The Impact Of Interactivity On Involvement And Social Presence: The Moderating Effects Of Opinion Leadership

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THE IMPACT OF INTERACTIVITY ON INVOLVEMENT AND SOCIAL PRESENCE: THE MODERATING EFFECTS OF OPINION LEADERSHIP

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Abstract

The internet is information media and social media for online consumers to seek information on the websites and opinions from other consumers. This study examines how the three dimensions of interactivity (control, direction of communication, and synchronicity) affect the users’ online information seeking process. According to past studies, individual differences such as knowledge of product and motivation of purchase, affect the process of information seeking online. Opinion leaders are often viewed as important targets for successful marketing campaigns, since opinion leaders have greater potential to affect others’ decisions by sharing their abundant knowledge and personal experiences with goods. Therefore, we also investigated how users’ opinion leadership moderates the effects of interactivity. The empirical method of survey is employed to test the proposed hypotheses. A total of 511 respondents were recruited to participate in the survey. The empirical results showed that the control and synchronicity significantly increased consumers’ involvement in the information shown on the websites, whereas communication direction and synchronicity significantly affect on social presence of other people online who provide product related information. Furthermore, users’ opinion leadership moderated the effects of communication direction and synchronicity on social presence. The findings of this study provide online practitioners with useful suggestions applicable to personalization strategies.

Keywords: Interactivity, Involvement, Social Presence, Opinion Leadership.
1. INTRODUCTION

The Internet has become one of the most important consumer sources for product information. Consumers seek the information online through two sources: information on the websites and opinions from other consumers. When consumers search Web pages for information, they may cognitively involve themselves in the information seeking process. When consumers require the information from other users or sellers, they may produce a feeling of human contact and sociability from others in the communication process. Therefore, information seeking activity manifests itself through both involvement and social presence.

Among the many features of the Internet that help users seek product information, interactivity has particularly drawn extensive attention from practitioners and researchers (Liu & Shrum, 2002). Interactivity is widely regarded as an essential factor in determining a variety of affective and behavioral outcomes such as satisfaction, attitude, decision-making and involvement (Fortin & Dholakia, 2005; Stewart & Pavlou, 2002; Coyle & Thorson, 2001; Haubl & Trifts, 2000). Through traditional channels, consumers passively receive product information from advertisers or other consumers. Conversely, the interactive features of the Internet allow online consumers to actively seek the information. Moreover, the traditional media also lack the non-verbal cues and personal connection with others. Online interactive functions provide consumers a chance to ask others the information they’re seeking.

Past research has revealed that the construct of interactivity is a composite concept involving user control (Ariely, 2000; McMillan & Hwang, 2002), two-way communication (McMillan & Hwang, 2002; Liu & Shrum, 2002), reciprocity (Johnson, Bruner II, & Kumar, 2006), synchronicity (Liu & Shrum, 2002), response time (Alba, Lynch, Weitz, Janiszewski, Lutz, Sawyer, & Wood, 1997), mapping (Steuer, 1992), and range (Steuer, 1992). Among the many features of interactivity, three characteristics—control, direction of communication, and synchronicity—have been identified as the most prominent features (Liu & Shrum, 2002). Because interactivity is a multi-dimensional concept, we cannot assume that the effects of all of dimensions are the same. Hence, the first objective of this study is to assess the effects of multiple dimensions of interactivity on consumers’ involvement and social presence in the context of e-commerce.

Although interactivity can help consumers search online information, consumers have diverse information needs such that their use of interactivity could be different. For instance, opinion leaders prefer to discuss and interact with other consumers. They want to gather and share the product information during communication process (Flynn, Goldsmith, & Eastman, 1996). On the other hand, non-opinion leaders prefer to ask others the questions (Flynn et al., 1996) and be fed with information they need. Opinion leaders are often viewed as important targets for successful marketing campaigns, since opinion leaders have greater potential to affect others’ decisions by sharing their own personal experiences with goods. They are also regarded as more reliable sources of information for consumers than other commercial sources such as traditional advertisement messages. As a result, there are many differences between opinion and non-opinion leaders: seeking needs, enduring involvement (Venkatraman, 1990), expertise (Lyons & Henderson, 2005), social activeness (Baumgarten, 1975), innovativeness (Goldsmith & Hofacker, 1991), and behavioral consequences such as heavy browsing (Goldsmith & d’Hauteville, 1998) and ongoing information seeking (Bloch, Ridgway & Sherrell, 1989). Due to the different levels of opinion leadership, consumers might need different kinds of interactivity facilitation in processing product-related information online. Therefore, three dimensions of interactivity could affect their cognitive involvement and perception of social presence differently between opinion leaders and non-opinion leaders. Hence, the second objective of this research is to investigate how online consumers’ opinion leadership (opinion vs. non-opinion leaders) could possibly moderates the effects of three dimensions of interactivity on their involvement and social presence.
2. LITERATURE REVIEW

