

Actual Relationship v. Perceived Relationship, Which is Better to Explain its Mediating Role between the Sense of Community and its Antecedents in an Online Brand Community

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The relationship has a critical role to play in user behavior within various social media platforms including online communities. The current study focuses on the measurement of this construct by comparing two methods: the perceived strength of the relationship using a self-administered survey and the closeness centrality of the relationship using social network analysis (SNA). The study designs a structural equation model with antecedents and consequences of the relationship. It compares two separate models with two types of relationships in terms of their predictive powers. The SNA model with the closeness centrality appears to have a superior fit over the other. With the closeness centrality measure, further studies can take benefits to predict various performances of social media contexts. Additionally, antecedents of this alternative measure should be examined and investigated to enhance its validity and reliability.

Key-words: Relationship, Online community, Social network analysis, Sense of community, Closeness centrality

I . Introduction

People have flocked together for a long time and the community is one of the most popular means to do so. An early work by Hillery (1955) conceptualized the community as “*persons in social interaction within a geographic area who have one or more additional common ties.*” Social interaction with common ties is a key concept of the community. The popu-

larization of the Internet transferred the community into the digital world. While traditional communities allow people to meet within a limited area and time, online communities enable them to communicate with people all around the world at anytime.

As a critical venue for consumers to communicate with others about on various products, the online community has expanded its scope to brands. The online brand community

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(OBC) is an influential place for people to share relevant information on brands, such as useful information on product quality, price, promotions, and so forth. Literature in marketing and consumer behavior areas has extensively explored the OBCs. Earlier studies conceptualized the OBC classified its types, and examined the motives of users (Hagel & Armstrong, 1997; Muniz & O'Guinn, 2001). Following studies empirically investigated various consequences of OBC (e.g., McAlexander, Schouten, & Koeing, 2002).

The literature emphasizes the role of relationships among the users as a key factor in the development and success of the OBC (Muniz & O'Guinn, 2001). In order to be a successful community (from the perspectives of both brands and users), it is critical to make, develop, and maintain relationships among members (Jang et al., 2008). The OBC is a communication network consisting of members who have interests in a specific brand in common. Therefore, strong relationships among them make the community successful (Cummings et al., 2002). In fact, consumer's immersion in a community enhances the brand equity with its capability of interactivity, informative benefits, and rewards for activities (Choi & Han, 2012).

The current study focuses on this critical construct, the relationship in online brand communities. Specifically, the study aims to evaluate the explanatory power of two dif-

ferent measures for the relationship among users in the OBC. One is a traditional measure of perceived strength of relationships, based on data collected using self-administered surveys. The other measures actual user-to-user interactions with social network analysis (SNA). Although these two measures can be not identical, they substantially measure some aspects of relationship. This study does not directly claim which measure can be closer to the original concept of the relationship, but clearly compare their explanatory power of the comprehensive model with major antecedents and consequences of the relationship. Regarding the validity issue which stems from the alternative measure from SNA, a following section deals with how the concept of relationship can be related and be measured with SNA's specific index.

The study investigates antecedents and consequences of relationships in terms of how much they affect and are affected by the two different measures of relationships. By comparing two contrasting models for their predictive powers with structural equation modeling processes, the study evaluates the two measures of relationships and presents suggestions for future research toward creating, modifying, and applying a better measure.

II. Online Brand Community

The current study, as posited earlier, focuses on the ‘relationship,’ which is one of the most critical constructs in explaining the interactions among users and the effectiveness of communication activities. Although ‘relationship’ is also the key factor of social media such as Facebook and Instagram, online community is evaluated to be a better platform to observe the user’s interactions and their relationships than SNS platforms which yield limited interactions. Specifically social media platforms usually provide active user’s interactions; however, the interaction happens between account users and their followers. In contrast, in online communities, interactions happen among various users. Therefore, the relationship built with many-to-many communication activities can be better observed in online communities than usual social media platforms. The most advanced type of interactivity is constructed with many-to-many communication than other types such as one-to-many and one-to-one communication (Hoffman & Navak, 1996).

Research efforts exploring brand communities increased drastically when online communities grew popular in the late 1990s. With the benefit of digital environment, online brand community (OBC) has been positively evaluated with its advantages as compared to traditional offline brand commu-

nities. Wirth and his colleagues (2013) compared OBCs with offline brand communities and supported OBC’s superiority over the latter. According to their explanations, OBC enables active participations with critical features of online environment such as anonymity, low costs to participate, various levels of participations and so forth.

The OBC has not only become a major research topic in diverse fields, but also has received much practical attentions, considering OBCs as important marketing tools for businesses, effective channels for communication to various consumers, and an alternative approach to engaging with users. The OBC consists of 1) a brand that is a source of community, 2) members who share the brand as a common concern, and 3) a virtual place where members can form, develop, and maintain a relationship (Muniz & O’Guinn, 2001; Williams & Cothrel, 2000). Briefly, the OBC is a virtual community where members with common interests in a particular brand can exchange information and form relationships.

