. The intervention by the neutral party is essential to protect consumers from the opportunistic behaviors by sellers. Online intermediary could be a candidate of neutral parties because it is located beside of the dyadic relationship between consumers and sellers, because it has the ability and motivation to protect consumers for maximizing its sales in e-marketplace, because it could set institutional mechanism and consumer protection policy (i.e., escrow service, credit card guarantee, etc.) in e-marketplace [9, 14]. Therefore, online consumers could have the general beliefs that that online intermediary would have competence, fidelity, and benevolence to consumers; they could trust the online intermediary, and this process is the trust generation process on online intermediary [9, 14, 15]. The trust generation process based on the institution-based trust mechanisms by online intermediary had been confirmed, and then the trust could be transferred to the communities of sellers who are closely related to that online intermediary [14]. That community of sellers could not behave opportunistically, because their opportunistic
behaviour could be easily detected, restricted, and punished in institutional mechanisms by the online intermediary [9]. Therefore, the core of this trust generation process and trust transference process in the institutional mechanisms for consumer protection and online consumer who transacted with the intermediary which had already set the institutional mechanisms are apt to be satisfied with the service of the online intermediary and apt to buy products of sellers in that intermediary [9].

In contrast with this situation, when the online intermediary intentionally broke their own institutional mechanisms by providing deceptive market information, this trust generation process and trust transference process could not be activated. Online consumers could feel much uncertainty and risk of their shopping decision making and could be afraid of the opportunistinc behaviours both by sellers and by online intermediary. Consumers could not still trust both of them. It could be induced not only to decrease the positive perception, attitude, and behavioural intentions on them, but also to dramatically increase the negative perception, betrayal feelings, and revenge intentions of consumers. Psychological contract violation literature had captured the negative changes of perception, attitude, and behavioural intentions of actors in this situation. Psychological contract refers to the psychological belief in which the counterpart in transaction has fidelity to fulfill adequately the promised obligations [16]. It is not legal and explicit contract condition, but it is implicit contract condition which would be naturally expected to be performed by the counterpart in fidelity, trust, ethics, and moral law [16]. Because the psychological contract roots in trust on the counterpart, the psychological contract violation could induce such extremely negative emotions as frustration, anger, resentment, disappointment, and even betrayal [16]. Consumers felt these types of negative emotions, when the counterpart lied to consumers, took advantage of consumers, tried to exploit consumer, violated the trust of consumers, cheated consumers, broke his promises with consumers, or disclosed confidential information of consumers [17]. The betrayal act by the counterpart had not easily been forgiven or forgotten and would produce greater punishment to betrayers [17]. Studies explain this phenomenon as “love becomes hate” effect [17]. Betrayed consumers invest efforts to restore fairness through the revenge to them and persist at demanding reparation.

The information processing of consumer shopping decision making had been concisely investigated by the various studies. Information transparency could facilitate consumers’ diagnosis of the target product among alternatives by providing abundant, highly qualified market information. Perceived information quality refers to an information user’s cognitive beliefs about the favourable or unfavourable characteristics of the currency, accuracy, completeness, relevance, and reliability of the information [12]. When the information transparency could be guaranteed, consumers could acquire the currency, accuracy, completeness, relevance, and reliability information about the product; they could perceive the market information highly qualified enough to effectively make their shopping decision [18]. Perceived diagnosticity refers to the ability of a website to convey relevant information that can assist consumers to understand and evaluate the product alternatives [19]. Information transparency could generate more attention on product and could facilitate deeper understanding about the product alternatives of consumers [19]. Qualified market information, perceived diagnosticity, and no ID detection could help consumers to succeed in their shopping decision making; consumers could feel that the website is useful [20]. Perceived usefulness and service satisfaction had been frequently elected as the beneficial consequences of consumers using the website [20, 21]. Perceived usefulness means the perceptions about enhanced effectiveness achieved through the use of a service [13]. Satisfaction means the favourable feelings toward a service in question [22]. When the consumer could perceive the service being useful, they would form such positive attitude as the service satisfaction [20, 23]. In the other way, when the information transparency could not be guaranteed or when the ID could be detected, consumers could perceive their shopping decision making being highly uncertain and risky [24–26], and consumers could not feel that website is useful [20]. Perceived risk refers to the extent to which one believes uncertainty exists about whether desirable outcomes will occur [12, 24, 27]. Feeling of violation refers to an affective and emotional experience of disappointment, frustration, anger, and resentment that may emanate from the perception that one has been betrayed or mistreated [8, 10]. In contrast with the path from perceived usefulness to satisfaction, perceived risk could decrease the favourable attitude as satisfaction and could increase the unfavourable attitude as feeling of violation [9, 10, 16, 17, 27]. General attitude could mediate between the perception and the behavioural intention of consumers [23, 28]. Several behavioural intentions could be elected in this study as the purchase intention [27, 29] and continuous usage intention [23, 28, 30, 31]. Along with these behavioural intentions, the prior experience could affect the postadoption process [13]. When consumers feel psychological contract violation in communication in website, they could not trust the target website in future [32]. In summary, ID could lead to decrease in the perceived information quality of product and the diagnosticity on products and to increase in the detection of ID. These changes make the perceived usefulness decrease and the perceived risk increase. Then they could form the dissatisfaction and feeling of violation and could decrease the purchase intention, continuous intention, and posttrust on PCS.

