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CULTIVATING SOCIAL CAPITAL THROUGH INTERACTIVITY ON SOCIAL NETWORK SITES

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Abstract

The Internet has changed from an information tool to a social tool. More and more people use social networking sites such as Facebook to build and maintain numerous interpersonal relationships. The benefits of online social interaction can be manifested in bridging and bonding social capital. This study examined how the four dimensions of perceived interactivity (control, synchronicity, surveillance, and social bandwidth) affected users' bridging and bonding social capital. Moreover, this study also assessed how the effects of perceived interactivity on bridging and bonding social capital were mediated by communication quality and social relationship support. This study recruited 422 respondents to participate in the survey. The first results showed that three out of four dimensions of perceived interactivity (control, synchronicity, and social bandwidth) positively influenced bridging and bonding social capital, whereas perceived surveillance negatively affected bridging social capital. Moreover, they have a stronger effect on bridging than on bonding social capital. The second findings revealed that the relationships between the two dimensions of perceived interactivity (synchronicity and social bandwidth) and bridging social capital were mediated by social relationship support.

Keywords: Perceived Interactivity, Bridging Social Capital, Bonding Social Capital, Communication Quality, Social Relationship Support

1. INTRODUCTION

As we grow up, we build and maintain many interpersonal relationships. Those relationships may develop or decay with the way. With the expansion of the Internet from an information tool to a social tool, people can keep in touch with friends through social network sites like Facebook, Twitter, MySpace, and LinkedIn. Technology supports online relationships (Resnick, 2001) and Internet use supplements social capital (Wellman, Haase, Witte, & Hampton, 2001). That is, the purpose of this study is to investigate how online social capital could be cultivated through the feature of Internet on social network sites. *Social capital* can be broadly defined as power accumulated through someone's interpersonal relationships (Coleman, 1988). It can also be divided into two types. *Bridging social capital* refers to the resources which are useful information or new perspectives from one others but typically not emotional (Granovetter, 1982; Putnam, 2000). *Bonding social capital* refers to the resources which are emotional supports or strength when you confront turning points in your life (Granovetter, 1982).

Among the many special features of the Internet, interactivity, deemed as the most prominent feature that distinguishes the new medium from traditional media, could be a powerful feature to support social relationships. Based on the previous research, the construct of interactivity is a composite concept (Liu & Shrum, 2002; Ha & James, 1998). Nowadays, social sites allow users to enjoy greater control of freely browsing or accessing whatever information they need without time, sequence, and content constraints (McMillan, 2000). They can control who they want to talk to and the way they want to present their messages (Boyd, 2011). Social sites are also a nice medium for providing users with greater connectedness and reciprocity (Ha & James, 1998; McMillan, 2000), which means they can switch between the sender role and the receiver role during the communication (Burgoon, Bonito, Ramirez, Dunbar, & Fischer, 2002). Thus, it can provide a pleasant experience of fast information exchange with others (Dellaert & Kahn, 1999; Kay, 1990; Nielsen, 2000; Vora, 1998). We will apply Liu's (2003) definition of interactivity, breaking it into three main categories: control, two-way communication, and synchronicity. However, communication in the social media is two-way. That is, we cannot examine the feature of two-way communication in this study. In addition to the above features, users can also broadcast their message to a wide range of audiences and make their information or their points of view visible and available to others (Slevin, 2002). Furthermore, users benefit from technology growth, and are able to distribute or access various kinds of information through the medium at the same time (Barry & Fulmer, 2004). Therefore, we argue that the new social interactivity features – surveillance and social bandwidth (Barry & Fulmer, 2004; Potosky, 2008) – should be included in this study. The first objective of this study is to examine how the four dimensions of perceived interactivity (control, synchronicity, surveillance, and social bandwidth) on social network sites affects users' bridging and bonding social capital.