A number of past studies exploring the OBCs have investigated whether various mediators and moderators (e.g., interactivity, sense of community, commitment, identification, trust) influenced consumers’ responses or evaluations of the brand. They also examined relevant effects (e.g., brand loyalty, brand attitude, and brand attachment), and the outcome variables used in the OBCs such

as participation, revisit, purchase intention, and so forth (McAlexander et al., 2002; Algesheimer, Dholakia, & Hermann, 2005; Bagozzi & Dholakia, 2006; Carlson, Suter, & Brown, 2008; Hsu & Lu, 2007; Koh, Kim, Butle, & Bock, 2007). Regarding the methodological perspective, most of the existing research have usually employed the survey approach on how psychological characteristics of individuals work in the OBC. This approach has overlooked the concept of relationships that the community theory has regarded, so far, as important, which has resulted in a lack of a broader and deeper understanding of the OBC.

Many scholars have broadly agreed that the online community is a set of social relationships among people (Ferbach & Thompson, 1995; Langerak et al., 2003). According to the community theory, an online community can be developed and disappeared depending on how well the relationship among the community members are formed, developed, and maintained (Jang et al., 2008; Schoberth, Preece, & Heinzl, 2003). The OBC is a network of people with a common interest in a particular brand, thus enabling an active and successful community if the relationship among members is deep and robust (Cummings et al., 2002). In this respect, it is important to remember that the OBC allows not only companies to provide additional communication channels, but also builds relationships with

enthusiastic users and prospective customers (Anderson, 2005). Therefore, this study focuses on community members' relationships that play an important role in building a successful OBC.

III. Role of Relationship

1. Relationships among the Members Within the Online Community

The research area of relationships, as a concept, is popular in various academic disciplines. Social and individual relationships are effectively repeated interactions between two parties (Doring, 2003). An online relationship can be differentiated from an offline relationship in terms of its site of the first interaction, while both types of relationships are similar in certain other ways (Parks & Roberts, 1998).

Relationships have been widely recognized and emphasized as a critical construct of the community. A relationship “*lies at the heart of the creation and development of virtual communities*”(Farquhar & Rowley, 2008, p. 164).” A majority of the literature supports that relationships among members are critical for communities to be successful (Hsu, Wang, & Tai, 2011). Among various reasons why people use SNS, relationship-related motives are the most frequently referred in past studies. For example, using online communication for building, maintaining, and extending relationships are strongly pursued (Sheldon, 2008).

Recent studies also emphasized the positive role of user-to-user interactivity yielding

strong relationships with sharing information and experiences (e.g., Cheung, Pires, Rosenbergm Leung, and Sharipudin, 2021). Kharouf and his colleagues (2020) conceptualize the interactions among consumers in the context of social media, and support that the interactivity among consumers enhances their senses of belonging, loyalty, and actual buying behavior.

In the context of OBC, the importance of the relationship is also recognized. It is critical to improve the level of the integration within the OBC, which refers how much a member feel him(her)self similar with or identical with other members, the community, and the brand or the company (Pedeliento, Andreini, & Veloutsou, 2020). When the level of integration gets higher, customers’ participations like sharing information, helping others, and actively creating a meaningful value should be improved, and this leads the dedication to the community. All of these managerial benefits can stem from the relationship (Pedeliento, et al., 2020)

The relationship is also a key factor in succeeding in online commerce. Rowley (2000) suggested four stages in the development of e-commerce in terms of the level of relationship. At the initial stage, one-way communication between the organization and customers is abundant, however, two-way communications among customers frequently prevail, and their relationships get stronger

as the community develops. That is to say, a highly developed online community should have a large number of interactions among users with strong ties, while a community in its early stages usually shows information gathering behaviors. The level of relationship is a critical index to evaluate the level of development of an online community.

2. Antecedents of the Relationship

Some factors affect relationships in OBCs. In keeping with the inherent characteristics of OBCs, they consist of people who share similar interests, such as loyalty to a specific brand.

Homophily refers to the perceived degree of similarity between the images and the human psyche, or the extent to which one is perceived to be similar to the perceiver (McCroskey, Richmond, & Daly, 1975). Homophily affects consumer's responses perception, persuasion, and more, both offline (Wheless, 1974) and online (Walther, Slovacek, & Tidwell, 2001). As competing constructs, heterophily and homophily are compared with each other in terms of their impacts. For example, among various sources of information, experts and peers are frequently important contacts. Heterophily connoted for most users by an expert may compete with homophily that one may experience through interactive communication with peers in discussion groups (Wang, Walther, Pingree, & Hawkins, 2008). Online

support groups "facilitate participant similarity and empathic support" (Wright & Bell, 2003, p. 39). Thus, people with similar backgrounds and experiences exhibit more empathy (Preece, 1999). Liberman et al. (2005) found that homogeneous people are more attracted and committed to each other with higher cohesiveness, satisfaction, and positive changes.