3. Hypothesis

Among the other types of e-commerce websites related with ID [8], PCS is the service providers as one of product recommendation agent as the information intermediary outside of sellers. ID of PCS is fatal that it could prevent the consumer’s right of store and product selection, and the impact on the e-marketplace could prevail in large scale. Therefore, I selected the PCS in this study and tried to empirically validate the impact of ID in PCS on consumer negative reactions. Two types of PCS could be cautiously selected. One is the PCS who is the related company of online intermediary; the other is the PCS who is founded by the consumer communities.
PCs could have mechanisms for product recommendation information provision, and one of them could be motivated to conceal the negative product information, to provide equivocal product knowledge, and to falsify the product recommendation results. Consumer community based PCS could support the information transparency of product recommendation results in the full scope of product information. Online intermediary related PCSs could have the limited views on product recommendation results for reflecting the interests of online intermediary. The former could provide more abundant qualified product recommendation result in larger scope of products in the neutral stance, but the latter would provide the limited quantity of product recommendation results in limited pool of the related product. The difference between two PCSs could generate the difference in perception on the information quality, the product diagnosticity, and the ID detection of the product recommendation result. So, I could hypothesize as follows:

H1: consumer community based PCS could provide higher quality of product recommendation results than online intermediary related PCS.

H2: consumer community based PCS could support higher perceived diagnosticity of product recommendation results than online intermediary related PCS.

H3: consumer community based PCS could make feel the lower information deception detection of product recommendation results than online intermediary related PCS.

When the perceived information quality of product recommendation results and the perceived diagnosticity would be high, consumers could effectively understand, judge, and select the products among the alternative product based on the product recommendation results. It could make consumers perceive the usage of PCS being useful and being beneficial for avoiding the possibility of abnormal product selection of consumers. When consumers could not detect the ID of product recommendation results, this product selection process could have lower uncertainty and consumers could confirm the transaction success. It also could make consumers perceive the usage of PCS being useful and certain for shopping decision making. So, I could hypothesize as follows:

H4: perceived information quality could positively affect the perceived usefulness.

H5: perceived diagnosticity results could positively affect the perceived usefulness.

H6: perceived information deception detection could negatively affect the perceived usefulness.

H7: perceived information quality could negatively affect the perceived risk.

H8: perceived diagnosticity results could negatively affect the perceived risk.

H9: perceived information deception detection could positively affect the perceived risk.

When consumers could perceive the PCS being useful and certain for shopping decision making, they could form the general attitude about the service of PCS. One of the positive attitudes could be the service satisfaction and the other one of negative attitudes would be the feeling of psychological contract violation. Consumers expect the value of service beforehand, and they could be satisfied with service, when their expectation could have been confirmed afterward based on the actual performance of service [23]. When their expectation could not intentionally be confirmed by the malicious counterparty, consumers could experience the psychological contract violation [16]. One of the sources of psychological contract violation is such ID as the product misrepresentation [16]. So, I could hypothesize as follows:

H10: perceived usefulness could positively affect the satisfaction.