Today, Web 2.0 interactivity features provide users with a variety of communication ways to communicate, and these services encourage users to express more about themselves, or participate more in the online social interactions. Online communication activity on social network sites could be manifested in terms of users' *communication quality* and *social relationship support*. Communication quality is defined as the degree to which users consider the information sharing to be timely, accurate, and rich (Daft, Lengel, & Trevino, 1987; Spralls, Hunt, & Wilcox, 2011). In addition, social relationship support refers to whether individuals can find and provide others with companionship, emotional support, and encouragement when using the communication medium (Kim, Gupta, & Koh, 2011). The interactivity features may allow users to experience the feelings of the quality and the emotional support of the communication process as well as further cultivate their social capital. The second objective is to explore how four dimensions of perceived interactivity (control, synchronicity, surveillance, and social bandwidth) affect users' bridging and bonding social capital through communication quality and social relationship support.

The rest of this paper is organized as follows: Section 2 develops the hypotheses and research model and Section 3 demonstrates the methodology, with results presented in Section 4. Finally, Section 5 concludes the findings, discusses managerial implications, limitations, and proposes future research.

2. HYPOTHESES DEVELOPMENT AND RESEARCH MODEL

2.1 Perceived interactivity and social capital on social websites

According to Wu's (2005) study, interactivity could be separated into "actual interactivity" and "perceived interactivity". Actual interactivity is defined as the features of an interactive medium such as a chat room and a guest board (Wu, 2005; Bucy & Tao, 2007). Perceived interactivity is defined as the users' feelings of using an interactive medium (Bucy & Tao, 2007). If a website provides interactive features to users for social interaction, it has high actual interactivity. However, high perceived interactivity is determined by how users interact with the features. Based on previous studies, perceived interactivity has been examined more frequently than actual interactivity (McMillan & Hwang 2002). That is, perceived interactivity could represent the concept of actual interactivity. In this study, we primarily focus on social interactivity between users, and finding out how users "perceive" these technical functions. Thus, we would discuss four dimensions of Web 2.0 interactivity: control, synchronicity (Liu, 2003), surveillance, and social bandwidth (Barry & Fulmer, 2004; Potosky, 2008) regarding the users' psychological states.

This first objective of this study is to investigate how perception of interactivity on social network sites influences users' bridging and bonding social capital. Social capital can be broadly defined as an power accumulated through someone's interpersonal relationships (Coleman, 1988). It facilitated the actions of actors, and it made possible the achievement of certain ends that would not be possible in its absence. According to the previous studies, social capital also could be categorized into two different types – *bridging social capital and bonding social capital* (Putnam, 2000). *Bridging social capital* is defined as the resources which are useful information or new perspectives from one others but typically not emotional. This type of resource can be provided by casual and connected acquaintances. These people come from diverse social groups (Putnam, 2000; Williams, 2006), and they may not participate much in someone's life, but they are useful information sources whenever one needs some suggestions. For instance, when you have trouble making a wise selection among several technology products, you may turn to one of your friends who know something about this field despite the lack of a close, strong relationship between you and him. *Bonding social capital* is defined as the resources which are emotional supports or strength when you confront turning point of their life. This type of the resource can be provided by close personal relationships. These people are generally from a homogeneous group (Putnam, 2000; Williams, 2006), and the relationship among these actors is really close; they provide emotional supports or critical strength whenever someone confronts a turning point in their life, gets stuck in serious life problems, or experiences other important events (Granovetter, 1982). For example, you may need someone that really understands you, who will be an appropriate job reference for you when applying a job, or one that can give you a large sum of money if you get into an accident.

