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Sense of Mobile Virtual Community (SOMVC): Measurement and Integrated Model

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Abstract

Purpose—This study developed a measurement (Study 1) and an integrated model (Study2) of SOMVC. On the basis of the past literature on Sense of Community (SOC), Sense of Virtual Community (SOVC), and Mobile Connection and Communication (i.e., the characteristics of mobile Internet), this study aimed to develop the dimensions and items of SOMVC. The integrated SOMVC model was developed by integrating Social Influence Theory and community loyalty.

Design/methodology/approach — Four surveys were conducted through convenience sampling of college students who were also Facebook users participated in this study. Study 1 included 304 valid samples (119 from first survey; 185 from second survey) and Study 2 collected 326 valid samples (123 from third survey; 203 from fourth survey).

Findings—First, this study developed a 15-item measurement of SOMVC that included 5 dimensions: Membership, Influence, Integration and Fulfillment of Needs, Shared Emotional Connection, and Mobile Connection and Communication. Second, this study found that Social Influence Factors (i.e., Group Norm, Social Identity, and Subjective Norm) significantly and positively influenced SOMVC, whereas SOMVC significantly and positively influenced Community Loyalty. SOMVC fully mediated the relationship between Social Influence Factors and Community Loyalty. Finally, within Social Influence Factors, this study found that Group Norms significantly and positively influenced Social Identity, and that Social Identity significantly and positively influenced Subjective Norm.

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Research limitations/implications－Future research can study other segments to retest the SOMVC measurement. In addition, future studies can compare the integrated model between different types of virtual communities (i.e., transactions, interest, fantasy, and relationship) and include moderators (e.g., susceptibility to interpersonal influence) in the integrated model.

Practical implications－This study verified that SOMVC positively influenced members' Community Loyalty; hence, increasing the SOMVC is crucial in maintaining a virtual community. This study suggested 3 approaches to increase the SOMVC: strengthen specific topics, purposes, values, and the vision of the virtual community to internalize them as members' beliefs (i.e., Group Norm); design a feedback or recommendation mechanism in the virtual community to increase recommenders' Social Identity; assign leaders in the virtual community to establish common norms and rules, and then influence members to participate in the community (i.e., Subjective Norm).

Originality/value－The SOVC concept has been widely discussed and applied since the 2000s because of the growth of the Internet. With mobile Internet becoming increasingly popular, this study first introduced the concept of SOMVC and developed the SOMVC measurement and integrated model.

Keywords: Mobile Virtual Community, Sense of Mobile Virtual Community, Mobile Connection and Communication, Social Influence Theory, Community Loyalty

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行動虛擬社群感（SOMVC）：「量表發展」與「前因後果模型建構」

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摘要

本研究旨在發展 SOMVC 量表（研究一）、及建構其前因後果模型（研究二）。透過「社群感」與「虛擬社群感」文獻，並考慮行動上網特性，本研究發展 SOMVC 量表之構面與問項；透過整合「社會影響理論」與「社群忠誠」，本研究發展整合 SOMVC 模式。本研究進行四次問卷調查，以便利性抽樣，針對台灣地區 Facebook 之大學生使用者進行調查。研究一包含 304 份有效問卷（第一次問卷調查：119 份；第二次問卷調查：185 份）；研究二包含 326 份有效問卷（第三次問卷調查：123 份；第四次問卷調查：203 份）。研究一結果發展出 15 題「行動虛擬社群感」量表，並包含五個構面：成員身分、影響力、需求的整合與滿足、共享情感連結、行動連繫與溝通。研究二結果發現「社會影響因素」（即：群體規範、社會認同、主觀規範）正向顯著影響「行動虛擬社群感」；「行動虛擬社群感」正向顯著影響「社群忠誠」。「行動虛擬社群感」會「完全中介」「社會影響因素」對「社群忠誠」之影響。最後，在「社會影響因素」之間，「群體規範」正向顯著影響「社會認同」；「社會認同」正向顯著影響「主觀規範」。

關鍵詞：行動虛擬社群、行動虛擬社群感、行動連繫與溝通、社會影響理論、社群忠誠

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1. Introduction

Sense of Virtual Community (SOVC) has been widely discussed and applied since the 2000s because of the growth of the Internet. SOVC is defined as using the Internet to participate in a Virtual Community (VC), the feeling that members have of belonging to the community, the belief that members matter to one another and to the community, and a shared faith that their needs are met through their commitment to the community (Abfalter et al. 2012; Blanchard 2007; Blanchard 2008; Blanchard & Markus 2004; Ellonen et al. 2007; Koh & Kim 2003). Certain studies have indicated that SOVC is a critical factor for creating a successful VC (Blanchard & Markus 2004; Ellonen et al. 2007; Koh & Kim 2003); thus, past researchers have widely discussed SOVC measurements (Abfalter et al. 2012; Blanchard 2007; Fraering & Minor 2006) and SOVC integrated models (Blanchard 2008; Keng et al. 2011; Kim et al. 2004; Koh & Kim 2003; Tonteri et al. 2011) to enhance our understanding of the participation behavior in VCs.

With the rapid growth of mobile devices and wireless technology, global mobile Internet adoption and usage have surged substantially over the last decade (Gerpott & Thomas 2014). Mobile Internet enables the use of mobile devices and wireless Internet for sending and receiving information, irrespective of the time and location (Chae et al. 2002). Mobile Internet enables people to communicate with each other instantly (Bilandzic & Foth 2012), and it changes the way users participate in VCs (Chang et al. 2015). By using mobile Internet, people can connect wirelessly in their participation in VCs, irrespective of the time and place (Chae et al. 2002), thus producing the concept of a Mobile Virtual Community (MVC) (Huang & Liu 2011; Jen 2010; Nysveen et al. 2005; Zhang et al. 2010).

An MVC, which is an extension of a VC, can be defined as a group of people who are uninterruptedly connected and who communicate with each other through mobile Internet, irrespective of time and place, to develop relationships and share interests (Kardaras et al. 2003; Kim & Garrison 2009). However, a few studies have presented discussions on the Sense of Mobile Virtual Community (SOMVC) concept. SOMVC is an extension of SOVC, which can be defined as using mobile Internet to participate in a virtual community, the feeling that members have of belonging to the community, the belief that members matter to one another and to the community, and a shared faith that their needs are met through their commitment to the community. Therefore, to understand the behavior of community members who use mobile Internet to participate in a VC, the

measurement and integrated SOMVC model must be discussed further.

Kim and Garrison (2009) indicated that, unlike traditional Internet, mobile Internet has the characteristics of perceived ubiquity and perceived reachability, and that study called this Mobile Connection and Communication. Perceived ubiquity is defined as an individual's perception regarding the extent to which mobile Internet provides a personalized and uninterrupted connection and communications between the individual and other users and/or networks. Perceived reachability is defined as an individual's perception regarding the degree to which he or she can reach other individuals anytime-and-anywhere through mobile Internet (Kim & Garrison 2009). Certain studies (Abfalter et al. 2012; Blanchard 2007; Blanchard 2008; Ellonen et al. 2007) have adopted the four-dimension Sense of Community (SOC) (i.e., Membership, Influence, Integration and Fulfillment of Needs, and Shared Emotional Connection) by McMillan and Chavis (1986) to develop the SOVC concept. For the measurement of SOMVC, we found that the characteristics of mobile Internet must be considered, and the SOMVC dimensions may include Membership, Influence, Integration and Fulfillment of Needs, Shared Emotional Connection, and Mobile Connection and Communication.

For the integrated SOMVC model, Lu and Yang (2011) indicated that social interaction plays a critical role in VC participation. Through interpersonal communication, community members are able to influence and identify with each other, resulting in continuous participation. Moreover, certain studies have proposed that social influence positively affects community participation intentions (Bagozzi & Dholakia 2002; Cheung & Lee 2010; Dholakia et al. 2004a; Song & Kim 2006; Zhou 2011).

Social Influence Theory was derived from Kelman's (1958) social influence process, which indicates that an individual's behavior is affected by social influence factors, which include Group Norm, Social Identity, and Subjective Norm. Blanchard (2008) indicated that, after creating a self-social identity, community members comply with the norms within the community (i.e., Subjective Norm) to produce the SOVC. Thus, we applied these studies on MVCs and propose that Social Influence Theory may also be used to develop the antecedents of SOMVC.

Certain studies have suggested that Community Loyalty is a critical factor for the sustainable growth of a VC (Flavián et al. 2006; Lin et al. 2009; Shen et al. 2010). Community Loyalty can be defined as the degree to which a member promotes the community to convince new members to join and talks about the benefits of the community (Lin et al. 2009; Srinivasan et al. 2002). Other studies have indicated that community members' SOVC positively influences their level of Community Loyalty

(Kim et al. 2004; Kim et al. 2009; Koh & Kim 2003; Lin 2008; Lin et al. 2009; Pai & Tsai 2011; Shen et al. 2010). Moreover, the interaction among community members facilitates their Community Loyalty (Frank 1997; Lin 2010; Lin et al. 2009; Shen et al. 2010; Srinivasan et al. 2002). Thus, we applied these studies on MVCs and propose that Community Loyalty may be a consequence of SOMVC.