H11: perceived risk could negatively affect the satisfaction.

H12: perceived usefulness could negatively affect the feeling of violation.

H13: perceived risk could positively affect the feeling of violation.

Service satisfaction increases the virtuous behavioral intentions [13]. Feeling of violation could not only decrease this virtuous behavioral intention [9] but also increase the behavioral intention of vengeance [16, 17]. When consumers could be satisfied with the PCS, they could be apt to buy products based on the product recommendation results, to continuously use PCS, and to trust PCS. When consumers feel violation of psychological contract, they could quit purchasing products following the product recommendation results and using PCS. They also could distrust PCS in future. So, I could hypothesize as follows:

H14: satisfaction could positively affect the purchase intention.

H15: satisfaction could positively affect the continuous usage intention.

H16: satisfaction could positively affect the post trusting belief.

H17: feeling of violation could negatively affect the purchase intention.

H18: feeling of violation could negatively affect the continuous usage intention.

H19: feeling of violation could negatively affect the post trusting belief.

The research model is shown in Figure 1.

In this paper, I must control over such variables as initial trust [14], information overload [33], information category involvement, and expertise [34]. These variables had been regarded as the exogenous variables to influence the information adoption process of IS users [34]. Also, I decided the measure the privacy concern as the marker variables to access the common method bias [35].
4. Methodology

All of the measurement items of each construct stemmed from the prior literature and adapted to fit in this study context to enhance internal validity [36]. Because each construct is composed of more than three items to successfully structure the constructs, I had decided to perform two stages of the conceptual validation procedure [37]. First, the review of the face validities of the instruments had been performed by five professors in MIS and Marketing. As a result, several changes had been made in nuance of instruments. Second, the pilot test with fifteen graduate students had been performed to ensure the easy understandability and the meanings clarity of instruments. I modified some items to enhance the readability and understandability of instruments. Then, all items of each construct were then consolidated into an instrument for actual survey. All items are measured by the 7-point Likert scale. The items of each construct and their sources are presented in Table 1.

The quasi-experiment had been performed for validating the hypothesis [38]. Comparing with the other methods, this method had the advantages of reflecting the reactions of the actual consumers without seriously undermining the internal validity. Laboratory experiment has limitation in reflecting the behaviors in real world [38]. In opposite, survey method has disadvantages of difficulties with recruiting subjects, rooted in the reluctant stance, and consumer protection policy like the other online companies [39]. Regarding my study context and purpose, the ID by PCS could not be perfectly manipulated in the virtual instruments, and I must reflect the dynamic reactions of the potential consumer; quasi-experiment method would be beneficial to my study. Two of real PCs in Korea had been selected. One PCS (Group 1, "Shopping About") is the subsidiary company of the online intermediary ("G-market"), and the other PCS (Group 2, "Danawa") is founded by the consumer communities which discuss about the products. Then I recruit the voluntary participants by advertising in the web portals. The population is the potential consumers who had experience of purchasing product in online intermediary and who had no prior knowledge or experiences with PCS. 150 subjects had been recruited, but 1 person had not participated in the experiment for his privacy. 149 subjects are randomly assigned to each of the two PCS groups. Participants are asked to select a specific product which they want to buy, navigate the PCS for the enough time, and evaluate the product recommendation results of PCS. Then they had been exposed to one of the two PCS and had been requested to fill in the survey material. $10 per a subject had been paid for participation reward. Because 1 response was the irresponsible response (all responses were 7), 148 responses had been inputted in analysis. The demographic data of respondents were shown in Table 2.