The first dimension of perceived interactivity, perceived control, is defined as the degree of people's perception of whether they can manipulate the duration of time, content, and sequence of presented information (Ariely, 2000) as well as decide the content and time of communication, communicator, and ways of communication (Sundar & Marathe, 2010). It also means that users may use this technology in order to have control over time, content, sequence, ways of communication, and the audiences. When users perceive they have more control over the website, they feel they have the ability of free arrangement and nonlinear hypertext navigation (Lustria, 2007). A high level of perceived control allows users to process the content in the sequence and pace they want (Rafaeli, 1988). In addition, users can freely use the content on sites like Facebook, feed stories that others clicked on, and have direct communication with their friends. For example, they could attract others or initiate connections by providing dedicatedly edited, impressive profiles (Walther, Van Der Heide, Kim, Westerman, & Tong, 2008). Moreover, they could also choose the way they want to present or distribute their messages on social sites like Facebook (Boyd, 2011). This way they would have greater participation in the social interaction and have more favorable attitudes toward this social medium (Chu, 2011; Smock, Ellison, Lampe, & Wohn, 2011). It not only satisfies users' social needs, but also lets them find greater companionship on the site (Smock, et al., 2011). Hence, perceive control may induce users' bridging and bonding social capital during the communication process on social websites. For this reason, we hypothesize that:

H1a: Perceived control positively affects bridging social capital on social network sites.

H1b: Perceived control positively affects bonding social capital on social network sites.

The second dimension of perceived interactivity, perceived synchronicity, is defined as the degree to which the perception of collaboration technology enables a user to communicate with others quickly (Brown, Dennis, & Venkatesh, 2010). For example, chat rooms could satisfy users' needs through instant response (Liu & Shrum, 2002; Warnick, Xenos, Endres, & Gastil, 2005), and helping them express their needs or consulting activities in real-time (Smock, et al., 2011; Thorson & Rodgers, 2006). The rapid interpersonal information exchange decreases perceived psychological distance (Kemp, Rutter, Dewey, Harding, & Stephenson, 1984) and increases a sense of presence (Steuer, 1992; Tu, 2000). In addition, users can receive the latest information about friends on social network sites. It allows users to receive others' most recent news in their profile, photos, tagged photos or "wall" postings without spatial and temporal obstructs (Boyd, 2008; Boyd & Ellison, 2007). Rapid updates let users experience a greater social presence (Tu, 2000), and users are able to join further in their friends' lives (Boyd, 2008) by providing real-time emotional supports. The instant social interaction makes users feel connected (Papacharissi & Mendelson, 2011), and it also facilitates users to solidify a newly developed social relationship, feel more connected to a greater universe, as well as feel less lonely (Smock, et al., 2011). Therefore, we hypothesize that perceived synchronicity positively affects users' bridging and bonding social capital on social sites, as stated in H2a and H2b.

H2a: Perceived synchronicity positively affects bridging social capital on social network sites.

H2b: Perceived synchronicity positively affects bonding social capital on social network sites.

The third dimension of perceived interactivity, perceived surveillance, is defined as the degree to which the perception of an outside party could monitor or intercept the message carried by a medium (Barry & Fulmer, 2004; Potosky, 2008). It also means the public degree of the messages during the communication process. When the communication medium is more public, users would tend to take a protective strategy, and they would like to monitor their responses regarding the anonymity of the medium (Barry & Fulmer, 2004; Potosky, 2008). Hence, it may result in higher social pressure (Barry & Fulmer, 2004) due to the increased publicness, and it may lead to negative reactions from the users (Potosky, 2008) when using the medium. They would be careful about their actions on the medium, and would be more likely to spend a greater time planning more "appropriate" actions and feedbacks (Walther, Van Der Heide, Hamel, & Shulman, 2009; Walther et al., 2008). As a result, it is harder for them to become involved to a greater extent and immerse themselves in the social interaction. Facebook has been struggling with the information sharing openness issues. People need to sacrifice some of their social information on the site in order to widen their social spheres; it is the general sharing nature of this social medium. For example, users need to share some of their personal information on their profile so that people can recognize and initiate a social relationship with them more easily. Thus, when perceived surveillance increases, we believe users will tend to protect themselves, and watch their responses because of the social pressure (Barry & Fulmer, 2004). As people are more cautious when sharing information, their shared expressions and connection strategies will be more careful (Potosky, 2008). The degree of participation would be lower, and so would the extent of emotional support or encouragement exchange on the site. And users will be unlikely to feel connected or find companionship. Therefore, perceived surveillance may decrease users' bridging and bonding social capital on social websites during the communication process, as hypothesized in H3a and H3b.