Thus, we developed a measurement and integrated SOMVC model. On the basis of the literature regarding SOC, SOVC, and Mobile Connection and Communication (i.e., the characteristics of mobile Internet), we developed the dimensions and items of SOMVC; the integrated SOMVC model was developed by integrating Social Influence Theory and Community Loyalty.

2. Literature Review

2.1 Sense of Community (SOC)

A community is defined as the relational interactions or social ties that draw people together (Heller 1989). The SOC concept, which was derived from the concept of a community, is a critical factor for achieving a successful community (Sarason 1986). Because SOC positively influences community satisfaction and community commitment (Burroughs & Eby 1998) and facilitates involvement in community activities (McMillan & Chavis 1986), the SOC concept has been discussed frequently in community psychology research (Blanchard 2008).

SOC was first introduced by Sarason (1986), who proposed SOC as a community member's feeling toward other members. McMillan and Chavis (1986) extended Sarason's (1986) research and formed the SOC concept. McMillan and Chavis (1986) defined SOC as the feeling that members have of belonging to the community, the belief that members matter to one another and to the community, and a shared faith that their needs are met through their commitment to the community.

There are four dimensions in the SOC framework by McMillan and Chavis (1986): Membership, Influence, Integration and Fulfillment of Needs, and Shared Emotional Connection. "Membership" refers to community members' self-reinforcing boundaries (i.e., knowledge regarding who is inside the community), emotional safety, personal investment (i.e., investments for becoming a valuable member), a sense of belonging, and a common symbol system (Abfalter et al. 2012; McMillan & Chavis 1986; Obst & White 2004).

"Influence" is derived from community cohesiveness and attractiveness, and includes members' perception of the impact on the community as well as the amount of influence the community has over individual members (Abfalter et al. 2012; McMillan & Chavis 1986; Obst & White 2004).

"Integration and Fulfillment of Needs" provides the integrative force to unite the community, and satisfies the needs of the members in the community. Integration and fulfillment of needs is based on the notion that rewards, benefits, and reinforcement are necessary components for members of a community and for maintaining a positive sense of togetherness (Abfalter et al. 2012; McMillan & Chavis 1986). The needs of community members can be fulfilled through membership status, the success of the community, and the perceived competence of other members (Abfalter et al. 2012; Obst et al. 2002).

"Shared Emotional Connection" is derived from a shared community history, shared events, positive interactions, and identification with the community (Abfalter et al. 2012; McMillan & Chavis 1986). More people interacting results in a greater likelihood of them developing close relationships, subsequently leading to a stronger bond (Abfalter et al. 2012; McMillan & Chavis 1986).

McMillan and Chavis's (1986) four-dimensional SOC framework was the basis of the present study on developing an SOC measurement. Chavis et al. (1986) used the research by McMillan and Chavis (1986) to develop the Sense of Community Index (SCI), which has been adopted and applied in future studies (Obst & White 2004). The importance of the SCI in community psychology literature is twofold (Obst & White 2004): First, it is one of the few scales that can be and has been used to measure SOC in diverse settings such as the workplace (Brodksy 2001; Cantano et al. 1993; Pretty & McCarthy 1991; Pretty et al. 1992), religious communities (Miers & Fisher 2002), immigrant communities (Sonn 2002), student communities (Pretty 1990), and residential and geographic communities (Brodksy 2001; Brodsky et al. 1999; Perkins et al. 1990). Second, the SCI has evolved from a sound theoretical basis with empirical support.

Chipuer and Pretty (1999) confirmed the SCI on the basis of neighborhood adults, neighborhood adolescents, and workplace adults. The results of confirmatory factor analysis (CFA) indicated that SOC includes four dimensions (i.e., Membership, Influence, Integration and Fulfillment of Needs, and Shared Emotional Connection), which complemented McMillan and Chavis's (1986) framework.

Obst and White (2004) also confirmed the SCI on the basis of neighborhood

groups, student groups, and interest groups. The CFA results revealed that SOC could be divided into Membership, Influence, Integration and Fulfillment of Needs, and Shared Emotional Connection, which were the same as in McMillan and Chavis (1986).

Peterson, Speer, and McMillan (2008) developed a brief SOC scale on the basis of McMillan and Chavis (1986). They collected data from a random sample of community residents located in the Midwestern United States. The scale contains McMillan and Chavis's (1986) four SOC dimensions: Membership, Influence, Integration and Fulfillment of Needs, and Shared Emotional Connection.

2.2 Sense of Virtual Community (SOVC)

The Internet provides a new way to communicate; it enables people to send and receive information as well as to chat, discuss, argue, and trust each other (Sproull & Faraj 1997). The Internet creates an intangible network among people; the geographical location does not impose a constraint for communication, resulting in the VC concept.

A VC, which is derived from the concept of a community or face-to-face community, was first introduced by Rheingold (1994). Rheingold (1994) indicated that a VC is a group of people who use an online bulletin board or computer network to exchange information or ideas with each other. Kardaras, Karakostas and Papathanassiou (2003) defined a VC as a group of people who communicate with each other through electronic media such as the Internet; they share common interests, and their geographical location, physical interaction, and ethnic origin do not impose any constraint in the formation of a community. Blanchard and Markus (2004) indicated that SOVC is the key factor that enables a virtual social group to become a VC. Certain studies have also suggested that SOVC is a critical factor for a successful VC (Blanchard & Markus 2004; Ellonen et al. 2007; Koh & Kim 2003).

SOVC was extended from the SOC concept. Certain studies (Abfalter et al. 2012; Blanchard 2007; Blanchard 2008; Ellonen et al. 2007; Koh & Kim 2003) have defined SOVC as using the Internet to participate in a VC, the feeling members have of belonging to the community, the belief that members matter to one another and to the community, and a shared faith that their needs are met through their commitment to the community, on the basis of McMillan and Chavis (1986).

Blanchard and Markus (2004) proposed the "Processes by which the Sense of Virtual Community develops." They indicated that serious processes exist before SOVC establishment; and these are the exchanging of support, creating of identity, and trust.

"Exchanging support" is defined as when members participate in the public and private "exchange of information" and "socio-emotional support." All members observe the public exchange of support; thus, members produce a sense of belonging, attachment, and obligation toward the VC (Blanchard & Markus 2004). The exchange of information contributes to the belief that a person's membership in a community is useful or meets other members' needs. Regarding socio-emotional support through public posts and private emails, when members experience both public and private socio-emotional support, they interpret it as evidence that they are accepted and valued members of a community (Blanchard & Markus 2004).

"Creating an identity" is defined as when members create an identity for themselves through their posts, such as by creating "signature files" that are automatically attached with their posts (Blanchard & Markus 2004). By creating self-identities and identifying others, members form a community from anonymous and primarily invisible potential members, and then enhance the feelings of attachment and mutual obligation (Blanchard & Markus 2004).

"Trust" among members plays a critical role in a VC; people who communicate electronically with unknown users are understandably concerned with whether such users are actually who they claim they are (Blanchard & Markus 2004). Members can use several ways to form trust; for example, first, there was a strong norm in a VC that members use their real name, either in their email address or signature. Second, the members publicly discussed their face-to-face interactions with other community members. Lastly, the members felt that posts were effective for determining other members' trustworthiness (Blanchard & Markus 2004).

Because the SOVC concept was introduced, Kim, Lee and Hiemstra (2004) explored its measurement by developing a 17-item scale of SOVC on the basis of past studies (Davidson & Cotter 1986; McMillan & Chavis 1986; Chavis et al. 1986; Doolittle & MacDonald 1978; McMillan 1996). In their scale, four dimensions consist of McMillan and Chavis's (1986) four-dimensional SOC. Blanchard (2007) used a 12-item SCI, and considered the characteristics of a VC to develop the 18-item SOVC, which also includes McMillan and Chavis's (1986) four dimensions, namely Membership, Influence, Integration and Fulfillment of Needs, and Shared Emotional Connection. Blanchard's (2007) scale was also used in a future study by Blanchard (2008).

Abfalter, Zaglia and Mueller (2012) used the SCI by Chavis et al. (1986) and the Modified Sense of Community Index (SCI-2) by Chavis, Lee and Acosta (2008) to develop a 15-item SOVC scale that includes McMillan and Chavis's (1986)

four-dimensional SOC.

2.3 Mobile Connection and Communication

Perceived ubiquity and perceived reachability are relatively new concepts in information system (IS) and information technology (IT) literature, but are becoming increasingly popular in research on m-commerce and wireless technology (Kim & Garrison 2009).

"Perceived ubiquity" is defined as an individual's perception regarding the extent to which mobile Internet provides a personalized and uninterrupted connection and communication between the individual and other users and/or networks, whereas "perceived reachability" is defined as an individual's perception regarding the degree to which he or she can reach other individuals anytime-and-anywhere through mobile Internet. We refer to both concepts as Mobile Connection and Communication.