5. Analysis and Results

I had performed the t-test to validate the impact of two types of PCS. t-test results indicated that the majority of dependent variables have significant differences by groups based on Wilk’s lambda and that the means of many of beneficial dependent variables (i.e., perceived diagnosticity) were significantly higher and many of betrayal dependent variables (i.e., perceived risk) were significantly lower in Group 2 than in Group 1. The upper bounding and lower bounding of means did not superpose with each other. But the difference in perceived information quality by groups was not significant. Therefore, I confirmed that H2 and H3 have been approved, but H1 has been rejected. The results of t-test are presented in Table 3.

The remaining hypotheses of the study were tested using PLS algorism, which could simultaneously assess the reliability and validity of constructs and could estimate the relationships among them [40]. PLS has been widely used in the various studies for the technical advantages of simplicity, reliability, and lower observation requirement than such other structured equation models as AMOS and LISREL [41]. Because the number of observation is only 148 in the situation that the number of hypothesis reaches 19, I decided to use PLS algorism for the rest of hypothesis validation. PLS model is analyzed in such two stages as the assessment of the reliability and validity of the measurement model and as the assessment of the structural model.

5.1. Measurement Model. Construct validity could be identified as two separating concepts as the convergent validity and discriminant validity. The values of AVE and composite
| Constructs                        | Measurement items                                                                                                                                                                                                 | Sources                                      |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| Perceived information quality   | In my thought, the given product recommendation results of PCS… (PIQ1) are current enough to meet my needs. (dropped) (PIQ2) are accurate enough to meet my needs. (PIQ3) are pretty much what I need. (PIQ4) are actually fit in public opinion. (PIQ5) are appropriate level of detail for my purposes. (PIQ6) can be relied upon. (PIQ7) can reflect of real feature of products and not be distorted. (dropped) | Nicolaou and McKnight (2006) [12]           |
| Perceived diagnosticity          | This PCS is… (PD1) helpful for me to evaluate the product… (PD2) helpful in familiarizing me with the product. (PD3) helpful for me to understand the performance of the product. | Jiang and Benbasat (2007) [19]              |
| Information deception detection  | Overall, I believe that the given product recommendation results of this PCS are… (IDD1) misleading (IDD2) deceptive (IDD3) biased | Xiao (2010) [8]                             |
| Perceived usefulness             | Using the portal site enhances… (PU1) my effectiveness. (PU2) my productivity. (PU3) my performance.                                                                                                           | Kim and Son (2009) [13]                      |
| Perceived risk                   | Believing recommendation results by this PCS… (PR1) is overall risky. (PR2) could make me be exposed to the significant threat. (PR3) could make me be exposed to the potential for loss. | Nicolaou and McKnight (2006) [12]           |
| Satisfaction                     | (SAT1) I am content with the services provided by this PCS. (SAT2) I am satisfied with the services provided by this PCS. (SAT3) What I get from using the PCS meets what I expect for this type of service. | Kim and Son (2009) [13]                      |
| Feeling of violation             | I feel a great deal of… (FV1) disappointment toward this PCS. (FV2) frustration toward this PCS. (FV3) anger toward this PCS                                                                                           | Xiao (2010) [8]                             |
| Purchase intention               | When I would buy some products… (PI1) The probability of buying some products following the product recommendation results of this PCS would be probable. (PI2) The likelihood that I would buy some products following the product recommendation results of this PCS is highly likely. (PI3) My willingness to buy some products following the product recommendation results of this PCS is highly willing. (PI4) The probability that I would consider seriously buying some products following the product recommendation results of this PCS is highly probable | Stemmed from Song and Zahedi (2005) [29], and modified based on the suggestion of Sussman and Siegal (2003) [34] |
| Continuous usage intention       | (CUI1) I intend to continue using this PCS rather than discontinuing (CUI2) My intentions are to continue using this PCS than using any alternative PCS. (CUI3) If I could, I would like to continue my usage of this PCS. | Bhattacherjee (2001) [23]                    |
| Posttrusting belief              | Compared with the other PCSSs, this PCS… (TB1) can be trusted at all times. (TB2) has high integrity. (TB3) is competent and knowledgeable.                                                                        | Pavlou and Gefen (2004) [9]                  |
| Initial trust                    | (ITRU1) I usually trust PCSSs until they give me a reason not to trust them… (ITRU2) I generally give PCSSs the benefit of the doubt when I first visit them. (ITRU3) My typical approach is to trust PCSSs until they prove I should not trust them. | Trusting stance in McKnight et al. (2002) [14] |
| Information overload             | (IO1) I need more time to understand the information of PCS. (IO2) This PCS contains too complex information for me to understand. (IO3) This PCS contains too much information for me to understand. | Paul and Nazareth (2010) [33]               |
| Involvement                      | (IV1) I am much involved in the topic of this PCS. (IV2) Much of the issue discussed in this PCS would be on my mind lately.                                                                                           | Sussman and Siegal (2003) [34]               |
| Expertise                        | (EP1) I am much informed on the subject matter of this issue in this PCS. (EP2) I am an expert on the topic of this PCS.                                                                                           | Sussman and Siegal (2003) [34]               |
Table 1: Continued.