In the same vein, similarity and reciprocity among members should positively influence the participation in the community. According to a study investigating online travel communities (Casalo, Flavian, & Guinaliu, 2013) supports that perceived similarity and reciprocity among community members and satisfaction with the relationship significantly improve the intention to participate in the community. The more members feel similar with others in terms of interests, perspectives, and goals, the more they trust with each other (Zhao, Lu, Wang, Chau, & Zhang, 2012).

Motivation is a critical predictor of relationships. Uses and gratification theory (Katz & Foulkes, 1962) explains why people use various media. The theory has especially been more popularized in the digital media era as the role of users appears relatively active now than in the pre-digital era, since it assumes that people use media to gratify their various motives. A majority of the literature agrees upon the fact that individuals

choose to use a medium since they expect a specific gratification from that usage (Burkart, 1998; Wright, 2002; Wright & Bell, 2003). A variety of motives including “information seeking,” “entertaining,” “passing time,” and “helping others” are explored to lead different usages of digital media.

3. A Consequence of the Relationship: Sense of Community

Sense of community (SOC) refers to a multidimensional construct. McMillan & Chavis (1986) conceptualized the construct of the Psychological Sense of Community (PSC) with four elements. These elements are as follows: 1) group membership, which is a feeling of belonging with interpersonal relatedness; 2) influence, which is a sense that one can make a difference in a community and that it matters to its members simultaneously; 3) needs fulfillment, which is a perception that members’ needs are met by the community; and 4) shared emotional connection, which is the belief that members share history, place, and experiences. SOC is regarded a critical variable in the community research field, since it influences various performance variables, such as the loyalty to a community (Carlson et al., 2008).

Relationships among members, directly or indirectly, influence these elements of SOC.

SOC can be critically influenced by interactions among members, as it is an outcome of shaping, building, and reinforcing relationships. There is a positive relationship between SOC and the ability to function competently in the community (Glynn, 1981). Members’ commitment and satisfaction are positively interrelated and they strengthen the interpersonal relationship followed by cohesiveness among members (Ahlbrand & Cunningham, 1979). The user-to-user interaction, which is strongly related with the relationship, is supported to be a critical antecedent of SOC (Mamonov, Koufaris, Benbunan, 2016). As consumer-to-consumer interactions builds bond and consciousness of kind among them, and this follows SOC (Lim & Kim, 2009).

In online communities, SOC can be improved with the homogeneity and the homophily which is an antecedent of relationship. Since a community, as reviewed earlier, is a place members share common interests including a specific brand. Therefore, they are somewhat homogeneous in terms of the interest they share. This homogeneity among them can be broader as well as deeper as a community develops. With the benefit of digital environment, anonymity is can enhance the level of perceived homogeneity and yielding higher members’ empathy (Yoon & Sohn, 2014).

Briefly, strong relationships should have positive impacts on SOC within a community.

IV. An Alternative Approach: Social Network Analysis

In traditional communication studies, especially in public relations fields, the relationship has been measured with how strong people perceive their relationships with others (e.g., Broom, Casey, & Ricchey, 2000; Grunig & Huang, 2002)

1. Social Network Analysis as a Relationship Measure

A social network, in the context of the analytical approach, is defined as “a *specific set of linkages among a defined set of persons*” (Wasserman & Faust, 1994). SNA (Social Network Analysis) is the analytical method of social networks consisting of nodes and links. A node represents an individual actor within the network, whereas the links refers to the relationships among individuals (Knoke & Yang, 2008; Scott, 2012). SNA can analyze a pair (or link) between a node and a node, tie between a person and a person, connection between a person and an object, and between concepts and concepts.

From the SNA perspective, the links in a group or network can be regarded as relationships (Knoke & Yang, 2008; Galawkiewicz & Wasserman, 1994). In other words, a social network is a specific set of relationships that

represents a social structure (Scott, 2012; Galawkiewicz & Wasserman, 1994). Therefore, SNA can explain how relationships are formed within a limited group such as an online community. This relationship among members within an online community can be depicted and deeply understood with the results provided by SNA.

SNA has been more popular as an alternative research paradigm for investigating the relationship among members within social networking sites or online communities (Knoke & Yang, 2008; Scott, 2017). With the growth of online communities, people easily build various relationships with others and SNA approach has accordingly been adopted in the context of online communities. Various research disciplines, including communication, consumer behavior, marketing, advertising, and eWOM research, have adopted the alternative approach to delve into the relationships among people. Some of these include the characteristics of relationships in information diffusion (Brown, Broderick, & Lee, 2007; Goldenberg, Han, Lehmann, & Hong, 2009; Han & Kim, 2008), communication characteristics of eWOM on social networking sites (Luo, & Zhong, 2015; Wang & Chiu, 2005), and the impact of relationships on outcomes in the OBC (Chin, & Chignell, 2007; Dholakia et al. 2004), and so forth.