H3a: Perceived surveillance negatively affects bridging social capital on social network sites.

H3b: Perceived surveillance negatively affects bonding social capital on social network sites.

The fourth dimension of perceived interactivity, perceived social bandwidth, is defined as the degree to which a person believes a certain communication medium will be able to convey information based on the social characteristics that it possesses, including social identity and social relationship information (Barry & Fulmer, 2004). Social bandwidth enables users to recognize and connect to others who have common experiences. It is possible for them to immerse themselves in the social interaction, producing more cognitive activities to make them feel closer to these like-minded people (Subrahmanyam, Reich, Waechter, & Espinoza, 2008). For example, physical information on

Facebook, such as the common points or experiences that link up users (Boyd, 2008; Lampe, Wohn, Vitak, Ellison, & Wash, 2011), or social relationship information on Facebook, like revealing mutual friends among users (Ellison, Steinfield, & Lampe, 2007), helps users recognize others with the same background. Sharing information on online personal pages, like people's "walls" gives users an opportunity to distribute their rich social information with various presentations. In addition, others can freely view friends' profiles, like relationship status photos about themselves or with others (Ellison, Steinfield, & Lampe, 2006). With respect to abundant social information on the medium, people can easily recognize others' social identities, such the common experiences between users and the person. It provides users with a great chance to generate more social interactions with those they share interests with, and turning more ephemeral and temporary acquaintanceships into more solid ones. It satisfies users' social needs and makes them feel connected to the wider world (Smock, et al., 2011). It also influences their psychological beings and relieves their loneliness (Boyd, 2011; Lee & Ma, 2012). Perceived social bandwidth may induce users' bridging and bonding social capital during the communication process on social websites. For this reason, we hypothesize that:

H4a: Perceived social bandwidth positively affects bridging social capital on social network sites.

H4b: Perceived social bandwidth positively affects bonding social capital on social network sites.

In addition, Donath and Boyd (2004) argued that social network sites could raise the number of weak ties for a user because the sites allowed them to maintain these ties more easily. When people received messages from Facebook friends, they could increase their bridging social capital (Bruke, Kraut, & Marlow, 2011). Nevertheless, when it comes to strong ties, according to the media multiplexity effect (Boyd, 2011; Haythornthwaite, 2005), people usually have multiple ways to connect to close social relationships. Thus, communicating through social sites like Facebook might not be the only channel. These intimate friends are worthwhile for them to keep in touch with regardless of the cost, and they can have a deeper talk through the telephone or face-to-face. Hence, we can infer that:

H5: Perceived interactivity (control, synchronicity, surveillance, and social bandwidth) has a greater influence on bridging than bonding social capital in online social network.

2.2 The mediating effects of communication quality and social relationship support

The second objective is to examine how four dimensions of perceived interactivity (control, synchronicity, surveillance, and social bandwidth) affect users' bridging and bonding social capital through communication quality and social relationship support. *Communication quality* is defined as aspects like the accuracy, the timeliness, the adequacy, and the credibility of communication when people exchange information (Daft et al., 1987; Spralls et al., 2011). When having an online meeting or participating in an online project discussion, users would evaluate the communication more positively if they realized that it was possible for them to coordinate or synchronize the resources in time and comprehensively. Also, it makes more perfect than perfect if users know that they can provide high extent in symbolic content that the symbolic meaning lets them to present and interpret the shared content appropriately and accurately. In addition, *social relationship support* is defined as the ability for users to form, maintain, and solidify their interpersonal relationships on the social site (Kim et al., 2011). Facebook helps users build and enhance social relationships regardless of whether they are acquaintances or close friends, but it influences the former significantly more than the latter (Ellison et al., 2007). Users can stay in touch with old friends by creating a group on Facebook, like creating an alumni page after graduating from high school (Ellison, et al., 2007). By utilizing the functions of Facebook, users can strengthen friendships after a high-school or college reunion, and obtain or give others emotional support on the site in the future.