| Constructs            | Measurement items                                                                 | Sources |
|-----------------------|-----------------------------------------------------------------------------------|---------|
| Privacy concern       | (PC1) I am concerned that the information I submit to Internet could be misused.   | Son and Kim (2008) [35] |
|                       | (PC2) I am concerned that a person can find private information about me on the Internet. |         |
|                       | (PC3) I am concerned about providing personal information to Internet, because of what others might do with it. |         |
|                       | (PC4) I am concerned about providing personal information to Internet, because it could be used in a way I did not foresee. |         |

Table 2: Demographic data.

| Gender | Online shopping times for 3 months |
|--------|-----------------------------------|
|        | 0  | 1~2  | 3~5  | 6~10 | 11~15 | 16~30 | Over 30 |
| Male   | 76 | 32   | 36   | 48   | 20    | 8     | 4       | 0       |
| Female | 72 | 32   | 36   | 48   | 20    | 8     | 4       | 0       |
| %      | 51.4% | 21.6% | 24.3% | 32.4% | 13.5% | 5.4% | 2.7% | 0.0% |

Table 3: t-test results.

| t-test results | Value | F     | Sig  | R²   | Ad. R² | Group | Mean | SD  | 95% Lower | 95% Upper |
|----------------|-------|-------|------|------|--------|-------|------|-----|----------|----------|
|                | λ     |       |      |      |        |       |      |     |          |          |
|                | III   | df    | MS   | F    | Sig    |       |      |     |          |          |
| PIQ            | 2.649 | 1     | 2.649 | 2.060 | 0.153  | 0.014 | 0.007 | 1   | 4.838    | 0.132    |
|                |       |       |       |       |        |       |      |     |          |          |
|                |       |       |       |       |        |       |      |     |          |          |
| PD             | 9.250 | 1     | 9.250 | 9.774 | 0.002  | 0.063 | 0.056 | 1   | 4.572    | 0.113    |
|                |       |       |       |       |        |       |      |     |          |          |
|                |       |       |       |       |        |       |      |     |          |          |
| IDD            | 20.688| 1     | 20.688| 15.368| 0.000  | 0.095 | 0.089 | 1   | 5.113    | 0.135    |
|                |       |       |       |       |        |       |      |     |          |          |
|                |       |       |       |       |        |       |      |     |          |          |
| PU             | 11.544| 1     | 11.544| 12.511| 0.001  | 0.079 | 0.073 | 1   | 4.635    | 0.112    |
|                |       |       |       |       |        |       |      |     |          |          |
|                |       |       |       |       |        |       |      |     |          |          |
| PR             | 17.345| 1     | 17.345| 15.471| 0.000  | 0.096 | 0.09  | 1   | 3.806    | 0.123    |
|                |       |       |       |       |        |       |      |     |          |          |
|                |       |       |       |       |        |       |      |     |          |          |
| SAT            | 19.947| 1     | 19.947| 20.191| 0.000  | 0.121 | 0.115 | 1   | 4.207    | 0.116    |
|                |       |       |       |       |        |       |      |     |          |          |
|                |       |       |       |       |        |       |      |     |          |          |
| FV             | 8.920 | 1     | 8.920 | 7.600 | 0.007  | 0.049 | 0.043 | 1   | 3.342    | 0.126    |
|                |       |       |       |       |        |       |      |     |          |          |
|                |       |       |       |       |        |       |      |     |          |          |
|                |       |       |       |       |        |       |      |     |          |          |
|                |       |       |       |       |        |       |      |     |          |          |
|                |       |       |       |       |        |       |      |     |          |          |