Sarker and Wells (2003) suggested that the most touted advantage of mobile wireless technology might be the ability to enable communication, collaboration, and commerce, irrespective of time and place. Looney, Jessup, and Valacich (2004) claimed that the capability of communicating from anywhere at any time offers extraordinary flexibility and convenience, which can affect behavioral intentions. Dholakia et al. (2004b) indicated that geographical flexibility, which is the capability of communicating at any time and any place, is one factor influencing the growth of mobile wireless technology. Kim and Garrison (2009) proposed that perceived ubiquity and perceived reachability positively influence the usage intention of mobile wireless technology.

2.4 Sense of Mobile Virtual Community (SOMVC)

Mobile Internet has become a popular and well-established mode of communication in the daily lives of many people, and has contributed to a shift of people's roles toward networked individuals in urban environments (Bilandzic & Foth 2012). Mobile media supports people not only to connect with distant users but also to coordinate and initiate social interactions with others in their physical proximity (Rheingold 2002). Mobile Internet changes the way people participate in a VC (Chang et al. 2015). Through mobile Internet, people are able to participate wirelessly in a VC, irrespective of time and place (Chae et al. 2002), thus producing the concept of an MVC (Huang & Liu 2011; Jen 2010; Nysveen et al. 2005; Zhang et al. 2010).

An MVC can be defined as a group of people who are uninterruptedly connected and

communicate with each other through mobile Internet, irrespective of time and place, to develop relationships and share interests (Kardaras et al. 2003; Kim & Garrison 2009). Sarason (1986) indicated that SOC plays a critical role in a community, and certain studies (Blanchard & Markus 2004; Ellonen et al. 2007; Koh & Kim 2003) have also indicated that SOVC is critical for VCs. However, for MVCs, we found a few studies that have presented discussions on the concept as well as the measurement of SOMVC. Thus, to understand the individual use of mobile Internet for participating in a VC (i.e., MVC), we suggest that it is critical to develop the concept of and measurement for SOMVC.

SOMVC is a concept that was extended from SOVC. On the basis of studies related to SOVC (Abfalter et al. 2012; Blanchard 2007; Blanchard 2008; Blanchard & Markus 2004; Ellonen et al. 2007; Koh & Kim 2003; McMillan & Chavis 1986), we also defined SOMVC as using mobile Internet to participate in a VC, the feeling members have of belonging to the community, the belief that members matter to one another and to the community, and a shared faith that their needs are met through their commitment to the community.

Regarding the SOMVC measurement, by integrating past studies related to SOC and SOVC (Table 1), we propose that the four dimensions of SOC and SOVC (i.e., Membership, Influence, Integration and Fulfillment of Needs, and Shared Emotional Connection) may also be applied to develop SOMVC dimensions.

Certain studies have suggested that the most touted advantage of mobile Internet is the ability to communicate anytime-and-anywhere (Chae et al. 2002; Dholakia et al. 2004b; Kim & Garrison 2009). Kim and Garrison (2009) indicated that, compared with traditional Internet, mobile Internet has the characteristics of perceived ubiquity and perceived reachability (i.e., Mobile Connection and Communication).

Table 1: Sense of Mobile Virtual Community (SOMVC)—Dimensions and Definitions

Dimension	Sense of Community (SOC)	Sense of Virtual Community (SOVC)	Sense of Mobile Virtual Community (SOMVC)—Definitions
Membership	Chavis et al. (1986); Chipuer and Pretty (1999); McMillan and Chavis (1986);	Abfalter et al. (2012); Blanchard (2007); Blanchard (2008); Blanchard and Markus (2004); Ellonen, Kosonen and	When using mobile Internet to participate in a VC, members' self-reinforcing boundaries, emotional safety, personal investment, a sense of belonging, and a common

	Obst and White (2004); Peterson, Speer and McMillan (2008)	Henttonen (2007); Keng, Ting and Chen (2011); Kim et al. (2004); Koh and Kim (2003); Tonteri et al. (2011)	symbol system (Abfalter et al. 2012; McMillan & Chavis 1986; Obst & White 2004)
Influence	Chavis et al. (1986); Chipuer and Pretty (1999); McMillan and Chavis (1986); Obst and White (2004); Peterson et al. (2008)	Abfalter et al. (2012); Blanchard (2007); Blanchard (2008); Ellonen et al. (2007); Kim et al. (2004); Koh and Kim (2003); Tonteri et al. (2011)	When using mobile Internet to participate in a VC, and members' perception of the impact on the community as well as the amount of influence the community has over individual members (Abfalter et al. 2012; McMillan & Chavis 1986; Obst & White 2004)
Integration and Fulfillment of Needs	Chavis et al. (1986); Chipuer and Pretty (1999); McMillan and Chavis (1986); Obst and White (2004); Peterson et al. (2008)	Abfalter et al. (2012); Blanchard (2007); Blanchard (2008); Blanchard and Markus (2004); Kim et al. (2004)	When using mobile Internet to participate in a VC, members perceive that they can be fulfilled through their membership status, success of the community, and the perceived competence of other members (Abfalter et al. 2012; McMillan & Chavis 1986; Obst et al. 2002)
Shared Emotional Connection	Chavis et al. (1986); Chipuer and Pretty (1999); McMillan and Chavis (1986); Obst and White (2004); Peterson et al. (2008)	Abfalter et al. (2012); Blanchard (2007); Blanchard (2008); Blanchard and Markus (2004); Ellonen et al. (2007); Kim et al. (2004); Tonteri et al. (2011)	When using mobile Internet to participate in a VC, members develop close relationships and strong bonds (Abfalter et al. 2012; McMillan & Chavis 1986)
Mobile Connection and Communication			When using mobile Internet to participate in a VC, members perceive that they are able to

			connect uninterruptedly and communicate with other members, anytime-and-anywhere (Kim & Garrison 2009)

For an MVC, community members can interact, irrespective of time and place, through mobile Internet; the sending and receiving of a message is immediate, thus generating realistic benefits from information exchange (Okazaki 2009). Compared with a VC, an MVC is a more spontaneous, personal, and direct mode of communication, which produces a higher level of social identity, participation desire, and participation intention (Okazaki 2009). Thus, regarding the SOMVC dimensions, this study proposes that the characteristic of mobile Internet (i.e., Mobile Connection and Communication) should be included (Table 1).

By integrating past studies related to SOC and SOVC, and considering Mobile Connection and Communication, this study proposed that SOMVC might be divided into five dimensions: Membership, Influence, Integration and Fulfillment of Needs, Shared Emotional Connection, and Mobile Connection and Communication. Thus, H1 is proposed as follows:

H1: The Sense of Mobile Virtual Community (SOMVC) contains five dimensions, namely Membership, Influence, Integration and Fulfillment of Needs, Shared Emotional Connection, and Mobile Connection and Communication.

2.5 Social Influence Theory

Social Influence Theory was derived from Kelman (1958), who proposed three processes in the social influence process: internalization, identification, and compliance: “Internalization” occurs when an individual accepts social influence because of the similarities of his or her goals and values with those of other group members (Shen et al. 2011), such as those that may transform the community vision and values into their own beliefs (Zhou 2011). “Group Norm” indicates an agreement among members regarding their shared goals and expectations (Zhou 2011); certain studies have proposed that Group Norm can represent (or measure) the concept of “Internalization” (Bagozzi & Dholakia 2002; Cheung & Lee 2010; Dholakia et al. 2004a; Shen et al. 2011; Zhou 2011).

“Identification” occurs when an individual accepts social influence to establish and

maintain a satisfying self-defining relationship with another person or group (Shen et al. 2011). Identification is defined as the individual identification with a community, such as a sense of belonging and attachment (Zhou 2011). For example, members may develop feelings of membership, influence, and value in a community (Zhou 2011). "Social Identity" refers to one's conception of the self regarding a relationship with another person or group (Zhou 2011); certain studies have indicated that Social Identity can represent (or measure) the concept of "Identification" (Cheung & Lee 2010; Dholakia et al. 2004a; Shen et al. 2011; Zhou 2011).

"Compliance" occurs when an individual accepts social influence to obtain support or approval from significant others (Shen et al. 2011). Compliance occurs when an individual acts to comply with the opinions of others who are important to him or her; for example, members follow the opinions of discussion board leaders (Zhou 2011). "Subjective Norm" can be defined as the effect of significant others' opinions on an individual's behavior (Zhou 2011), and it can represent (or measure) the concept of "Compliance" (Cheung & Lee 2010; Dholakia et al. 2004a; Shen et al. 2011; Venkatesh et al. 2003; Zhou 2011).