Communication quality refers to whether the information sharing is timely, accurate, and rich (Spralls, et al., 2011). Communication quality allows users to broadcast expressive information sharing to a wide range of like-minded people (Smock, et al., 2011), such as communicating with others by contributing information on a Facebook Group. In this way, other users may interpret statements as a more reliable signal about their tastes (Donath, 2007), and increase a sense of group membership. It facilitates user relationship initiations and management. Users will have a greater probability of building up or strengthening social ties with acquaintances that have the same interests but who come

from different backgrounds. Thus, they are able to connect themselves to a large group as well as accumulate abundant social capital (Ellison, et al., 2006). Likewise, communication quality can influence the relationships between intimate friends. As mentioned above, communication quality refers to whether the information sharing is timely, accurate, and rich (Spralls, et al., 2011). These expressive social interactions let users clearly convey their genuine opinions with little delay, and make them feel less lonely (Gangadharbatla, 2008). Thus, it helps the two parties keep in touch or maintain the pre-existed relationship by overcoming geographic and temporal problems, and it intensifies the emotional closeness between them (Farrow & Yuan, 2011). For example, close friends can transmit messages about their sincere suggestions and wholehearted emotional support with abundant expressions in time (Rodgers & Chen, 2005) to their dearest friends when they face a critical decision or experience an important event, and accumulate a friendship that barely decayed. That is, we argue that the four dimensions of perceived interactivity enhance users' level of communication quality, which further mediates the effects onto their bridging and bonding social capital, as stated in hypotheses H6a and H6b.

H6a: The effects of perceived interactivity (control, synchronicity, surveillance, and social bandwidth) onto bridging social capital on social network sites are mediated by communication quality.

H6b: The effects of perceived interactivity (control, synchronicity, surveillance, and social bandwidth) onto bonding social capital on social network sites are mediated by communication quality.

Social relationship support is when the communication medium facilitates users finding and providing others with companionship, emotional support, and encouragement. Namely, users can form, maintain, and solidify their interpersonal relationships on the social site much more easily (Kim, et al., 2011). Social websites help users turn transient acquaintanceships into more valuable ones without a great deal of cost regarding spatial and temporal obstructs (Cummings, Butler, & Kraut, 2002), by adding someone they met at a party and would like to know more as a friend on Facebook (Ellison, et al., 2007). They can intensively utilize the social site, and keep in contact with these acquaintances in case they want to see them again or need their help in the future (Lewis & West, 2009). Therefore, the intensity with which users use social network sites can open up their social spheres and help them build up a greater number of social ties with little cost (Ellison, Steinfield, & Lampe, 2011). Moreover, social sites help people sustain the precious social relationship with little cost, and they provide them with an alternative method of communication in order to give their emotional support or critical advice necessary without temporal and spatial obstructs whenever their close friends face a life struggle or hardship (Boyd, 2011; Parks, 2007). They can further get the benefit of accumulating these pre-existed but especially important social relationships. That is, we argue that the four dimensions of perceived interactivity increase users' level of social relationship support, which further mediates the effects on their bridging and bonding social capital, as stated in the hypothesis H7a and H7b.

H7a: The effects of perceived interactivity (control, synchronicity, surveillance, and social bandwidth) onto bridging social capital on social network sites are mediated by social relationship support.

H7b: The effects of perceived interactivity (control, synchronicity, surveillance, and social bandwidth) onto bonding social capital on social network sites are mediated by social relationship support.