2.1. Interactivity and Online Information Processing

Interactivity is defined as “the degree to which two or more communication parties can act on each other, on the communication medium, and on the messages and the degree to which such influences are synchronized” (Liu & Shrum, 2002). For example, consumers provide their opinions of the products or reply to the product-related information provided by online sellers. In traditional channels of advertising, consumers passively receive product information from advertisers. Conversely, the interactive features of the Internet may lead to online consumers’ active involvement in information. Moreover, the traditional media also lack non-verbal cues and social interaction. Online interactive functions, however, increase the opportunity for human-to-human interaction. Cognitive involvement refers to the extent of cognitive elaboration that occurs during a communication process (Petty, Cacioppo, & Schumann, 1983). The previous literature revealed that consumers are more likely to be cognitively involved when using interactive media than when using traditional media, due to the closer attention that consumers pay to these information activities (Bezjian-Avery, Calder & Iacobucci, 1998; Colye & Thorson, 2001; Liu & Shrum, 2002; Lustria, 2007). When consumers search the information through Web pages, they may cognitively involve in the information seeking process. As suggested by the previous literature, interactivity is a multi-dimensional concept (Steuer, 1992; Ha & James, 1998; Liu & Shrum, 2002) that consists of three dimensions: control, direction of communication, and synchronicity. Control is defined as the extent to which people can manipulate the duration of time, content, and sequence of presented information (Bezjian-Avery, Calder & Iacobucci, 1998; Ariely, 2000). For instant, a blog has the characteristic of high control whereas TV is low control because the content is pushed to consumers in a predetermined order and pace. A high degree of control provides consumers freedom to choose what to read, in what order and at what pace. The high control allows users to actively browse and digest the information they need. In other words, high control provides users more opportunities to search relevant information in the active manner. On the contrary, a low degree of control only allows consumers to passively avoid unwanted information. That is, consumers do not actively seek information according to their needs. Therefore, a high level of control leads consumers to pay more attention to information seeking activity and engage in cognitively browsing the product information (Liu & Shrum, 2002; Fortin & Dholakia, 2005). Hence, control may induce consumers’ cognitive involvement in the information shown on the websites. For this reason, we hypothesize that:

H1: The perception of control positively affects users’ involvement.

In addition to information provided by websites, consumers also seek product information from other consumers online such that the concept of social presence of other consumers is also relevant. Social presence is defined as the degree of prominence of the other person in the interaction and the consequent salience of the interpersonal relationships (Short, Williams, and Christie, 1976). Consumers using interactive media have more social presence than those using traditional media, because interactive media provide feelings of human contact and sociability (Yoo & Alavi, 2001). Even though control is one of the features of interactivity, this concept pertains to the way how information is presented to consumers, instead of the way of communicating with other people. Therefore, we assume that control does not affect perceived social presence.

The second feature of interactivity, direction of communication, which could be one-way or two-way, is defined as the degree to which users are able to provide feedback to others (McMillan & Hwang, 2002; Liu & Shrum, 2002). For instance, two-way communication could include instant messengers, chat rooms, or email whereas one-way communication offers FAQ (Frequently asked questions) or real-time news. Communication direction provides consumers a chance to offer feedback to the website of a company or talk to other consumers for their precious personal experiences regarding products of interest. On the other hand, one-way communication only allows consumers to obtain the information through the Web pages. Past research has shown that social presence could be accumulated by providing users with more means of interaction with other human beings (Hassanein & Head, 2007). In addition, two-way communication compensates for the lack of social cues in online
channels by providing a medium for users to interact with other users. Therefore, direction of communication may raise consumers’ feelings of human contact and sociability from other people online who provide product related information, as hypothesized in H2. However, direction of communication seems to be irrelevant to the degree of involvement because both one way and two way communication can possibly provide information that is adequately enough to cognitively engage consumers.