Several studies have referred to Group Norm, Social Identity, and Subjective Norm as social influence factors, and have applied them to VC research. Dholakia, Bagozzi and Pearo (2004a) indicated that social influence factors positively influence VC members' decision-making and participation. Okazaki (2009) claimed that social influence factors in a VC positively influence members' participation regarding desire and intention. Okazaki (2009) also applied Uses and Gratifications Theory to develop three types of the perceived value of VC participation intention, which are purposive value, social enhancement, and intrinsic enjoyment. Certain studies have also proposed that social influence factors positively influence VC participation intention, and these social influence factors include Group Norm (Bagozzi & Dholakia 2002; Cheung & Lee 2010; Song & Kim 2006; Zhou 2011), Social Identity (Bagozzi & Dholakia 2002; Cheung & Lee 2010; Song & Kim 2006; Zhou 2011), and Subjective Norm (Bagozzi & Dholakia 2002; Cheung & Lee 2010; Song & Kim 2006; Zhou 2011).

Social interaction plays a critical role in VC participation; through interpersonal communication, community members are able to influence and identify with each other, thereby producing continuous participation (Lu & Yang 2011). Moreover, certain studies have also proposed that social influence positively affects VC participation intention (Bagozzi & Dholakia 2002; Cheung & Lee 2010; Dholakia et al. 2004a; Song & Kim 2006; Zhou 2011). Thus, we proposed that Social Influence Theory may also be applied

for constructing the antecedents of SOMVC.

Hogg and Abrams (1988) indicated that cooperative interdependence resulting from the pursuit of shared goals results in the establishment of a well-defined group structure, which consequently leads its members to identify with it. Alon, Brunel, and Schneier Siegal (2004) proposed that instrumental behaviors and the understanding of each other's goals precede the establishment and propagation of a community's identity. Dholakia et al. (2004a) suggested that, once community members understand and accept the Group Norm in a VC, they form a strong identification with the community. Zhou (2011) suggested that when users are aware that their goals and expectations are consistent with those of a VC, they believe they are eligible members of the community. Thus, Group Norm may positively influence Social Identity.

Social Identity, which reflects one's conception of the self regarding a relationship with another person or group, includes cognitive identity, affective identity, and evaluative identity (Zhou 2011). Cognitive identity is the categorization process through which users understand both their similarities with other members and dissimilarities with outsiders; affective identity is an individual's emotional involvement with a community, such as a sense of attachment and belonging; and evaluative identity emerges when users are aware of their value is importance in a community (Zhou 2011). Social identity significantly influences users' attitudes (DeBono & Snyder 1995; Terry et al. 1999); in a VC, when members are aware that they have a high similarity and emotional involvement with the community, they are willing to comply with the social pressure from other community members (i.e., Subjective Norm) (Song & Kim 2006). Thus, Social Identity may positively influence Subjective Norm.

We applied the aforementioned studies on VCs to the MVC. We propose that users may use mobile Internet, anytime and anywhere, to participate in a VC uninterruptedly, to instantly understand the latest updates from the community, and to internalize the community goal to ensure consistency with their own beliefs (i.e., Group Norm). When their values are consistent with those of other community members, users attempt to develop their self-identity in the community. By using mobile Internet to interact with each other frequently, they may discern other members' identity (i.e., Social Identity). With the development of Social Identity, users may attempt their best to comply with other members' expectations and norms. For example, to avoid being potential members, they may be requested to use mobile Internet to provide immediate feedback with their own opinions, or to provide instant solutions when other members require assistance (i.e., Subjective Norm). Thus, H2 and H3 are proposed as follows, and the research framework

is shown in Figure 1.

H2: In a Mobile Virtual Community (MVC), Group Norm significantly and positively influences Social Identity.

H3: In a Mobile Virtual Community (MVC), Social Identity significantly and positively influences Subjective Norm.

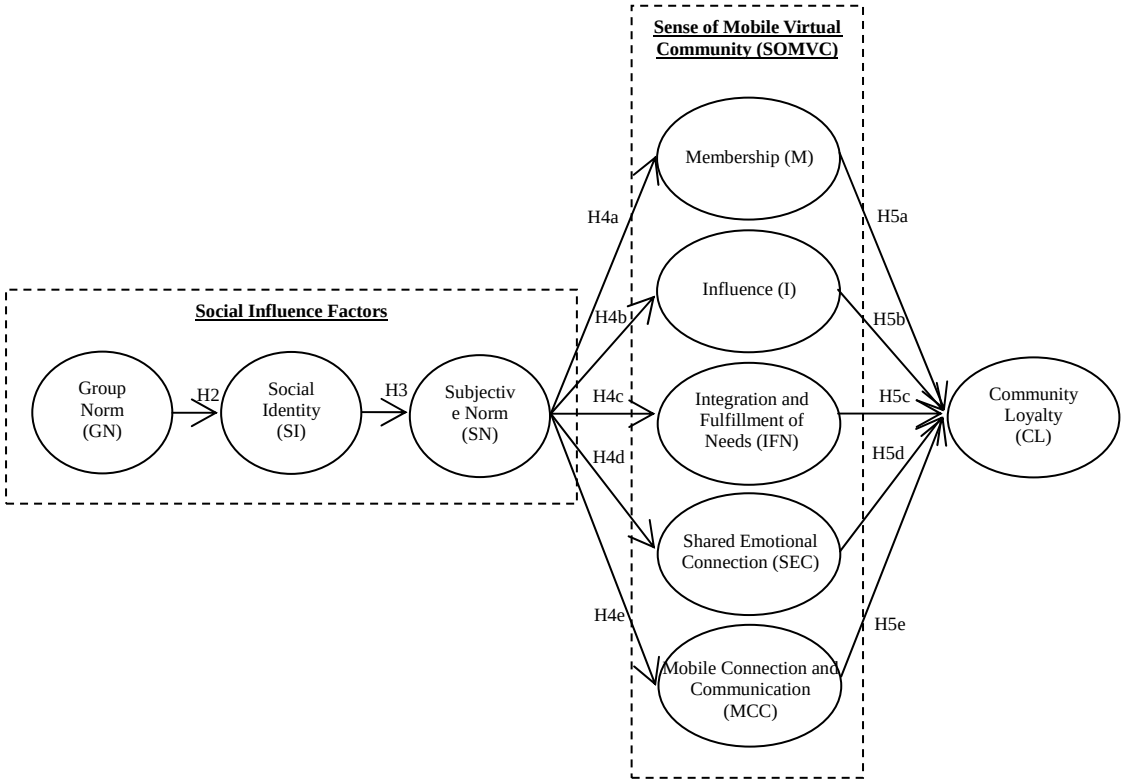

Figure 1: Research Framework

Blanchard and Markus (2004) proposed the "Processes by which the Sense of Virtual Community develops" They suggested that individuals may create their own Social Identity by posting a message. Once their own Social Identity is created, they are willing to comply with strong norms in the VC (i.e., Subjective Norm) to earn other members' trust, resulting in SOVC. Blanchard (2008) indicated that, after members create their own Social Identity, they comply with the norm in the VC (i.e., Subjective Norm) to produce SOVC. Thus, Subjective Norm may positively influence SOVC.

For this study, we applied the aforementioned studies on VCs to MVCs, and

proposed that through the processes of internalization (i.e., Group Norm), identification (i.e., Social Identity), and compliance (i.e., Subjective Norm), individuals in an MVC may produce SOMVC; that is, by using mobile Internet to participate in a VC, individuals produce a sense of belonging toward the VC (i.e., Membership), perceive having an influence on the community (i.e., Influence), are satisfied with individual and group needs (i.e., Integration and Fulfillment of Needs), produce emotional bonds (i.e., Shared Emotional Connection), and perceive that they can connect with the VC uninterruptedly, anytime and anywhere (i.e., Mobile Connection and Communication). Thus, H4 is proposed as follows:

H4: In a Mobile Virtual Community (MVC), Subjective Norm significantly and positively influences Sense of Mobile Virtual Community (SOMVC).
- H4a: In a Mobile Virtual Community (MVC), Subjective Norm significantly and positively influences Membership.
- H4b: In a Mobile Virtual Community (MVC), Subjective Norm significantly and positively influences Influence.
- H4c: In a Mobile Virtual Community (MVC), Subjective Norm significantly and positively influences Integration and Fulfillment of Needs.
- H4d: In a Mobile Virtual Community (MVC), Subjective Norm significantly and positively influences Shared Emotional Connection.
- H4e: In a Mobile Virtual Community (MVC), Subjective Norm significantly and positively influences Mobile Connection and Communication.

2.6 Community Loyalty

Community Loyalty can be defined as the degree to which a member promotes a community to get new members to join and talks about the benefits of this community (Lin et al. 2009; Srinivasan et al. 2002). It is critical for a VC to develop members' community loyalty because a VC is akin to a type of e-service, in which experiences of interpersonal interactions among members are an appealing characteristic (Shen et al. 2010). Community Loyalty is also a critical factor for a successful VC (Flavián et al. 2006) and a sustainable competitive advantage for the community (Lin et al. 2009).

Kim et al. (2004) proposed that SOVC, which contains the four dimensions, Membership, Influence, Integration and Fulfillment of Needs, and Shared Emotional Connection, positively influences Community Loyalty. Kim, Yang and Kim (2009) found

that SOVC positively affects Community Loyalty. Certain studies have also suggested that members' SOVC positively influences their Community Loyalty (Koh & Kim 2003; Lin et al. 2009; Pai & Tsai 2011).