The above hypotheses regarding the effects of interactivity are illustrated in Figure 1. In conclusion, we argue that the perceived interactivity (control, synchronicity, surveillance, and social bandwidth) affects users' bridging and bonding social capital. Moreover, we also argue that the relationships between four perceived interactivity dimensions as well as bridging and bonding social capital are mediated by communication quality and social relationship support.

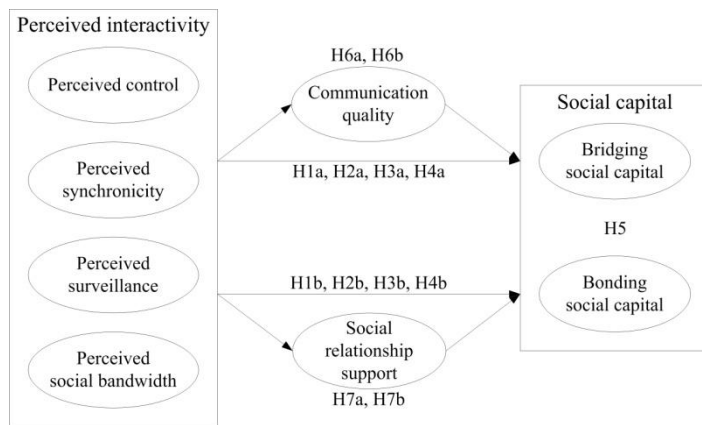


Figure 1. The proposed framework of the research

3. METHODOLOGY

This study adopted the survey method to test the proposed hypotheses. According to the research goal, our study focused on user-to-user interactivity on Facebook. Respondents needed to evaluate their perception of communication quality and social relationship support and two different kinds of social capitals – bridging and bonding social capitals, control, synchronicity, surveillance, and social bandwidth through the measurements from the previous research. In addition, they were also asked to answer the questions about their general Facebook experiences of motivation and social medium usage.

3.1 Participants

This study recruited a total of 422 valid student samples. There were 171 males (40.5%) and 251 females (59.5%). We compared our data against the data of the Taiwan Institute for Information Industry survey (2011) to assess the external validity of our sample. The distributions of age (20 years old or below: 25.1%; 21-30 years old: 73.5%; 31-40 years old: 1.2%; 41 years old or above: 0.2%) and education (high school or below: 0%; vocational school: 0.3%; university or college: 81.0%; master degree or above: 18.7%) in our sample are different from the results of the online user demographic report of MIC survey in 2011, especially in the respects of age (20 years old or below: 7.1%; 21-30 years old: 48.2%; 31-40 years old: 29.9%; 41 years old or above: 14.8%) and education (high school or below: 13.3%; vocational school: 15.5%; university or college: 54.7%; master degree or above: 16.5%). The results suggest that our sample is younger and better educated. However, the results of user motivations and social medium usages are similar (see Table 1). Thus, it shows that our finding has enough external validity and that we can go on further analysis.

3.2 Measurements

This research adopted the measurements of the constructs from past studies: perceived control scale developed by Wu (1999), Chung, Park, Wang, Fulk, and McLaughlin (2010), and self-developed; the scale of perceived synchronicity by Brown et al. (2010); the scale of perceived surveillance by Pike, Bateman, and Butler (2009); the scale of perceived social bandwidth by Carlson and Zmud (1999); the scale of communication quality Burke and Chidambaram (1999); the scale of social relationship supported by Kim et al. (2011); and the scales of bridging and bonding social capital by Chang and Zhu (2012). In addition, this study used a seven-point Likert scale to measure all items to show the participants' agreement or disagreement regarding the items, with 1 representing "Strongly Disagree" and 7, "Strongly Agree."