**H2: The perception of direction of communication positively affects users’ social presence.**

The third feature of interactivity, synchronicity is defined as the extent to which users’ input into a communication and the responses which they receive from the communication are simultaneous (Liu & Shrum, 2002). For example, a blog offers a low degree of synchronicity whereas instant messaging system has the feature of higher synchronicity because they allow for real-time response. However, such definition only applies to two-way communication because of requirement of feedback. Nonetheless, “no delay” could also refer to “timeliness” of information in one-way communication, meaning the time interval between the occurrence of the information and the time it is reported (Doll & Torkzadeh, 1988; Gelderman, 1998; Bailey & Pearson 1983). A high degree of synchronicity allows consumers to quickly acquire the information they need through searching the information available on web pages or asking questions of other people. High synchronicity allows consumers to have more opportunities to digest and cognitive the information which they received due to its timeliness. Moreover, high synchronicity enables users to engage in discussions with others like face-to-face interaction. On the other hand, consumers do not gather the product information simultaneously in low synchronicity conditions. Hence, they may not engage in the information seeking process as well as not feel that the feature is human contact and sociability. According to the previous studies, the responsiveness and timeliness of the information leads users to become more interested in and more willing to process the received information (Weiss, Lurie, & MacInnis, 2008). Furthermore, when immediate responses are not received, the user’s perceived social presence decreases (Tu, 2000). Therefore, we hypothesize that synchronicity positively affect consumers’ cognitive involvement as well perceived social presence, as stated in H3a and H3b.

**H3a: The perception of synchronicity positively affects users’ involvement.**

As we have argued so far, that the three facets of interactivity tend to increase consumers’ involvement and social presence, but is that the case for all consumers? For instant, if consumers do not have enough motivation or expertise to use them, the impacts of these technological features will not be as widespread. The empirical results of past research suggest that moderating factors can be used to account for the seemingly contradictory results of interactivity (Liu & Shrum, 2002; Lustria, 2007) such as need for closure (Amichai-Hamburger, Fine, & Goldstein, 2004), desire for control (Liu & Shrum, 2002), expertise (Wu & Lin, 2006), motivation (Wu & Lin, in press), and need for cognition (Lustria, 2007). Opinion leaders are often viewed as important targets for successful marketing campaigns. They have greater potential to affect others’ decisions by sharing their own personal experiences with goods. Therefore, opinion leadership may play an important role in the information seeking activity. We will further assess the moderating effect of opinion leadership in this study.

**2.2. Opinion Leadership: the Moderating Effects**

Opinion leaders are defined as individuals “who exert an unequal amount of influence on the decisions of others” (Rogers & Cartano, 1962). Opinion leaders influence the attitudes and actions of other people, and have been suggested as more reliable sources of information for consumers than to commercial sources such as traditional advertisement messages (Busch & Houston, 1985; Berkman & Gilson, 1986). Based on the previous research, opinion leaders have been identified as having a number of characteristics. Opinion leaders have more enduring involvement with a product category (Venkatraman, 1990), expertise or experience (Lyons & Henderson, 2005), public individualism (Chan & Misra, 1990), social activeness (Baumgarten, 1975), and innovative (Goldsmith & Hofacker,
Furthermore, opinion leaders were found to lead to actual behavioural consequences. For example, they were heavier product consumption (Goldsmith & d’Hauteville, 1998), information sharing and information seeking (Venkatraman, 1989), as well as heavy browsing (Bloch, Ridgway, & Sherrell, 1989). As discussed in the past paragraph, opinion leaders have higher expertise or experience than non-opinion leaders (Lyons & Henderson, 2005). Moreover, opinion leaders have been identified as more socially active (Baumgarten, 1975) and more likely to engage in information sharing activities (Venkatraman, 1989) than non-leaders. That is, opinion leaders also may not only possess a higher degree of knowledge but also have higher motivation for sharing the information to others than non-opinion leaders. Hence, opinion leaders are viewed as a comprehensive personality trait as well as a unique consumer trait.