Comparison: Group 1: online intermediary related PCS, Group 2: consumer community based PCS, λ: Wilks’s λ, III: type III sum of square, df: degree of freedom, MS: mean squared, Sig.: significance, Ad. R²: adjusted R², and 95%: 95% significant interval.

reliability could be the indicators to access the convergent validity. I examined the average variance extracted (AVE) of each construct to assess the convergent validity. AVE values should exceed 0.50 cut-off level, which indicates that the majority of the variance is explained by the constructs. I also examined the composite reliability (CR) to assess the reliability of indicators [42]. The CR values should exceed 0.70 cut-off level, which indicates that the indicators are internally consistent [43]. I could have confirmed that the convergent validity and reliability could be acquired, because all values of AVE and CR exceeded the recommended cut-off level in Table 4. Discriminant validity refers to the extent to which a construct is independent with the other constructs, and it could be assessed by the comparison between the square root of AVE and correlation to the other constructs [41]. When a construct share more variance with its indicators than with the indicators of the other constructs, I could confirm the discriminant validity to be acquired [44]. All squares of AVE (diagonal values in right part of Table 4) in this study are greater than the correlations among the other latent variables (off-diagonal values in right part of Table 4).

Another way to demonstrate the convergent and the discriminant validity is to access the factor loadings of each indicator. Each indicator should load higher on its own construct than on any other constructs [41]. Some indicators of perceived information quality had been omitted in PLS.
Table 4: Latent variable correlations.

|       | AVE | CR  | R²   | α   | PIQ | PD   | IDD  | PU   | PR   | SAT  | FV   | PI   | CUI  | TB   |
|-------|-----|-----|------|-----|-----|------|------|------|------|------|------|------|------|------|
| PIQ   | 0.779 | 0.946 | 0.929 | 0.883 | 0.779 | 0.946 | 0.929 | 0.883 |       |      |      |      |      |      |
| PD    | 0.730 | 0.890 | 0.819 | 0.421 | 0.855 |       |      |      |      |      |      |      |      |      |
| IDD   | 0.828 | 0.935 | 0.896 | −0.188 | −0.112 |      |      |      |      |      |      |      |      |      |
| PU    | 0.838 | 0.939 | 0.619 | 0.448 | 0.775 | −0.080 | 0.828 | 0.935 | −0.188 | −0.112 | 0.910 |      |      |      |
| PR    | 0.862 | 0.949 | 0.355 | 0.482 | 0.342 |      |      |      |      |      |      |      |      |      |
| SAT   | 0.903 | 0.965 | 0.478 | 0.661 | 0.213 | 0.660 | −0.471 | 0.910 |      |      |      |      |      |      |
| FV    | 0.862 | 0.949 | 0.356 | 0.639 | 0.215 | 0.663 | −0.395 | 0.755 | −0.337 | 0.719 | 0.968 | 0.928 |      |      |
| PI    | 0.861 | 0.961 | 0.362 | 0.643 | 0.129 | 0.659 | −0.344 | 0.601 | −0.254 | 0.928 |      |      |      |      |
| CUI   | 0.936 | 0.978 | 0.572 | 0.463 | 0.697 | −0.215 | 0.663 | −0.395 | 0.755 | −0.337 | 0.719 | 0.968 | 0.928 |      |
| TB    | 0.886 | 0.959 | 0.380 | 0.935 | 0.597 | 0.582 | −0.229 | 0.562 | −0.458 | 0.600 | −0.367 | 0.589 | 0.696 | 0.941 |

*AVE: average variance extracted; CR: composite reliability; α: Cronbach’s α.*

Diagonal cells in right side are the square root of AVE of each construct. Off-diagonal cells are squared correlations.