2. Centrality as an Alternative Measure for Relationships

A relationship is a kind of contact, connection, or tie that occurs between a pair of actors (Knoke & Yang, 2008). A relationship is not an attribute of an actor but a characteristic of a dyad that exists only when two actors maintain a bond. The relationship appearing as a network structure is rather a behavioral construct than a personal attribute, such as age, gender, value, and beliefs (Galawkiewicz & Wasserman, 1994; Knoke & Yang, 2008). For example, in the context of the diffusion theory, the chronological pattern can be explained better by exploring interactions among actors than the personal attribute including education, class, and gender (Cowan & Jonard, 2004; Valente, 1995).

An online community is a social network that can be regarded as a set of relationships among members (Ferbach & Thompson, 1995) and has a structural characteristic with a variety of relationships (Scott, 2012; Galawkiewicz & Wasserman, 1994). Since the online community is a virtual space of interactions where many people exchange information through bulletin boards (Donnelly & Hermann, 1994; Armstrong & Hagel, 1996), the structural characteristic of the relationship can be investigated by collecting and analyzing the relational data regarding the interaction among members within the OBC. The structural

characteristic of the relationship can be measured using SNA indicators such as centrality, centralization, and sub-network. The centrality indicates who is at the center of the community, the centralization represents how much the community itself is centralized as a whole, and the sub-network refers to how sub-groups in a community are organized (Freeman, 1979; Scott, 1991; Wasserman & Faust, 1994). Among these, centrality is one of the most widely used indicators, measured by calculating the number of relationships maintained by each individual in the network (Freeman, 1979; Wasserman & Faust, 1994). The centrality refers to the location of actors within a network, and accordingly, it shows that the dominant actors take strategic positions within the network.

The centrality, in SNA, can be measured by three types of degree centrality, closeness centrality, and betweenness centrality (Freeman, 1979; Scott, 1991). First, degree centrality measures how much a node is related to other nodes. The more links between the nodes, the higher the degree centrality. Second, closeness centrality is measured based on the degree to which the node is located close to others. A higher closeness centrality means a closer distance among members. Third, betweenness centrality is a measure of the degree as to how closely located a mediating member between people is. When a person acts as a broker to control others, s(he) has

a high degree of betweenness centrality. A shorter path between the mediating node and other nodes has a higher betweenness centrality than a longer path (Wasserman & Galaskiewicz, 1994).

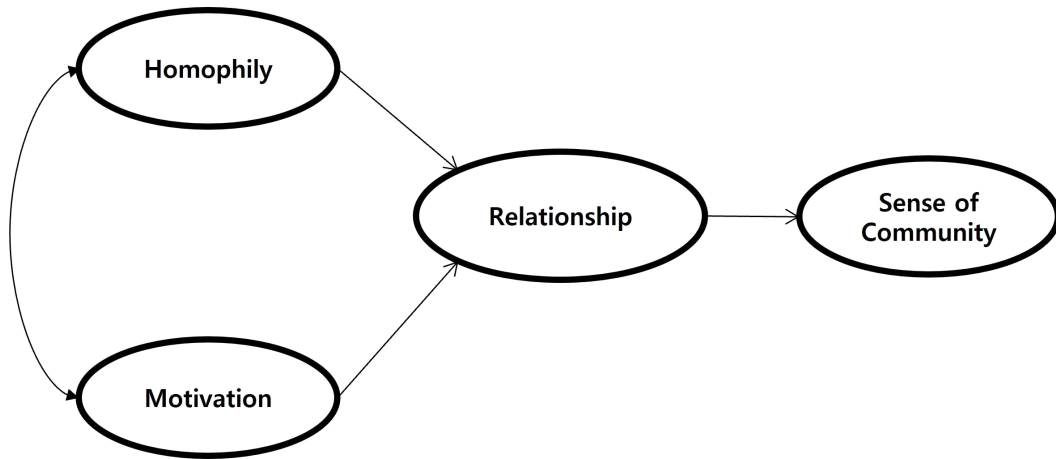
In this study, among the three centrality indices, closeness centrality was centrality as an alternative measure of the relationship. Since the concept of closeness centrality deals with the distance between nodes, this measure can help represent the relationship among members. In other words, closeness centrality is an indicator of how close members are located in the community, so it is more effective in grasping the relationship of the entire network than degree centrality (Sohn, 2002). Also, closeness centrality helps to understand the trend of structural relations over the long term of OBC (Doh & Hwang, 2011). Relational data among members of the OBC are acquired from the actual communication activities about who exchange opinions and information with whom. The structural relationships among members are investigated using SNA.

V. Design & Methods

The current study sheds light on the role of relationships in the context of OBCs. As reviewed in the preceding section, there are some antecedents and consequences of relationships. Two antecedents including homophily and motivation are expected to influence the relationship positively, and the SOC (Sense of Community) is expected to be a critical consequence of the relationship. This three-stage path model was designed and examined.