Because of high levels of expertise, opinion leaders explicitly know that they could go to where to find the information based on their needs. Thus, opinion leaders have the specific goal of information seeking and their attentions are directed to information related to their goals. The feature of control provides opinion leaders the freedom to browse or search the product information online. They can search for information they want, and read and digest information at their own pace. On the contrary, non-opinion leaders do not have the clear goal of information seeking compared to opinion leaders. Non-opinion leaders are not aware of where they could look for the information they need. Even though control allows them the freedom to search for information, they do not feel the benefit of this feature. Similarly, Wu and Lin (2006) also revealed that the degree of information control should be matched by the degree of expertise of consumers. That is, a high degree of information control is more suitable for consumers with greater expertise, whereas consumers with less expertise will prefer a lower degree of control. Hence, based on the above discussions, we argue that the effect of control works differently for opinion leaders and non-opinion leaders, as stated in the following hypothesis:

**H4: Opinion leadership moderates the relationship between control and involvement. The relationship between control and involvement is stronger for opinion leaders than for non-opinion leaders.**

According to the past literature, opinion leaders consider that they have much knowledge and desire for sharing the information to other consumers. In addition, opinion leaders are also considered as opinion seekers due to their desire for more knowledge or expertise (Sun, Youn, Wu, & Kuntataporn, 2006), and often conduct in ongoing information seeking activity (Venkatraman, 1989). Hence, opinion leaders are simultaneously information givers and receivers. Two-way communication facilitates reciprocal communication between users. The feature of communication direction allows opinion leaders to fully engage in sharing and searching the information. Opinion leaders can discuss product information with others through two-way communication. Conversely, non-opinion leaders use the feedback tools to ask the questions in order to search the information. Non-opinion leaders are passively fed with information they need. Although two-way communication benefits both opinion leaders and non-opinion leaders, opinion leaders prefer to do social activity such as sharing and searching the information with other consumers. As such, opinion leaders may use the feature of two-way communication more frequently than non-opinion leaders. Therefore, opinion leaders feel more human contact and sociability by using direction of communication than non-opinion leaders. Based on the above mentioned, we argue that opinion leaders’ social presence is higher than that of non-opinion leaders when using two-way communication, as stated in H5:

**H5: Opinion leadership moderates the relationship between direction of communication and social presence. The relationship between direction of communication and social presence is stronger for opinion leaders than for non-opinion leaders.**

As above discussion, non-opinion leaders think that they have a lower degree of expertise or less knowledge than opinion leaders. Hence, non-opinion leaders need to search much information to satisfy their preferences. That is, they are information receiver. The feature of synchronicity can provide consumers with updated information related to their needs. A higher level of synchronicity enables non-opinion leaders to be more involved in the information seeking process and have more opportunities to digest the information which they received. Moreover, high synchronicity allows non-opinion leaders to ask information from other consumers with a higher level of expertise. Thus, a high level of synchronicity implies a responsive information provider who is willing to feed useful
information to non-opinion leaders. On the other hand, opinion leaders already have abundant information compared to non-opinion such that opinion leaders are more likely to play the role as information feeder. A high degree of synchronicity does not seem as crucial to opinion leaders because they already hold the adequate knowledge to achieve their needs. Therefore, they may not feel the same level of benefits from websites that offer a higher degree of synchronicity, in terms of their involvement and social presence in processing product information. That is, synchronicity should be more effective in inducing involvement and social presence for non-opinion leaders than for opinion leaders, as stated in the following hypothesis:

**H6a:** Opinion leadership moderates the relationship between synchronicity and involvement. The relationship between synchronicity and involvement is stronger for non-opinion leaders than for opinion leaders.

**H6b:** Opinion leadership moderates the relationship between synchronicity and social presence. The relationship between synchronicity and social presence is stronger for non-opinion leaders than for opinion leaders.

The above hypotheses regarding the effects of interactivity are illustrated in Figure 1. In conclusion, we argue that the three interactivity dimensions affect consumers’ involvement and social presence. Furthermore, we also argue that consumers’ opinion leadership moderates the effects of interactivity on their involvement and social presence.