In addition, Lin (2008) and Shen et al. (2010) indicated that sense of belonging is the determinant of member loyalty in a VC. The interactivity between members facilitates the enhancement of Community Loyalty (Frank 1997; Lin et al. 2009; Srinivasan et al. 2002). Lin (2010) and Shen et al. (2010) also indicated that a positive social interaction experience is a critical factor in producing Community Loyalty.

For this study, we applied the aforementioned studies on VCs to MVCs. We propose that using mobile Internet to participate in a VC results in a greater sense of belonging toward the VC (i.e., Membership), a higher level of perception regarding the influence on the community (i.e., Influence), a higher level of satisfaction with individual and group needs (i.e., Integration and Fulfillment of Needs), a higher level of emotional bonds (i.e., Shared Emotional Connection), and a greater ability to connect with the VC uninterruptedly, anytime-and-anywhere (i.e., Mobile Connection and Communication), thereby producing a higher level of Community Loyalty. Thus, H5 is proposed as follows:

H5: In a Mobile Virtual Community (MVC), Sense of Mobile Virtual Community (SOMVC) significantly and positively influences Community Loyalty.
- H5a: In a Mobile Virtual Community (MVC), Membership significantly and positively influences Community Loyalty.
- H5b: In a Mobile Virtual Community (MVC), Influence significantly and positively influences Community Loyalty.
- H5c: In a Mobile Virtual Community (MVC), Integration and Fulfillment of Needs significantly and positively influences Community Loyalty.
- H5d: In a Mobile Virtual Community (MVC), Shared Emotional Connection significantly and positively influences Community Loyalty.
- H5e: In a Mobile Virtual Community (MVC), Mobile Connection and Communication significantly and positively influences Community Loyalty.

3. Method

3.1 Research Design

On the basis of past studies (Chi 2011; Chu 2011; Donath & Boyd 2004; Ellison et al.

2007; Institute for Information Industry 2012; Ji et al. 2010; Kim 2007; Wellman et al. 2001), we surveyed Facebook users who are also college students for the following reasons:

First, based on the statistics of the Taiwanese official research unit, Institute for Information Industry (2012), 71.3% of Internet users in Taiwan are Facebook users. Certain studies that have presented discussions on VCs or social networking service have surveyed Facebook users as research samples (Chi 2011; Chu 2011; Donath & Boyd 2004; Ellison et al. 2007; Ji et al. 2010; Kim 2007; Wellman et al. 2001).

Second, Pelling and White (2009) proposed a comparison with the other groups, and a college student group is more appropriate for sampling social networking community research because college students usually spend more time daily participating in a social networking community. Chu (2011) indicated that a college student group that positively participates in Facebook enjoys social interactivity. Chi (2011) recruited college students as samples to discuss the community behavior on Facebook. Moreover, in Taiwan, the official research unit, Institute for Information Industry (2013), found that college students are the main segment for mobile Internet use.

We developed a measurement (Study 1) and an integrated SOMVC model (Study 2) according to the following sampling criteria: (a) participants were college students; (b) participants were Facebook users; (c) participants owned mobile devices (e.g., a notebook computer, smart phone, or tablet computer) with 3G or 4G mobile Internet provided by Teclecom, enabling uninterrupted Internet access, anytime-and-anywhere (those who used Internet only through Wifi were excluded because the Wifi coverage rate in Taiwan does not reach 100%, which may inhibit the ability to use the Internet uninterruptedly, anytime-and-anywhere).

Participants were asked to target the “group” or “page” that they participate in, pay attention to, or browse, or whether they posted messages recently on Facebook by using mobile Internet, and then to respond to the questionnaire.

Thus, we recruited Facebook users who were also college students in Taiwan through convenience sampling. We conducted four rounds of surveys: the first survey involved 119 participants (60 men and 59 women) who were subject to Exploratory Factor Analysis (EFA) in Study 1; the second survey involved 185 participants (94 men and 91 women) who were subject to Confirmatory Factor Analysis (CFA) in Study 1; the third survey involved 123 participants (65 men and 58 women) who were subject to EFA in Study 2; and the last survey involved 203 participants (105 men and 98 women) who were subject to CFA and Structural Equation Modeling (SEM) in Study 2.

The gender distribution in the four surveys were similar to that of the statistics of the Institute for Information Industry (2014) (i.e., mobile Internet users in Taiwan) and the International Telecommunication Union (2013) (i.e., Internet users in developed countries).

3.2 Definitions and Measures

We developed a measurement (Study 1) and integrated SOMVC model (Study 2). The full measurement items are provided in Subsections 4.1 and 4.2.

We defined SOMVC as using mobile Internet to participate in a VC, the feeling members have of belonging to the community, the belief that members matter to one another and to the community, and a shared faith that their needs are met through their commitment to the community (Abfalter et al. 2012; Blanchard 2007; Blanchard 2008; Blanchard & Markus 2004; Ellonen et al. 2007; Koh & Kim 2003). In Study 1, we referred to past studies and concluded the five SOMVC dimensions (Table 1):

Membership refers to, when using mobile Internet to participate in a VC, members' self-reinforcing boundaries, emotional safety, personal investment, a sense of belonging, and a common symbol system (Abfalter et al. 2012; McMillan & Chavis 1986; Obst & White 2004). We developed the items on the basis of Abfalter et al. (2012).

Influence is defined as, when using mobile Internet to participate in a VC, members' perception of the impact on the community as well as the amount of influence the community has over individual members (Abfalter et al. 2012; McMillan & Chavis 1986; Obst & White 2004). We developed the items on the basis of Abfalter et al. (2012).

Integration and Fulfillment of Needs can be defined as, when using mobile Internet to participate in a VC, members perceive that they can be fulfilled through their membership status, success of the community, and the perceived competence of other members (Abfalter et al. 2012; McMillan & Chavis 1986; Obst et al. 2002). We developed the items on the basis of Abfalter et al. (2012).

Shared Emotional Connection is defined as, when using mobile Internet to participate in a VC, members develop close relationships and strong bonds (Abfalter et al. 2012; McMillan & Chavis 1986). We developed the items on the basis of Abfalter et al. (2012).

Mobile Connection and Communication can be defined as, when using mobile Internet to participate in a VC, members perceiving that they are able to connect uninterruptedly and communicate with other members anytime and anywhere (Kim &

Garrison 2009). We developed the items on the basis of Kim and Garrison (2009).

Study 2 contained the five dimensions of SOMVC, social influence factors (i.e., Group Norm, Social Identity, and Subjective Norm), and Community Loyalty. Group Norm indicates an agreement among members regarding their shared goals and expectations (Shen et al. 2011; Zhou 2011); Social identity refers to one's conception of the self regarding a relationship to another person or group (Shen et al. 2011; Zhou 2011); Subjective norm can be defined as the effect of significant others' opinions on an individual's behavior (Zhou 2011). We developed the items of social influence factors on the basis of Shen et al. (2011) and Zhou (2011).

Community Loyalty refers to the degree to which a member promotes a community to convince new members to join and talks about the benefits of the community (Lin et al. 2009; Srinivasan et al. 2002). We developed the items on the basis of Lin, Hung and Chen (2009).

4. Results

4.1 Study 1: Measurement of SOMVC

The objective of Study 1 was to develop the measurement for SOMVC. Abfalter et al. (2012) developed a 15-item SOVC scale on the basis of the SCI by Chavis et al. (1986) and the Modified Sense of Community Index (SCI-2) by Chavis et al. (2008). We used the 15-item SOVC scale by Abfalter et al. (2012) and included the four-item Mobile Connection and Communication measures by Kim and Garrison (2009) to develop our SOMVC scale.

This study used 119 samples for the first survey to conduct EFA, and excluded items with a factor loading less than 0.5 (Duhachek 2005; Handelman & Arnold 1999; Menon et al. 1999). The findings revealed five factors. The original four-item mobile Connection and Communication Measures by Kim and Garrison (2009) were extracted into one factor, and we named it "Mobile Connection and Communication"; the other items were extracted as four factors that were consistent with the scale by Abfalter et al. (2012), but two items in Integration and Fulfillment of Needs and two items in Shared Emotional Connection were excluded because the factor loadings were less than 0.5.

This study then used the 185 samples from the second survey to conduct CFA. Table 2 lists the CFA results, and the measurement model provided an acceptable fit according to traditional fit indices (χ^2/df = 1.17; GFI = .94; AGFI = .91; NFI = .98; NNFI = .99; CFI = .99; RMSEA = .03).