5.2. PLS Analysis Results. The hypotheses were validated by estimates using 200 iterations of the bootstrapping technique in PLS [46]. The explanatory power of the structural model could be accessed by the $R^2$ value of the dependent variables. I also assessed the $t$-statistics for the standardized path-coefficient and calculated $P$ values based on a two-tail test with the significance level for validating hypothesis. The PLS results were presented in Figure 2. Some hypotheses in this study had been significantly approved, but several hypotheses had been rejected. $R^2$ values of the dependent variables are calculated as perceived usefulness (0.644), perceived risk (0.355), satisfaction (0.478), feeling of violation (0.356), purchase intention (0.362), continuous usage intention (0.572), and post trusting belief (0.380).

6. Discussion

The $t$-test results indicate that the consumer community based PCS could significantly provide more diagnostic product-recommendation results without the ID than the online intermediary related PCS. But the former could not provide more highly qualified product recommendation results.
than the latter. According to the PLS results, this increased perceived diagnosticity could significantly enhance the perceived usefulness and could also significantly induce the purchase intention following the recommendation of PCS, continuous PCS usage intention, and posttrust toward PCS, when consumers could be satisfied with the recommendation service of PCS. On the contrary of this path, this decreased information deception detection could significantly decrease the perceived risk of PCS usage and then could also induce the postrusting belief toward PCS by increasing the satisfaction and by decreasing the feeling of violation on the service of PCS. These results were consistent with my expectation based on the prior studies.

Nevertheless, some of hypothesis could not be approved. First, perceived information quality of product recommendation results had no differences between two types of PCSs, and perceived information quality of product recommendation results could have no significant effects on the perceived usefulness and the perceived risk of the PCS usage. Second, perceived diagnosticity could not significantly affect perceived risk of PCS usage, and information deception detection could only affect it. Third, perceived usefulness could not directly affect the feeling of violation and the feeling of violation could not influence the purchase intention following the recommendation of PCS, continuous PCS usage intention. Although these results are different with the logics from the prior studies, few studies could explain the reasons in PCS context.

To explain these unexpected results, I performed the additional interviews to the voluntary subjects. First, concerned with the difference between two types of PCS and the effect of perceived information quality on the perceived context.
usefulness and the perceived risk, they answered that each piece of the product information in the product recommendation results could have high quality enough to understand the products in both types of PCS. It is because of the fact that these pieces of information stemmed from the online intermediaries and sellers in both cases, that the equivocation and the falsification which participants could easily detect by comparing the results between PCSs rather than concealment of the negative information and competitive alternative products which participants could not easily detect had been frequently used in the actual PCSs in this study, and that the information quality in both cases could be felt being the same by some participants. Moreover, participants answered that they could not differentiate the information quality between two cases, and the perceived usefulness of both PCSs could seem to be the same to them. These interview results are consistent with the findings of Xiao [8] in the one aspect, which argues that the ID could not easily be detected by consumers and in which ID warning mechanisms could be needed for consumers. Second, concerned with the effects of perceived diagnosticity and information deception detection, they answered that product comparability is the most salient characteristic of PCSs, that consumers of low involvement have little motivation for active product information search and they cannot help judging about the product in the scope of the merely provided information by PCS, that they could not acknowledge the transaction risk because they believed the enough quality and quantity of product information to be already acquired by just using PCS, and that most of the product information could be fit to being useful when they detect the information deception in little scale in their thoughts. They also answered that the path from the perceived diagnosticity to the perceived risk and the path from the information deception detection to the perceived usefulness could be still ambiguous. Third, concerned with the effects of perceived usefulness on feeling of violation and the feeling of violation on the purchase intention and continuous usage intention, they answered that they could not confirm the stance of PCSs because they also had the benevolence and integrity of the components of trust when they unintentionally provide the distorted recommendation results, that PCS switching cost of consumers could be high, because there are only limited number of the alternative PCSs, and that they are eager to do more direct behaviours of vengeance before adopting the recommendations of PCS and quitting PCS usage, when they feel the psychological contract violation. The last interview result could be consistent with the argument of Grégoire and Fisher [17] which describes the consumers’ betrayal behaviours not to be easily forgotten and forgiven.