![Figure 1. The proposed research model of this study](image-url)
3. **METHODOLOGY**

This study adopted the survey method to test the proposed hypotheses. We constructed eight websites to simulate the eight possible combinations of the three dimensions of interactivity. Although using the real websites can increase the reliability and validity, we just can compare the website effects with two levels (all of high levels of interactivity vs. all of low levels of interactivity). We cannot discriminate from the effects of three dimensions of interactivity simultaneously. In addition, there are different in the product and content in the diverse websites. That is, adopting the simulative websites can avoid possible confounded effects embedded in existing commercial websites such as amount of information, website reputation, consumer reviews, and so on. Moreover, we also can reveal that any two websites among the eight websites only have one difference as well as the product information is the same between eight websites. By the way, we can separately examine the individual effects of the three dimensions of interactivity. The products to be tested in this study were food, travel, camera, and bicycle. Furthermore, we adopted Flynn et al. (1996)’s opinion leadership scale. The opinion leadership scores ranged between 7 and 35. We determine the score that stands out as opinion leaders (top 30% or above compared with other participants) or as non-opinion leaders (bottom 30% or below compared with other participants). Users may simultaneously play opinion leaders or non-opinion leaders in the different products. Therefore, we only choose the salient scores in the one of four products to be an opinion leader or a non-opinion leader. Participants were divided into opinion and non-opinion leader groups passed on their opinion leadership scores. Finally, we adopted the statistic methods of SEM analysis to assess the research model and test the moderating effects of opinion leadership on involvement and social presence.

3.1. **Websites Constructed for Representing Interactivity Dimensions**

This research included eight possible combinations in the three dimensions of interactivity: control (high vs. low), direction of communication (two-way vs. one-way), and synchronicity (high vs. low). For each possible combination, the feature of interactivity was found to represent it. For instance, a high control condition was presented with rich information in a combination of text, images, and hyperlinks. Users could freely choose what to read, how long to read, and the order in which to read. On the other hand, low control condition was presented with information slides which were the same as high control. The slides, which have predetermined text and image order, were played only one time. Users have no control over the pace and viewing order of the conveyed information. Moreover, two-way communication condition was presented with an embedded instant messenger. Users could pose questions to others and then receive the feedback. In contrast, one-way communication condition was presented in a Frequently Asked Questions (FAQ) format. Users do not interact with others. Furthermore, we utilized a real-time news format to present a high synchronicity condition. Users could obtain the responsiveness and timeliness of information through this feature. In addition, we adopted a forum format as a low synchronicity condition under which users did not gather the information immediately. Every participant was randomly assigned to one of the eight websites to conduct the required tasks. To counter balance different product types (experience vs. search goods), we finally selected restaurant, travel (two experience goods), camera, and bicycle (two search goods) as the testing materials. In addition, to avoid the brand bias of products, we chose the brands that had Top 2 to 5 market share in Taiwan, where the data were collected.

3.2. **Measurement**

The measurements of the constructs were scales adopted from previous relevant research: Personal Involvement Inventory (PII) scale developed by Zaichkowsky’s (1994); the scale of social presence by Gefen and Straub (2004); the scale of perception of control by Liu (2003); perception of direction of communication by Liu (2003); perception of synchronicity by Doll and Torkzadeh (1988) and Wu (2000); and the scale of opinion leadership scale by Flynn, Goldsmith and Eastman (1996). All items were measured using a seven-point Likert scale to indicate the participants’ agreement or disagreement regarding the items, with 1 representing “Strongly Disagree” and 7 being “Strongly
Agree.”

3.3. Participants

A total of 514 participants were recruited for the study. After deleting the outliers which are detected through box plot method, 511 participants remained for further analysis. There were 477 (93.35%) students and 34 (6.65%) non-students. The participants included 213 (42.3%) males and 298 (57.7%) females. Their age ranged from 18 to 40 years (Mean = 22.40, SD = 9.30). Most (71.23%) reported undergraduate degrees as their highest level of education. Of the remaining participants, 27.20% had master’s degrees or above, and 1.57% reported that a high school diploma or below was their highest level of education. Insightxplorer is the largest market survey company in Taiwan. According to Insightxplorer 2011 online users’ demographic report, the distributions of age and education in our sample are different from the results of the report. To confirm the external validity of our study, we adopted K-S test (Kolmogorov-Smirnov test) to test whether the student and non-student samples were significantly different from each other. If they were not, their data will be combined for further analysis.