The most important part of the current study is to evaluate the method of measuring relationships. A 'relationship' can be measured using two different methods: perceived relationship using a survey and actual relationship with SNA. These two measures are conceptually similar, for both deal with the strength of relationships among community members. The former is regarded as 'subjective' and as a perception-based measure, while the latter is evaluated as 'objective' and as a behavior-based one. Previous studies in marketing, consumer behavior, and advertising disciplines usually deal with the relationship with perception-based measure which can be obtained from surveys or interviews which measure perception and recall based relationship (e.g., Cheung, et al., 2021; Tsai, Huang, & Chiu, 2012).

Although perception-based measures have



(Figure 1) Basic Model

been widely employed in marketing, consumer behavior, and advertising areas, it limits in some aspects. First, it can hardly reflect actual and specific behaviors relating to the relationship, since the respondents' capability of recall. Second, in the same vein, the perception based measure should take a specific point in time, which can be somewhat tentative. Third, the perception based measure should require recruiting process which needs time and budget. On the other hand, an alternative measure from SNA (social network analysis) can be collected for a longer time of period stored online. Moreover, it measures actual interaction among members at each time with efficient process. The study is designed to compare two models with the same variables except the way of measuring a critical variable, 'relationship.'

1. Case Community

In order to pursue the research purpose, it is necessary to select an OBC for collecting the communication activity data from the bulletin board and conducting a survey. The selected OBC is an iPhone user community where consumers voluntarily create and exchange information with each other in a community service provided by Naver, the country's largest online search portal. This OBC consists of people who are not only interested in iPhone usage but also love the iPhone brand.

Since the smartphone is an IT product with diverse and complex functions, prospective customers are usually willing to want various kinds of information, to help make their purchase decisions. Additionally, since users who have already purchased smartphones con-

tinuously need information about product usage, such as upgrades, software, and various utilization methods, they interact with each other actively. The selected OBC has a larger size of members (approximately 100,000) as compared to other communities for competitive brands. Therefore, this community was appropriate for observing and studying the relationships among community members.

2. Research Procedure – Actual Relationships vs. Perceived Relationships

There has rarely been any investigation of the predictive power about multiple measures of relationships. There are two main ways for measuring relationships. One is the 'actual relationship' obtained using SNA, while the other is the 'perceived relationship' as measured by the survey. This study adopted multi-method approach of a prior study (Lee & Lee, 2007) that integrated the actual behavior data (SNA) of community members and the perceived data (survey). This previous study (Lee & Lee, 2007) employed SNA measures including density, centrality, and centralization and their projections to emotional attachment.

The former is an objective way to measure the relational data formed by the actual behavior in an OBC. Relational data can be

obtained through the actual communication behaviors in which members exchange information with each other on the bulletin board. For example, if member A writes a post first on the bulletin board and member B writes a reply to the post, it can be assumed that A and B have a relationship. In this study, we define member A as the main writer and member B as the follower.

For six weeks, the main writer-follower's relational data were collected using the posts written on the bulletin board for each week. However, data of 'main post-1st follower comment-2nd follower comments' was targeted. Data from 3rd comments was not included in the data collection because the meaning of the relationship was weakened. The total number of data collected for each week was as follows. There were 801 members (1,165 links) in the 1st week, 733 members (1,001 links) in the 2nd week, 683 members (939 links) in the 3rd week, 681 members (1,067 links) in the 4th week, 694 members (1,087 links) in the 5th week, and 645 members (1,127 links) in the 6th week. This relational data was analyzed using SNA software called *NetMiner*. The software program provides a variety of indicators related to network analysis and makes statistical analysis easy. The closeness centrality obtained by SNA was employed for the actual relationship. Each member who participated in communication activity for each week had his (her) own

closeness centrality indicators. The closeness centrality is an actual relationship that indicates how close the member is to others. If a particular member is close to another member, he or she can easily relate to them, and can be considered to play a central role as such.

The latter is a perceived relationship that has been used in numerous studies. The members of the OBC were surveyed for four weeks to gather data on perceived relationships. An online survey questionnaire called “*Awareness and Opinion Survey on the iPhone Community*” was opened with the help of the operator of the community and a notice for this survey was posted on a front board, which members always checked whenever they visited the OBC. Rewards (e.g., battery packs, leather cases) were offered to respondents to encourage to participate in the survey. A member who wanted to participate in the survey could go to the page provided by the online survey service by clicking the ‘*Survey*’ link. Prior to responding to the survey, the participant noticed that the data from this survey were to be used for research purposes only (not for any commercial purposes). At the end of the questionnaire, they were asked to share the nicknames (IDs) they used in the community, in order not to be excluded from the reward. In sum, 424 respondents were surveyed.

Finally, it is critical to match the data on

actual and perceived relationships. To do so, it is necessary to obtain the data of these two variables from an identical sample. Thus, the same nickname (same member) was extracted from the data obtained by the two methods for the analysis. A total of 222 people matched with each other. The majority of the sample comprised males (90%), younger users (20s~30s: 87.9%), students (35.6%), and workers (48.7%). As for the usage of the community, 78% of the members visited the community once every two days.