7. Conclusion

This study had empirically validated the impact of ID by PCS which was novel area for research in both MIS and Marketing on the cognitive and affective reactions of consumers as the recommendation agent users. Consequently, this study has such academic implications as follows. First, I could successfully introduce the ID by PCS into the academic research area and empirically validate its effects. Despite the potential severity of the consequences of ID and practically its executions by PCS for the long before, the impacts of ID by PCS have not yet been discussed in research area. This study is an almost first-moving study to conduct the issue of ID except few studies [8, 10]. Prior studies could not sufficiently validate the impact of ID, because their main hypothesis had been partially approved or denied. By successfully identifying the paths of ID’s effect on consumer reactions in this study, I could find the benefits and cost of both PCSs and online intermediaries as the information intermediaries by deceiving consumers. Second, I could provide the basis of the discussion on how we could guarantee the information transparency without ID in the ubiquitous computing era and what are the necessary and sufficient conditional antecedents of the psychological contract violation. The findings introduce the possibilities that although the data had been automatically collected in distributed systems, the information generated by the information intermediaries could be intentionally distorted. This means that the information transparency could not be acquired only by the technological progress, that the structural safeguard could be needed for guaranteeing the information transparency, and that the interdisciplinary studies in convergent area could be needed for guaranteeing the information transparency. The results could provide the abundant cues to the researchers who tried to capture the dynamics of causal relationships of consumer reactions when the psychological contract had been violated. For example, feeling of violation could not directly affect the behavioral intentions of consumers in this study, different with the findings of prior studies. This means that some conditions could be triggers of the betrayal behaviors, but the other conditions could not directly facilitate the betrayer behaviors. The interview results could provide somewhat reasonable explanation, and future studies could be beneficial to investigate the variables of reasons in interview results. Third, I could balance the scale of the IS research by investigating the dark side effect of IS usage in earnest. There are tremendous studies which are conducted with the benefits of information system usage, but there are few studies conducted with the side effect of IS abuse. People could be apt to believe that they could get the abundant qualified information online, but the potential risk of information deception could prevail even in Web 2.0.

Besides the academic implications, this study could also provide the various practical implications of how to make the information transparency mechanisms without ID. First, this study could contribute to what elements of these mechanisms could be needed. Findings of this study suggested that consumers could not easily detect the ID especially in intentional concealment of negative information compared with equivocation and falsification. When they could know the entire set of information and when the directory service of information could provide the semantic relationship between information, consumers could easily detect the ID, and they could actively react on the intentional ID practices. These findings could expand the findings of prior study [8] in which only the effect of warning mechanism could be significantly validated. Second, this study could contribute to providing
the necessity basis of consumer protection agency as the third party and to emphasizing his roles. Along with the first practical contribution, an individual could not easily detect the ID, and they had no information to legally react on ID. The results of this study suggested that the switching cost of consumers could be dramatically high in the condition of limited number of PCSs. In this condition, active intervention by the agency could be essential to protect the consumers.

Despite the value of this study, there are also some limitations. First, this study tried to identify the impact of ID only by PCS, but ID could be more frequently made by sellers. Future study could be beneficial to comparing the impacts of ID by ID sources. Second, this study had performed the quasi-experiment. Laboratory experiment could help explain the relationship between variables more rigorously by controlling the exogenous variables. To enhance the internal validity, the various research methods such as laboratory experiment and field study could be adopted in future study. Third, I could not directly conduct the various betrayal behaviors as the complaining to the company and the accusing of the company to the governmental agency [35]. Future study could be needed to capture the various betrayal behaviors induced by ID detection. Fourth, I performed the hypothesis validation by 148 observations which is relatively small number of observation, regarding the 19 hypotheses in this study. It could be enough to analyze by PLS algorithm [46], but mass of observation could be helpful to enhance the experiential power of future study. By the progress of big data analytics, it could be beneficial in gathering the big data of real betrayal behaviors appearing in the various online sites.

Conflict of Interests

The author declares that there is no conflict of interests in the paper.

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