<table>
<thead>
<tr>
<th>Demographic information</th>
<th>Insightxplorer’s report</th>
<th>Our sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>52.0%</td>
<td>42.3%</td>
</tr>
<tr>
<td>Female</td>
<td>48.0%</td>
<td>57.7%</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
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<tr>
<td>10-19</td>
<td>20.6%</td>
<td>15.7%</td>
</tr>
<tr>
<td>21-29</td>
<td>23.4%</td>
<td>81.6%</td>
</tr>
<tr>
<td>30-39</td>
<td>24.2%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Master degrees or above</td>
<td>6.0%</td>
<td>27.7%</td>
</tr>
<tr>
<td>University degrees</td>
<td>50.2%</td>
<td>71.23%</td>
</tr>
<tr>
<td>High school diploma or below</td>
<td>43.8%</td>
<td>1.57%</td>
</tr>
</tbody>
</table>

Table 2. Demographic information compares with Insightxplorer’s report and our sample

3.4. Procedure

The participants were randomly assigned to one of the eight websites. Each participant was presented four products, and participants were required to complete the same procedure for each of them. First, participants were asked to answer questions of opinion leadership and then browse the product information. In the scenario, participants needed to buy the product and were instructed to search for additional information regarding the product through the randomly assigned website. After they finished browsing information about each of the four products, they were required to answer questions regarding involvement and social presence. Next, the participants needed to answer questions regarding their perceptions of the three dimensions of interactivity for the assigned website. Finally, their demographic information was collected. On average, the participants spent 40 minutes to complete the whole study, and each of them received NT$100 as an incentive after they finished it.
4. RESULTS

We first conducted the K-S test to assess possible differences between student and non-student samples. Second, we assessed the validity and reliability of the measurements with Cronbach’s α, average variance extracted (AVE), and composite reliability (CR). Finally, we used SEM analysis to test the research model and the moderating effect of opinion leadership. All of the empirical results were in the following sections.

4.1. K-S Tests of Students and Non-students

Our sample was consisted of both students and non-students. Therefore, we used K-S test to assess the student and non-student samples in terms of opinion leadership score, their perceptions of the three dimensions of interactivity and both of dependent variables. The results revealed that there were no significant differences between the two samples with respect to their evaluations of opinion leadership ($D = .16 < D_{.05, 477, 34} = .24, p = .43, \text{ns}$), perception of control ($D = .16 < D_{.05, 477, 34} = .24, p = .43, \text{ns}$), perception of two-way communication ($D = .12 < D_{.05, 477, 34} = .24, p = .73, \text{ns}$), perception of synchronicity ($D = .09 < D_{.05, 477, 34} = .24, p = .96, \text{ns}$), involvement ($D = .12 < D_{.05, 477, 34} = .24, p = .85, \text{ns}$), and social presence ($D = .11 < D_{.05, 477, 34} = .24, p = .43, \text{ns}$). Therefore, we combined the data of student and non-student samples for further analysis.

4.2. Reliability and Validity

We used confirmatory factor analysis (CFA) to assess the reliability and validity of the measures. The results showed that the factor loadings of all items were higher than .65 (see Table 2) which were considered reliable (Hair, Anderson Jr., Tatham, & Black, 1998). Similarly, the values of Cronbach’s α for all measurement scales, ranging from .81 to .96 indicated acceptable reliability (Nunnally, 1978) of the measurements. In addition, average variance extracted (AVE) and composite reliability (CR) was used to evaluate convergent validity. For all measurement scales, the values of average variance extracted (AVE) value ranged from .73 to .79. Moreover, composite reliability value range was from .89 to .96. All average variance extracted (AVE) values exceeded .50, and composite reliability (CR) values were all over .70, suggesting acceptable convergent validity of the measurements used in this study (Fornell & Larcker, 1981). We also examined the discriminant validity of the constructs. Fornell and Larcker (1981) suggested that discriminant validity was determined by comparing the squared root of AVE estimate for each construct with the correlations between constructs. As illustrated in Table 3, the numbers in a diagonal line was the squared root of average variance extracted (AVE) estimate for each construct. In the table, all numbers in the diagonal line were higher than the correlations between respective constructs. Therefore, the discriminant validity levels of all constructs were satisfactory (Fornell & Larcker, 1981).
### Table 2. Results of Reliability and Convergent Validity