3. Measures

The study formatted each survey measure item into a seven-point (“strongly agree–strongly disagree”) *Likert*-type response scale. SOC is measured using an adapted 8-item scale (McMillan&Chavis,1986,Carlson et al., 2008). McMillian and Chavis (1986) suggested membership, influence, integration and fulfillment of needs, and shared emotional connection as elements for a SOC. The perceived relationship, the mediating variable in this study, was measured using seven items modified and supplemented by applying the scale provided by Parks & Floyd (1996), which conceptualized the relationship as a concept that can grasp the depth and level of human relationships among members of the community. Homophily was measured by five items (McCroskey, McCroskey, Richmond, 2006), and

motivation was measured by modifying the items developed by Papacharissi and Rubin (2000) to fit the OBC.

In order to investigate the research model (Fig.1), the Perception-based Relationship Measure Model (Fig. 2) was examined, followed by the SNA-based Relationship Measure Model (based on closeness centrality). Finally, the two models were compared with each other in terms of the goodness-of-fit.

The final model excluded some individual factors or measuring items of some latent variables based on scale reliability and val-

idity tests in the structural equation model. Specifically, one of five items for homophily and three of eight items for the SOC were removed in order to improve the scale reliability and validity of the model. All constructs with multi-items showed acceptable levels of reliability.

<Table 1> Items used in the initial analysis

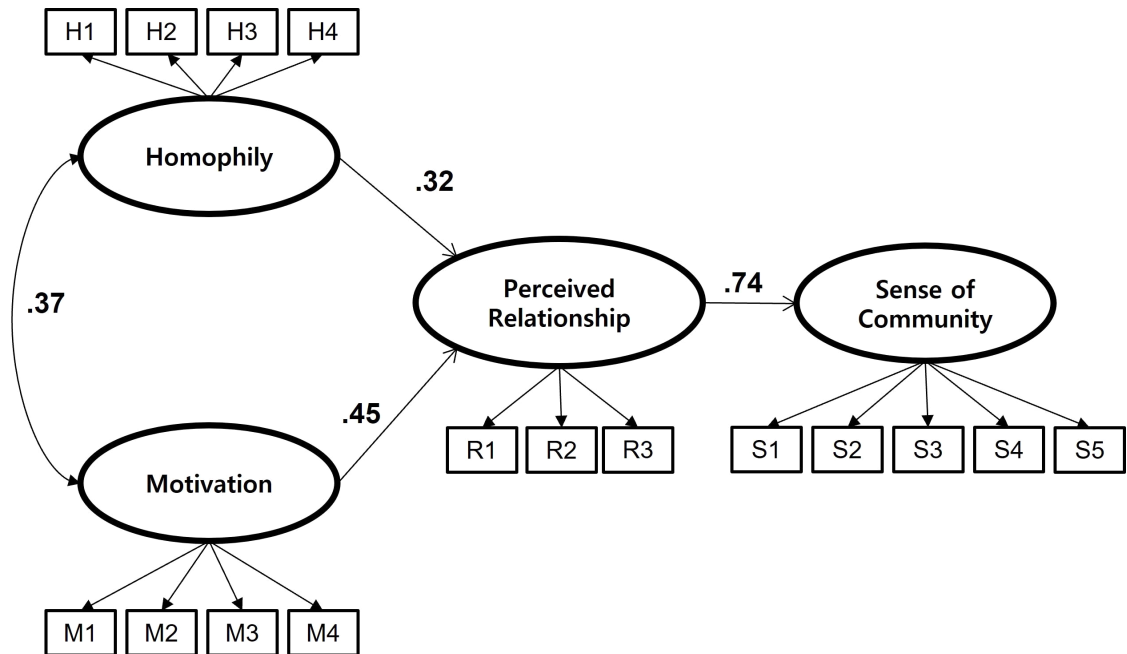
Variables	Items Measured
SOC	<ul style="list-style-type: none"> • I feel like 'we' in relationships with iPhone community members. • I think it affects or is affected lot by the iPhone community. • I think there are many opportunities to reflect my opinion on iPhone community activities. • I think members and me have similar needs in the iPhone community. • I think the iPhone community is adequately satisfying the needs and desires of me and my members. • I think the joy and pleasure with iPhone community members is mine. • I am close to iPhone community members with an emotional connection.
Relationship	<ul style="list-style-type: none"> • The subject of communication is wide and diverse • Once a conversation begins, it's easy to talk from one topic to another. • I also talk about what I feel. • I've talked about what I like. • I'm interested in maintaining relationships with other people. • This relationship is very important to me. • I look forward to this relationship lasting a long time.
Homophily	<ul style="list-style-type: none"> • Community members have similar interests with me. • Community members think similarly to me. • Members of the community are similar to me. • Community members behave similarly to me. • Community members have a lot in common with me.
Motivation	<ul style="list-style-type: none"> • for pleasure • For a change • for leisure time • for the latest information • To get information easily • To make new people • To have a conversation • To get a lot of conversation topics with others • for the sake of friendship

VI. Results

The study aimed to: 1) investigate the mediating role of relationships between two predictors, homophily and motivation, and SOC, and 2) evaluate whether “centrality” measure from the SNA process can substitute the perception-based measure of “relationship” as a mediator in the model proposed (Figure. 1). First, a model with the traditional perception-based measure of relationship as the core mediator was examined as follows.