Table 2: Confirmatory Factor Analysis—Measurement of SOMVC

Factors/Items	Factor Loading	*t*-Value	CR	AVE
By using mobile Internet to participate in this group (or page), I feel…				
Membership (M)				
I get important needs of mine met because I am part of this group (or page)	.87	14.70	.87	.69
When I have a problem, I can talk about it with members of this group (or page)	.91	15.70		
People in this group (or page) have similar needs, priorities, and goals	.90	15.36		
Influence (I)				
Most group (or page) members know me	.73	10.58	.89	.82
I can trust people in this group (or page)	.86	12.76		
Integration and Fulfillment of Needs (IFN)				
Fitting into this group (or page) is important to me	.86	14.04	.92	.79
If there is a problem in this group (or page), members can get it solved	.89	15.00		
This group (or page) has good leaders	.84	13.74		
Shared Emotional Connection (SEC)				
I am with other community members a lot and enjoy being with them	.71	18.88	.94	.88
It is very important to me to be a part of this group (or page)	.91	15.69		
Members of this group (or page) care about each other	.90	15.31		
Mobile Connection and Communication (MCC)				
More connected to other members	.95	17.23	.95	.89
I have many incoming contacts from other members	.92	16.28		
I can connect and communicate with other members anytime	.92	16.36		
I can connect and communicate with other members anywhere	.74	11.63		

Inter-Correlation and the Square Root of the AVE	M	I	IFN	SEC	MCC
M	**.83**				
I	.60	**.90**			
IFN	.59	.63	**.89**		
SEC	.61	.74	.67	**.94**	
MCC	.54	.62	.54	.62	**.95**

Goodness-of-Fit Index

$\chi^2 = 93.21$ ($p = .15$)
df = 80
χ^2/df = 1.17
GFI = .94; AGFI = .91
NFI = .98; NNFI = .99
CFI = .99; RMSEA = .03

Convergent validity was assessed by examining whether all factor loadings were significant and >.50; Average Variance Extracted (AVE) > .50 (Fornell & Larcker 1981). The results revealed that all factor loadings were > .50 ($p < .01$) and had an AVE > .50 (Table 2). The correlation estimates between any two factors were ≤ .85, and the square root of the AVE for the factor was > its correlations with other factors (Table 2), which satisfies the test for discriminant validity (Fornell & Larcker 1981). Table 2 shows

Composite Reliability (CR) > .60, indicating that the five constructs had satisfactory levels of internal consistency (Hair et al. 1998).

We then compared the one-factor model, two-factor model, and five-factor model of the SOMVC measurement. In the one-factor model, we addressed SOMVC as a single factor (15 items). In the two-factor model, because certain studies (Blanchard 2007; Blanchard 2008; Tonteri et al. 2011) have addressed SOVC as a uni-factor, this model contains two factors, which are SOVC and Mobile Connection and Communication. Regarding the five-factor model, certain studies have addressed SOVC as four factors (i.e., Membership, Influence, Integration and Fulfillment of Needs, and Shared Emotional Connection) (Abfalter et al. 2012; Kim et al. 2004; Obst & White 2004; Peterson et al. 2008). Therefore, we included additional factors (i.e., Mobile Connection and Communication) and devised a five-factor model. Table 3 shows that the five-factor model had a more acceptable model fit compared with the others models.

Thus, we developed a 15-item measurement of SOMVC, which included Membership (three items), Influence (two items), Integration and Fulfillment of Needs (three items), Shared Emotional Connection (three items), and Mobile Connection and Communication (four items). Thus, H1 was supported.

Table 3: Comparison of SOMVC Measurement Model

Goodness-of-fit Index	One-Factor Model [a]	Two-Factor Model [b]	Five-Factor Model [c]
χ^2	5174.67 (p = .00)	3354.56 (p = .00)	93.21 (p = .15)
χ^2/df	54.47	36.86	1.17
GFI	.21	.29	.94
AGFI	.003	.066	.91
NFI	.55	.68	.98
NNFI	.51	.65	.99
CFI	.56	.69	.99
RMSEA	.54	.44	.03
References		Blanchard (2007); Blanchard (2008); Tonteri et al. (2011)	Abfalter et al. (2012); Kim et al. (2004); Obst and White (2004); Peterson et al. (2008)

Note[a] : SOMVC is a single factor

[b]: SOMVC includes two-factors (SOVC and Mobile Connection and Communication)

[c]: SOMVC includes five-factors (Membership, Influence, Integration and Fulfillment of Needs, Shared Emotional Connection, and Mobile Connection and Communication)

4.2 Study 2: Integrated Model of SOMVC

The objective of Study 2 was to develop an integrated SOMVC model. This study used SEM to test the hypotheses after conducting EFA and CFA.

This study used 123 samples from the third survey to conduct EFA, and excluded items with a factor loading less than 0.5 (Duhachek 2005; Handelman & Arnold 1999; Menon et al. 1999). The findings revealed nine factors. The 15-item SOMVC was also extracted into five factors, which were consistent with that reported in Section 4.1.

This study then used 203 samples from the fourth survey to conduct CFA. Table 4 lists the CFA results, and the measurement model provided an acceptable fit according to traditional fit indices (χ^2/df = .86; GFI = .92; AGFI = .89; NFI = .99; NNFI = .99; CFI = .99; RMSEA = .001).

Convergent validity was assessed by examining whether all factor loadings were significant and > .50; AVE > .50 (Fornell & Larcker 1981). The results revealed that all factor loadings were > .50 (p < .01) and had an AVE > .50 (Table 4). The correlation estimates between any two factors were ≤ .85, and the square root of AVE for the factor was > its correlations with other factors (Table 4), thus fulfilling the test for discriminant validity (Fornell & Larcker 1981). Table 4 shows CR > .60, indicating that the five constructs had satisfactory levels of internal consistency (Hair et al. 1998).

Table 4: Confirmatory Factor Analysis—Integrated Model of SOMVC

Factors/Items	Factor Loading	*t*-Value	CR	AVE
By using mobile Internet to participate in this group (or page), I feel…				
Group Norm (GN)				
All members in this group (or page) have a shared goal	.92	16.34	.68	.61
Other members and I have a shared goal	.88	15.22		
Social Identity (SI)				
My self-image overlaps with that of other members	.92	16.95	.91	.79
I have a strong sense of belonging toward this group (or page)	.95	17.94		
I am a valuable member in this group (or page)	.88	15.86		
Subjective Norm (SN)				
Most people who are important to me think that I should participate in	.82	12.89	.92	.86

this group (or page)				
Most people who have influence on my behavior think that I should participate in this group (or page)	.79	12.24		
Membership (M)				
I get important needs of mine met because I am part of this group (or page)	.88	15.64	.89	.74
When I have a problem, I can talk about it with members of this group (or page)	.91	16.35		
People in this group (or page) have similar needs, priorities, and goals	.89	15.77		
Influence (I)				
Most group (or page) members know me	.87	14.84	.85	.75
I can trust people in this group (or page)	.89	15.36		
Integration and Fulfillment of Needs (IFN)				
Fitting into this group (or page) is important to me	.86	14.88	.92	.80
If there is a problem in this group (or page), members can get it solved	.89	15.60		
This group (or page) has good leaders	.84	14.25		
Shared Emotional Connection (SEC)				
I am with other community members a lot and enjoy being with them	.74	12.05	.94	.88
It is very important to me to be a part of this group (or page)	.91	16.46		
Members of this group (or page) care about each other	.90	15.99		
Mobile Connection and Communication (MCC)				
More connected to other members	.95	18.08	.95	.90
I have many incoming contacts from other members	.92	17.07		
I can connect and communicate with other members anytime	.92	17.05		
I can connect and communicate with other members anywhere	.77	12.78		
Community Loyalty (CL)				
I will frequently talk to people about the benefits of this group (or page)	.97	18.20	.73	.62
I will actively invite my close acquaintances to join this group (or page)	.92	16.76		

Inter-Correlation and the Square Root of the AVE

	GN	SI	SN	M	I	IFN	SEC	MCC	CL
GN	.78								
SI	.50	.89							
SN	.66	.59	.93						
M	.64	.54	.61	.86					
I	.68	.64	.64	.60	.87				
IFN	.59	.53	.57	.58	.62	.89			
SEC	.76	.60	.71	.62	.75	.68	.94		
MCC	.69	.54	.69	.51	.61	.52	.63	.95	
CL	.67	.57	.68	.64	.70	.64	.73	.65	.79

Goodness-of-Fit Index

$\chi^2 = 211.44$ ($p = .57$)
df = 216
$\chi^2/df = .86$
GFI = .92
AGFI = .89
NFI = .99
NNFI = .99
CFI = .99
RMSEA = .001

Figure 2 shows the SEM results for SOMVC, and the structural model provided an acceptable fit according to traditional fit indices (χ^2/df = 1.10; GFI = .91; AGFI = .88; NFI = .98; NNFI = .99; CFI = .99; RMSEA = .022). Hypothesis testing was as follows:

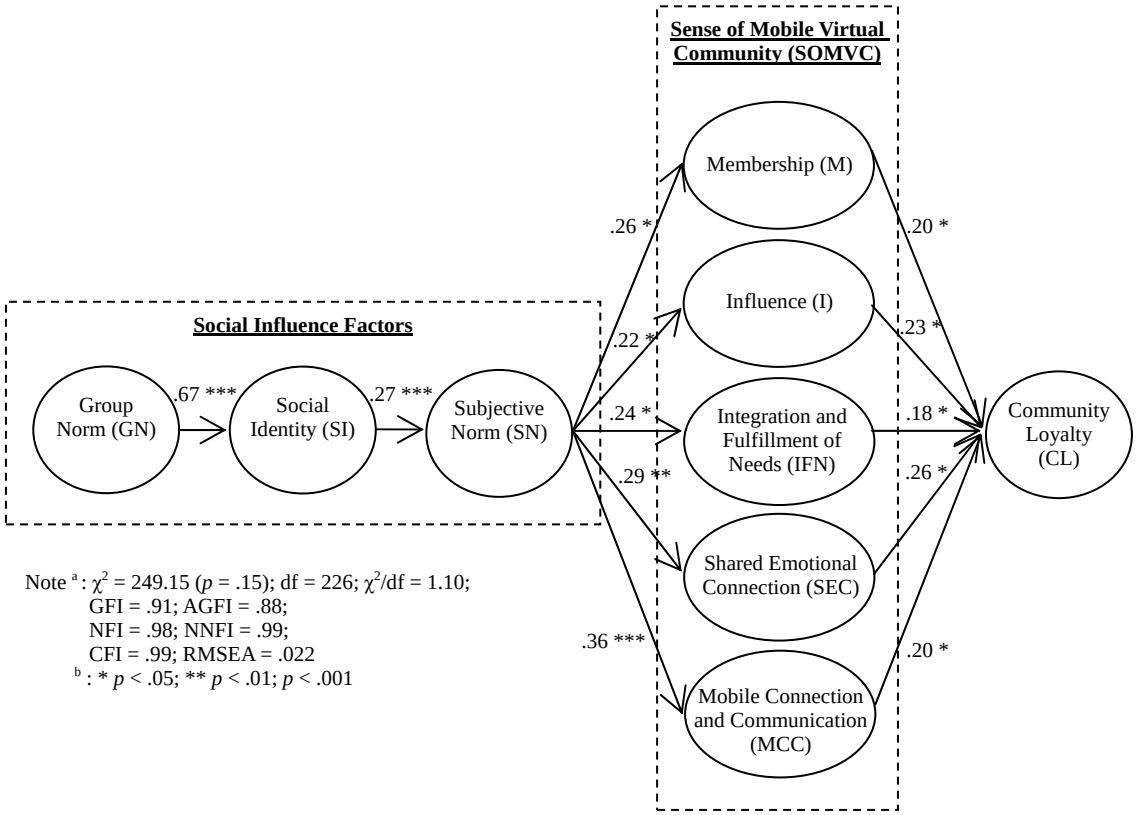

Figure 2: Structural Equation Model of SOMVC

Group Norm significantly and positively influenced Social Identity (path coefficient = .67, $p < .001$); thus, H2 was supported. Social Identity significantly and positively influenced Subjective Norm (path coefficient = .27, $p < .001$); thus, H3 was supported.

Subjective Norm significantly and positively influenced Membership (path coefficient = .26, $p < .05$), Influence (path coefficient = .22, $p < .05$), Integration and Fulfillment of Needs (path coefficient = .24, $p < .05$), Shared Emotional Connection (path coefficient = .29, $p < .01$), and Mobile Connection and Communication (path coefficient = .36, $p < .001$); thus, H4a, H4b, H4c, H4d, and H4e were supported.

Membership (path coefficient = .20, $p < .05$), Influence (path coefficient = .23, $p < .05$), Integration and Fulfillment of Needs (path coefficient = .18, $p < .05$), Shared

Emotional Connection (path coefficient = .26, $p < .05$), and Mobile Connection and Communication (path coefficient = .20, $p < .05$) significantly and positively influenced Community Loyalty; thus, H5a, H5b, H5c, H5d, and H5e were supported.

We additionally discussed the direct and indirect effects between variables (Table 5). For the relationships between the three social influence factors (i.e., Group Norm, Social Identity, and Subjective Norm), the results revealed that the direct effect of Group Norm on Subjective Norm was significant (path coefficient = .53, $p < .001$), and the indirect effect of Group Norm on Subjective Norm was significant (path coefficient = .18, $p < .001$); thus, the effect of Group Norm on Subjective Norm is partially mediated by Social Identity.

For the relationships between social influence factors and SOMVC, the direct effect of Group Norm on Membership was significant (path coefficient = .38, $p < .001$), and the indirect effect of Group Norm on Membership was significant (path coefficient = .28, $p < .001$); the direct effect of Group Norm on Influence was significant (path coefficient = .41, $p < .001$), and the indirect effect of Group Norm on Influence was significant (path coefficient = .32, $p < .001$); the direct effect of Group Norm on Integration and Fulfillment of Needs was significant (path coefficient = .37, $p < .001$), and the indirect effect of Group Norm on Integration and Fulfillment of Needs was significant (path coefficient = .28, $p < .001$); the direct effect of Group Norm on Shared Emotional Connection was significant (path coefficient = .52, $p < .001$), and the indirect effect of Group Norm on Shared Emotional Connection was significant (path coefficient = .31, $p < .001$); the direct effect of Group Norm on Mobile Connection and Communication was significant (path coefficient = .42, $p < .001$), and the indirect effect of Group Norm on Mobile Connection and Communication was significant (path coefficient = .34, $p < .001$). Therefore, the effect of Group Norm on SOMVC is partially mediated by Social Identity and Subjective Norm.

The direct effect of Social Identity on Membership was significant (path coefficient = .15, $p < .01$), as was the indirect effect of Social Identity on Membership (path coefficient = .07, $p < .05$); the direct effect of Social Identity on Influence was significant (path coefficient = .24, $p < .001$), as was the indirect effect of Social Identity on Influence (path coefficient = .06, $p < .05$); the direct effect of Social Identity on Integration and Fulfillment of Needs was significant (path coefficient = .17, $p < .01$), as was the indirect effect of Social Identity on Integration and Fulfillment of Needs (path coefficient = .07, $p < .05$); the direct effect of Social Identity on Shared Emotional Connection was significant (path coefficient = .15, $p < .01$), as was the indirect effect of Social Identity on

Shared Emotional Connection (path coefficient = .08, $p < .05$); the direct effect of Social Identity on Mobile Connection and Communication was significant (path coefficient = .11, $p < .05$), as was the indirect effect of Social Identity on Mobile Connection and Communication (path coefficient = .10, $p < .01$). Therefore, the effect of Social Identity on SOMVC is partially mediated by Subjective Norm.

Table 5: Structural Equation Model of SOMVC—Direct and Indirect Effects [a b]

Dependent Variables / Independent Variables	Group Norm	Social Identity	Subjective Norm	Membership	Influence	Integration and Fulfillment of Needs	Shared Emotional Connection	Mobile Connection and Communication
	Path Coefficient	Path Coefficient	Path Coefficient	Path Coefficient	Path Coefficient	Path Coefficient	Path Coefficient	Path Coefficient
Social Identity (SI)								
Direct Effect	.67 ***							
Indirect Effect	---							
Total Effect	.67 ***							
Subjective Norm (SN)								
Direct Effect	.53 ***	.27 ***						
Indirect Effect	.18 ***	---						
Total Effect	.71 ***	.27 ***						
Membership (M)								
Direct Effect	.38 ***	.15 **	.26 *					
Indirect Effect	.28 ***	.07 *	---					
Total Effect	.66 ***	.22 ***	.26 *					
Influence (I)								
Direct Effect	.41 ***	.24 ***	.22 *					
Indirect Effect	.32 ***	.06 *	---					
Total Effect	.73 ***	.30 ***	.22 *					
Integration and Fulfillment of Needs (IFN)								
Direct Effect	.37 ***	.17 **	.24 *					
Indirect Effect	.28 ***	.07 *	---					
Total Effect	.65 ***	.24 ***	.24 *					
Shared Emotional Connection (SEC)								
Direct Effect	.52 ***	.15 **	.29 **					
Indirect Effect	.31 ***	.08 *	---					
Total Effect	.83 ***	.23 ***	.29 **					
Mobile Connection and Communication (MCC)								
Direct Effect	.42 ***	.11 *	.36 ***					
Indirect Effect	.34 ***	.10 **	---					
Total Effect	.76 ***	.21 ***	.36 ***					

Community Loyalty (CL)								
Direct Effect	.01	.01	.13	.20 *	.23 *	.18 *	.26 *	.20 *
Indirect Effect	.88 ***	.29 ***	.30 ***	---	---	---	---	---
Total Effect	.89 ***	.30 ***	.43 ***	.20 *	.23 *	.18 *	.26 *	.20 *

Note [a] : χ^2 = 249.15 (p = .15); df = 226; χ^2/df = 1.10; GFI = .91; AGFI = .88; NFI = .98; NNFI = .99; CFI = .99; RMSEA = .022

[b] : * p < .05; ** p < .01; p < .001

For the relationships among social influence factors, SOMVC, and Community Loyalty, the direct effect of Group Norm on Community Loyalty was non-significant (path coefficient = .01, p > .05), whereas the indirect effect of Group Norm on Community Loyalty was significant (path coefficient = .88, p < .001); thus, the effect of Group Norm on Community Loyalty is fully mediated by Social Identity, Subjective Norm, and SOMVC. The direct effect of Social Identity on Community Loyalty was non-significant (path coefficient = .01, p > .05), whereas the indirect effect of Social Identity on Community Loyalty was significant (path coefficient = .29, p < .001); thus, the effect of Social Identity on Community Loyalty is fully mediated by Subjective Norm and SOMVC. The direct effect of Subjective Norm on Community Loyalty was non-significant (path coefficient = .13, p > .05), whereas the indirect effect of Subjective Norm on Community Loyalty was significant (path coefficient = .30, p < .001); thus, the effect of Subjective Norm on Community Loyalty is fully mediated by SOMVC. The results emphasized the critical role that SOMVC plays in the relationship between social influence factors and Community Loyalty; in other words, social influence factors must be fully mediated by SOMVC, and then influence Community Loyalty.