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<thead>
<tr>
<th>Variables</th>
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<td>2. Direction of communication</td>
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<td>3. Synchronicity</td>
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<td>4. Involvement</td>
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<td>5. Social presence</td>
<td>.26</td>
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<td>.33</td>
<td>.45</td>
<td>.85</td>
</tr>
</tbody>
</table>

Table 3. Results of Discriminant Validity: Extracted AVE

4.3. SEM Analysis of Research Model

Based on the threshold values, there were 287 participants in the opinion leader group and 224 in the non-opinion leader group. As our sample was adequate, we adopted LISREL8.70 to assess the research model. We first analyzed the data that combined both groups (Figure 2), and then evaluated our research model by comparing the results of both groups (Figures 3 and 4). Based on the Table 4, the goodness of fit statistics results for combined groups are acceptable. As Figure 2 shows, the
effects of control and synchronicity on involvement were significant (control: $\beta = .13$, $p < .01$, and synchronicity, $\beta = .24$, $p < .01$). Hence, control and synchronicity are positively related to user involvement. According to the results, Hypothesis 1 and 3a are strongly supported. Moreover, the feature of communication direction and synchronicity were significant (communication direction, $\beta = .39$, $p < .01$, and synchronicity, $\beta = .25$, $p < .01$). Therefore, communication direction and synchronicity are positively related to user social presence. Hypothesis 2 and 3b are also strongly supported by the empirical results of the survey.

![Figure 2. Results of SEM Analysis](image)

<table>
<thead>
<tr>
<th>Results</th>
<th>$\chi^2$/df</th>
<th>GFI</th>
<th>AGFI</th>
<th>SRMR</th>
<th>CFI</th>
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<tr>
<td>Suggested value</td>
<td>$&lt; 3$</td>
<td>$&gt;.9$</td>
<td>$&gt;.8$</td>
<td>$&lt; .1$</td>
<td>$&gt;.9$</td>
<td>$&lt; .08$</td>
<td>$&gt;.9$</td>
<td>$&gt;.9$</td>
<td>$&gt;.9$</td>
</tr>
<tr>
<td>Both groups combined</td>
<td>690.10/318</td>
<td>2.17</td>
<td>.92</td>
<td>.89</td>
<td>.05</td>
<td>.99</td>
<td>.05</td>
<td>.98</td>
<td>.98</td>
</tr>
<tr>
<td>Opinion leader group</td>
<td>587.98/329</td>
<td>1.79</td>
<td>.88</td>
<td>.85</td>
<td>.06</td>
<td>.98</td>
<td>.05</td>
<td>.96</td>
<td>.98</td>
</tr>
<tr>
<td>Non-opinion leader group</td>
<td>585.87/322</td>
<td>1.82</td>
<td>.85</td>
<td>.81</td>
<td>.06</td>
<td>.98</td>
<td>.06</td>
<td>.95</td>
<td>.97</td>
</tr>
</tbody>
</table>

Table 4. Goodness of Fit Statistics Results of SEM Analysis

4.4. SEM Analysis of Moderating Effect of Opinion Leadership

In order to observe the moderating effect, the data were divided into two groups, opinion and non-opinion leaders (Dabholkar & Bagozzi, 2002; Baron & Kenny, 1986). The results of combined sample were showed by Figure 2, and the results of opinion and non-opinion leaders were displayed in Figure 3 and 4, respectively. Based on the Table 4, the goodness of fit statistics results for opinion and non-opinion leader groups were also acceptable even though the GFI values were .88 for opinion leaders and .85 for non-opinion leaders. The effect of control on involvement had no significant effects on involvement for opinion (control: $\beta = .12$, n.s.) and non-opinion leaders (control: $\beta = .11$, n.s.). Control does not increase the level of involvement for opinion leaders and non-opinion leaders. Based on the results, Hypothesis 4 is not supported. Furthermore, the effect of synchronicity on involvement was highly significant for opinion leaders (synchronicity: $\beta = .24$, $p < .01$) and non-opinion leaders (synchronicity: $\beta = .24$, $p < .01$). Although synchronicity is effective in raising the level of involvement for opinion leaders and non-opinion leaders, the difference between two groups is not significant. For this reason, Hypothesis 6a is not supported. In addition, the effect of two-way communication and synchronicity on social presence were highly significant for opinion
(communication direction: $\beta = .52$, $p < .01$, and synchronicity: $\beta = .15$, $p < .05$) and non-opinion leaders (communication direction: $\beta = .31$, $p < .01$, and synchronicity: $\beta = .36$, $p < .01$). The feature of two-way communication has a stronger effect on social presence for opinion leaders than for non-opinion leaders. Conversely, the dimension of synchronicity is more effective in increasing the level of social presence for non-opinion leaders than for opinion leaders. Therefore, Hypothesis 5 and 6b are strongly supported by the empirical results of the survey. The empirical results of the survey demonstrate interesting moderating effects of user’s opinion leadership on the relationship among interactivity, involvement, and social presence.