1. Model 1: Perception-based Relationship Measure

The “perceived relationship” was supported to mediate the causal relationship between two antecedents, homophily and motivation, and SOC in the model proposed (Figure 2). The structural equation model shows a reliable fit with qualified goodness-of-fits (GFI .888, CFI .957, AGFI .848, RMR .249, RMSEA .073). As shown in Figure 2, coefficients from homophily and motivation to perceived relationship were relatively high (.32 from homophily and .45 from motivation). The influence of “relationship” on the “sense of



(Figure 2) The ‘Subjective’ Relationship Model

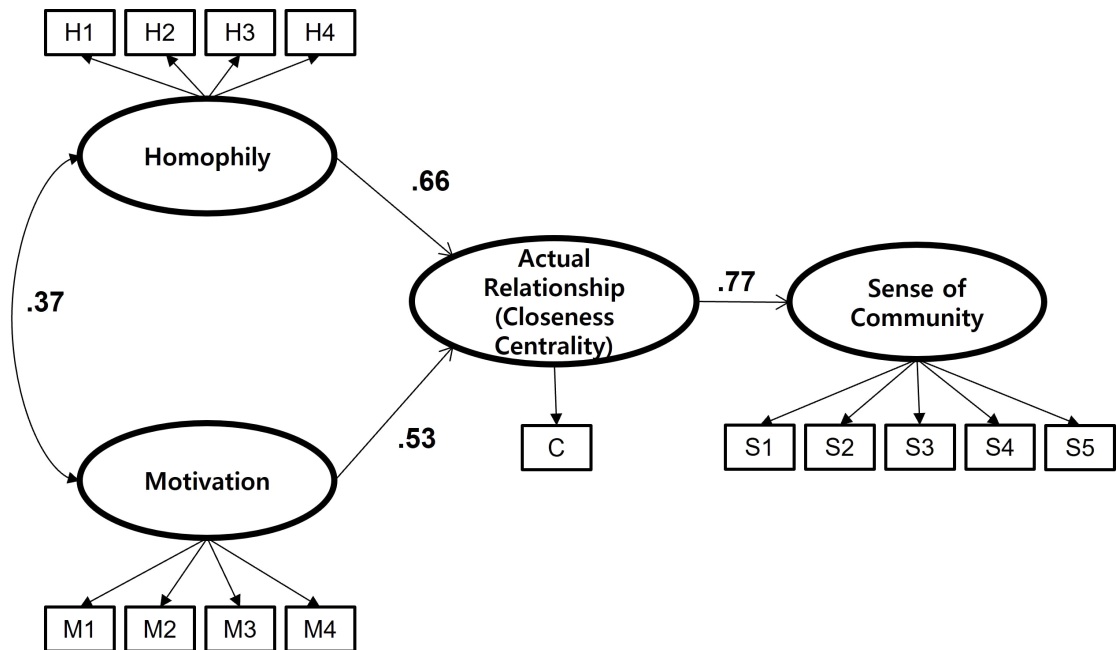
community” was the considerably high (coef-
ficient of .74).

2. Model 2: SNA-based Relationship Measure, ‘Centrality’

The “closeness centrality,” a representative measure of centrality in the SNA approach, was conceptually proposed to be a substitute of perception-based ‘relationship’ in the model. The substitutive model with ‘closeness centrality’ was examined and the result shows a better goodness-of-fit. In all indices, SNA model yields higher scores without exceptions (GFI .933, CFI .983, AGFI .904, RMR .100,

RMSEA .048). Therefore, this alternative model can be evaluated better than the previous model with a perception-based relationship measure. Accordingly, it supports that ‘centrality’ measure from SNA is a better mediator than the perceived relationship in explaining the causal relationship posited in the basic model.

Regarding the explanatory power of the model and individual paths, the alternative model shows higher predictive capability in all paths. Individual coefficients representing the strength of causal relationships between variables were higher than those in the perception-based model. As shown in Figure 3,



〈Figure 3〉 The ‘Actual’ Relationship Model

coefficients from homophily to closeness centrality were relatively high (.67) as compared to the case of perceived relationship (.32). The other antecedent's coefficient was also higher than the case of the previous model (motivation: .52 as compared to .45). The influence of 'closeness centrality' on the SOC maintains a high level (coefficient of .77). Other coefficients, including covariates between homophily and motivation in the two models, stayed same level of co-influences.

VI. Discussion

The current study primarily focuses on the comparison of two measures for relationships among members in an OBC, in terms of the predictive power for the SOC. In order to achieve the research objective, the study investigated an active OBC and its members. It measured two antecedents and a consequence of the relationship. It also measured two measures of the relationship using a survey for the subjective relationship and SNA for the objective one.