5. Discussion

5.1 Summary of Findings

Mobile Internet has changed the way people participate in VCs (Chang et al. 2015). Through mobile Internet, people are able to participate wirelessly in VCs, irrespective of time and place (Chae et al. 2002), thus resulting in the MVC concept (Huang & Liu 2011; Jen 2010; Nysveen et al. 2005; Zhang et al. 2010). Because SOVC is a critical factor for a successful VC (Blanchard & Markus 2004; Ellonen et al. 2007; Koh & Kim 2003), to understand the behavior of member participation in an MVC, we developed a measurement (Study 1) and integrated model (Study 2) of SOMVC.

For the SOMVC measurement (Study 1), we defined SOMVC as the means of using mobile Internet to participate in a VC, the feeling that members have of belonging to the community, the belief that members matter to one another and to the community, and a shared faith that their needs are met through their commitment to the community. By conducting EFA and CFA, we developed a 15-item measurement of SOMVC that includes five dimensions: Membership (3 items), Influence (2 items), Integration and Fulfillment of Needs (3 items), Shared Emotional Connection (3 items), and Mobile Connection and Communication (4 items).

For the integrated SOMVC model (Study 2), this study verified that, through the process of social influence, social influence factors significantly and positively affected SOMVC, and subsequently significantly and positively influenced Community Loyalty. The results are summarized as follows: Group Norm significantly and positively influenced Social Identity; Social Identity significantly and positively influenced Subjective Norm; and Subjective Norm significantly and positively influenced Membership, Influence, Integration and Fulfillment of Needs, Shared Emotional Connection, and Mobile Connection and Communication. Moreover, Membership, Influence, Integration and Fulfillment of Needs, Shared Emotional Connection, and Mobile Connection and Communication significantly and positively influenced Community Loyalty.

This study proposed that people may use mobile Internet, anytime-and-anywhere, to participate in a VC uninterruptedly, to receive instant updates regarding the community, and to attempt to internalize the community goal with their own belief (i.e., Group Norm). When a user's values are consistent with those of other community members, he or she attempts to use mobile Internet to interact frequently with other members, to ensure a high level of similarity with other members, to increase the attachment and sense of belonging toward the community, to create value regarding his or her importance in the community, and to develop his or her self-identity in the community (i.e., Social Identity). Once Social Identity has been developed, users may attempt their best to comply with other members' expectations and norms. For example, to avoid being potential members, they may be requested to use mobile Internet to provide immediate personalized feedback or to provide instant solutions when other members require assistance (i.e., Subjective Norm).

Moreover, social influence factors may produce a high level of SOMVC; that is, through internalization (i.e., Group Norm), identification (i.e., Social Identity), and compliance (i.e., Subjective Norm) in the social influence process, people may perceive

that using mobile Internet to participate in a VC, irrespective of time and place, produces a sense of belonging toward the VC (i.e., Membership), and they may perceive having an influence on the community (i.e., Influence), the satisfying of individual and group needs (i.e., Integration and Fulfillment of Needs), the forming of emotional bonds (i.e., Shared Emotional Connection), and that they are able to connect with the VC uninterruptedly, irrespective of time and place (i.e., Mobile Connection and Communication).

Finally, when members have a higher level of SOMVC, a greater willingness is generated to discuss the benefits of the VC and to promote the VC to convince new members to join (i.e., Community Loyalty).

5.2 Theoretical Contributions

The theoretical contributions of this study are as follows: the measurement (Study 1) and the integrated model (Study 2) of SOMVC.

First, the SOC concept has been widely discussed and applied since the 1980s. With the growth of the Internet, the SOVC has been discussed since the 2000s. However, our findings revealed that, with mobile Internet becoming increasingly popular, a few studies have discussed SOMVC. Unlike traditional Internet, mobile Internet has the characteristics of perceived ubiquity and perceived reachability (Kim & Garrison 2009), and thus, the behavior of using mobile Internet to participate in a VC (i.e., MVC) may be unique. Because SOC plays a critical role in the community, we first introduced the concept of SOMVC and developed its measurement to extend the traditional SOC to the mobile Internet environment.

Second, certain studies have proposed that SOC is a critical factor for a successful community (Blanchard & Markus 2004; Ellonen et al. 2007; Koh & Kim 2003; Sarason 1986). Thus, we first constructed the integrated model (i.e., antecedents and consequences) of SOMVC to understand the positive outcomes (e.g., Community Loyalty) of SOMVC and the factors (e.g., social influence factors) that induce a feeling of SOMVC.

This study also defined the role of SOMVC during the process of socialization for MVCs. Our results indicated that SOMVC occurs in the last stage of the social influence process; that is, Subjective Norm influences Social Identity and Group Norm, and subsequently affects SOMVC. Our findings also revealed that SOMVC fully mediates the relationship between social influence factors and Community Loyalty, emphasizing the critical role of SOMVC in the relationship between social influence factors and

Community Loyalty.

5.3 Managerial Implications

Increasingly more companies are exploring how to organize and manage their VCs (Bagozzi & Dholakia 2002; Balasubramanian & Mahajan 2001; Dholakia et al. 2004a). By managing a VC, companies are able to influence consumers' decisions, quickly express the concepts of new products to consumers (Dholakia & Bagozzi 2001), and actively interact and communicate with customers to develop a positive customer relationship (Dholakia et al. 2004a).

Unlike the traditional SOVC, SOMVC has the characteristics of perceived ubiquity and perceived reachability, which facilitate close communication between people as well as active participation in a VC. Therefore, the product (or brand) sellers or VC owners must not only improve their web design of the VC but also expend effort to develop a mobile webpage or mobile marketing (e.g., business and community applications) to create additional opportunities to communicate with virtual community members or consumers.

This study verified that SOMVC positively influenced members' Community Loyalty; thus, enhancing SOMVC is crucial for product (or brand) sellers or VC owners in maintaining their business or community. Because we found that social influence factors lead to an increased SOMVC, this study proposed ways to increase social influence factors: first, product (or brand) sellers or VC owners must strengthen specific topics, purposes, values, and the vision of the VC to internalize them as members' (or consumers') beliefs (i.e., Group Norm). Second, it is possible to design a feedback or recommendation mechanism in the VC to increase recommenders' Social Identity. For active recommenders, it is possible to provide them with incentives to facilitate their enthusiasm to participate and invite newcomers (e.g., after thumbing, recommenders can take their smart phone to a brick-and-mortar store to receive a discount). Finally, leaders are necessary in a community because they can establish common norms and rules, and then influence members (or consumers) to participate in the community (e.g., request instant member responses or feedback and avoid being potential members; i.e., Subjective Norm); Moreover, it is also possible to have opinion leaders promote a product or brand to members (or consumers).

5.4 Limitations and Future Research

The limitations and future research of this study can be discussed in three ways: (a) samples and sampling, (b) the type of community, and (c) the research framework. For the samples and sampling, on the basis of past studies (Chi 2011; Chu 2011; Donath & Boyd 2004; Ellison et al. 2007; Institute for Information Industry 2012; Ji et al. 2010; Kim 2007; Wellman et al. 2001), we recruited college students for surveys. Moreover, because the sampling framework of Facebook users is difficult to understand, we adopted convenience sampling. Future studies can select other segments and use random sampling.

Regarding the type of community, Armstrong and Hagel (1996) indicated four types of VCs (i.e., transactions, interest, fantasy, and relationship). The Facebook users recruited for this study belong to the relationship type. Future studies can select other types of VCs to develop an integrated SOMVC model or compare the integrated model between different types of VCs.

For the research framework, McGuire (1968) and Bearden, Netemeyer and Teel (1989) have indicated that the perception of individuals toward social influence is influenced by Susceptibility to Interpersonal Influence, which can be defined as the need to identify with or enhance a personal image on the basis of the opinion of others by acquiring and using products and brands, thereby demonstrating a willingness to conform to the purchasing expectations of others or to learn about products and services by observing or seeking information from others (Bearden et al. 1989). Thus, susceptibility to interpersonal influence may moderate the effect of social influence factors on SOMVC, and future research can include it in the integrated model.

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