**Figure 3. Results of SEM Analysis for the Opinion Leader Group**

**Figure 4. Results of SEM Analysis for the Non-Opinion Leader Group**

### 5. CONCLUSION, MANAGERIAL IMPLICATIONS, LIMITATIONS AND FUTURE RESEARCH

This study examines how the three dimensions of interactivity affect consumers’ involvement and social presence in the online information seeking process. The empirical results revealed that control
and synchronicity increase the level of consumers’ involvement. Moreover, communication direction and synchronicity raise the level of consumers’ social presence. In addition, users’ opinion leadership serves as an important moderator on the relationship among the three dimensions of interactivity, users’ social presence. Specifically, synchronicity has stronger effects on social presence for non-opinion leaders than for opinion leaders. Conversely, the direction of communication has stronger effects on social presence for people with opinion leadership than those with non-opinion leadership.

The internet is information media and social media for online consumers to seek information on the websites and opinions from other consumers. The empirical results of the study provide managerial implications regarding design guidelines of website interactivity, so that they can determine the most appropriate feature of interactivity for general online consumers or different levels of opinion leadership consumers, in order to achieve better levels of consumers’ involvement and social presence. When a company uses the source of the information on the websites to provide the product information for consumers, it may focus on developing the features of control and synchronicity. In addition, a company may concentrate on expanding the features of two-way communication and synchronicity when it supplies the product information for consumers through the source of the opinions from others. The results also demonstrate that the explanatory power of involvement was weak ($R^2 = .10$) whereas social presence was strong ($R^2 = .28$). Consumers need to spend high costs on actively engaging in the product information. That is, increasing consumers’ involvement is much difficult than inducing their social presence. Therefore, the system must provide more features which help consumers to spend much time on the website, and then they are more likely to keep on using the website. If a company can provide more features to raise consumers’ involvement than other companies, it is strategy implication.

In addition, opinion leaders usually fill the role of an influential. They have higher expertise and prefer the social activeness than non-opinion leaders. They also like to exchange their opinion of the product with others or discuss with others about the product information which they are very familiar with. Therefore, giving them two-way communication allows them to communicate with other people about the product information. At the same time, they have more opportunities to interact with others. On the contrary, non-opinion leaders have less expertise regarding the products. Hence, they demand much information to satisfy their needs. Giving them the more synchronicity helps them obtain the product information immediately. They may produce more feelings of human contact and sociability from other consumers. Such results can also shed some light on the management of recently popular social network sites. The contribution of the study offers the practitioners of e-commerce useful strategies that provide product information or advertising to online consumers of different opinion leadership through personalized features of interactivity.

There are some limitations in this study. First, we constructed websites for the opinion leadership of this research. Therefore, the website design may not have followed typical practices and may have appeared artificial for the respondents. Secondly, the explanatory power for involvement was only 10% for the data combined (9% for the opinion leader group, and 9% for the non-opinion leader group). This could be due to the long list of possible antecedents of involvement, including situational and individual factors (Petty, Cacioppo, & Schumann, 1983). This study only considered the effects of media and opinion leadership of the individuals, such that the explanatory power for the involvement was not as conspicuous as those for other dependent variables in our study.

In future studies, real websites should be used to further investigate the effects of interactivity. Furthermore, features of interactivity can also be investigated in the context online social interactions. With the growth of social networking sites, it will be interesting to see how the three dimensions of interactivity affect social life in the real world as well as of the virtual world. In addition, we must further explore that other dimensions of interactivity influence consumers’ involvement and social presence.
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