The results show that the measure for 'actual relationship' is relatively more reliable with higher goodness-of-fit index and coefficient values for explaining the model posited. Thus, 'actual relationship' is better than 'perceived relationship' for explaining the causal relationships within two antecedents, homophily and motivation, and a consequence, SOC. Literally, the 'closeness centrality' measure from SNA can be employed for measuring the concept of relationship to substitute the perception-based relationship from the survey. Its explanatory power with homophily, motivation, and SOC is much stronger than the survey measure.

This study recommends that future studies examining relationships among users in OBCs need to adopt SNA data. As noted, in explaining the causal relationship among critical variables in OBC, SNA is more reliable

and predictive than traditional measures using surveys. Furthermore, SNA can be used as a representative index for the effectiveness of OBC. As described earlier, relationship is a strong predictor of various consequences including SOC, loyalty, and so forth. The SNA as a behavioral index can be acquired online, researchers can examine the relationship among members over time while investigating a community with a chronological perspective.

From the practical perspective, it is more recommendable to use SNA index to measure the relationship among members due to its advantages in terms of efficiency and reliability. When measuring the relationship alone, SNA is more convenient and efficient than a survey or an interview, which requires to recruit many participants. Regarding the reliability, the advantage of SNA index is the longer time-range of data collection. Since SNA data have been stored in the community's digital platform for a long time, the measure ranged from a point in the distant past like many years ago to the current point. A strong relationship inherently requires relatively long duration of time for members, SNA data created for longer term should be more reliable than a perceived relationship data measured in a specific point of time.

In order to improve the relationship among community members, it is natural to enhance

the homophily and motivation as the current result as well as previous studies supports. The current study's contribution can stem from the alternative measure, SNA index, the closeness centrality is a concept that measures the distance between members by analyzing the actual communication activity data between members within the OBC. The shorter and closer the distance is, the more it exists in the center. Therefore, if members communicate with each other actively or post a lot for any reason (e.g., motivation, homophily, product information exchange, usage, personal friendship, etc.) in OBC, the closeness centrality among members will increase and appear close.

Due to its infancy, it is important to examine SNA data for measuring relationship in online communities further, especially for its validity. It can be claimed whether the closeness centrality really measures 'relationship' among users. In some respects, closeness centrality is not identical with the perceived relationship. Every research measuring perceived relationship does not employ identical measures due to adopting some parts of scales or different scales. This alternative measure can be evaluated to be one of many different scales in spite of employing a different tool.

Nonetheless, as the traditional process of scale development does, repeated validation process can enhance the validity of the SNA

measure. Although this index does not require purification process which is essential for perception-based scale, its scope and context need to be investigated. Since the concept of relationships can vary across multiple disciplines and studies, future studies should explore the conceptualization of the relationship for this specific measure. Nevertheless, this measure is valuable in explaining the causal relationships among critical variables in the field of online community study.

An additional suggestion can be related to the role of users. Any further study needs to investigate the different roles of respondents in their communities - readers and writers. The respondents of the current survey can be regarded as writers and readers at the same time, but in fact, there is a limitation in that the role cannot be clearly distinguished. In future research, it is expected that attempts will be made to classify the role of respondents and to reveal in-depth differences in results.

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국문초록

실제 관계와 인지된 관계: 커뮤니티 의식과 선행요인들 간의 매개변인으로서의 설명력 비교

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‘관계’는 온라인 커뮤니티를 비롯한 소셜미디어 내에서의 사용자 행동에 매우 중요한 역할을 한다. 본 연구는 이 중요한 구성개념에 대해 서로 다른 두 가지 측정 방법의 비교에 초점을 두고 있다. 하나는 전통적인 방법인 자기기입식 설문에 의해 측정되는 인지된 관계의 강도이며, 다른 대안적인 측정은 사회관계망 분석(SNA: Social Network Analysis)에 의해 측정되는 관계의 근접중심성(closeness centrality)이다. 온라인 커뮤니티 내의 ‘관계’를 설명하기 위한 관계의 선행요인과 결과요인을 포함하는 모델을 구성하고, 이 두 가지 구조방정식 모형의 설명력을 비교하도록 하였다. SNA 모델이 더 높은 설명력을 갖고 있는 것으로 나타나, 인지된 관계보다는 네트워크 지표에 나타난 관계가 더 타당성이 높은 지표임이 지지되었다. 본 연구를 바탕으로 후속 연구에서는 SNA 데이터를 활용한 다양한 맥락에서의 ‘관계’ 측정이 이루어질 수 있을 것으로 기대한다. 근접중심성을 수단으로 하는 관계의 측정을 통한 소셜 미디어 상의 효과 검증 연구에서 활발하게 활용될 수 있을 것이다. 또한, 보다 장기적 관점에서의 관계라고 할 수 있는 근접중심성의 선행요인을 탐색 및 검증해 내는 작업은 본 지표의 타당성과 신뢰성을 구축하는 데에 매우 중요한 과정이 될 것으로 판단한다.

키워드: 관계, 온라인 커뮤니티, 사회연결망분석, 커뮤니티 의식, 근접중심성