Demographic information	Our sample	MIC survey
Motivation (multiple)		
I use social mediums to connect to my family and friends	92.4%	71.3%
I use social mediums to track my favorite brands	24.2%	22.2%
I use social mediums to track celebrities I have interest in	33.4%	24.0%
I create social mediums groups with friends, discussing issues in the group	76.8%	17.6%
I use social mediums to track particular media	18.5%	15.7%
I have no such activity on social mediums	1.4%	0%
Social medium usage		
I sometimes update my status on social mediums	60.0%	50.9%
I often update my status on social mediums	36.7%	40.9%
I have no such activity on social mediums	3.3%	8.2%

Table 1. Demographic data analysis

3.3 Procedure

This study collected data from three northern Taiwan universities: National Taiwan University, National Taiwan University of Technology and Science, and National Chengchi University. The participants were directed to fill in the paper-and-pencil questionnaire during the 10-minute break of the class. First, we introduced the general objective of this survey and assured them that all the private information they submitted would not be disclosed. Second, the participants were asked to evaluate their communication quality and social relationship support on Facebook. Third, they needed to assess their bridging and bonding Facebook social capitals. Fourth, they responded some questions about their perceptions of control, synchronicity, surveillance, and social bandwidth on Facebook. Finally, we asked them to fill out their demographic information and Facebook usage behavior.

4. RESULTS

We first evaluated the validity and reliability of the measurements with Cronbach's α , average variance extracted (AVE), and composite reliability (CR). Second, we adopted SEM analysis to test the research model and mediating effect of communication quality and social relationship support. All of the empirical results were in the following sections.

4.1 Common Method Variance (CMV) Test

According to Peng, Kao, and Lin's (2006) study, Harman's one-factor test could be used to detect the serious degree of common method variance. In order to test common method variance, we adopted Harman's one-factor test which is the most common method to process this problem. If the factor analysis extracted only one factor or the variance explained of the first principle component was higher than 50% in the unrotated condition, this study has the problem of common method variance (Mattila & Enz, 2002). The results showed that we extracted twelve factors and the cumulative variance explained was 66.54%. The variance explained of the first component was 25.49% which was not higher than 50%. That is, this study did not have the serious degree of common method variance.

4.2 Reliability and Validity

First, we adopted an exploratory factor analysis (EFA) with varimax rotation to eliminate low loading items in our scale. According to EFA results, we dropped 9 items which were from the perceived control scales (one item, factor loading < .4), perceived surveillance (one item, factor loading < .1), communication quality (three items, factor loading < .4), and bridging social capital (four items, factor loading < .4) after the pre-test. Second, we conducted a confirmatory factor analysis (CFA) to evaluate the reliability and validity of the measurements. The results showed that the factor loadings of all items were greater than .50 (see Table 2) which was deemed significant (Chin, 1998). Similarly, the values of Cronbach's α for all measurement scales, ranging from .76 to .85 indicated acceptable reliability (Nunnally, 1978) of the measurements. In addition, average variance extracted (AVE) and composite reliability (CR) was adopted to assess convergent validity. The values of average variance

extracted (AVE) ranged from .52 to .71 for all measurement scales. Average variance extracted (AVE) values of all constructs exceeded .50. Moreover, the composite reliability value range was from .84 to .89. All composite reliability (CR) values were all over .70, suggesting acceptable convergent validity of the measurements used in this study (Fornell & Larcker, 1981). We also evaluated the discriminant validity of the constructs. Discriminant validity was determined by comparing the squared root of the AVE estimate for each construct with the correlations between constructs (Fornell & Larcker, 1981). The numbers in a diagonal line was the squared root of average variance extracted (AVE) estimate for each construct. In table 3, all numbers in the diagonal line were higher than the correlations between respective constructs. Therefore, the discriminant validity levels of all constructs were satisfactory (Fornell & Larcker, 1981). Please note that the four dimensions of interactivity assessed here are consumer perceptions of the respective concepts.

Items	Standardized loading	AVE	CR	α	Items	Standardized loading	AVE	CR	α
Bonding social capital		.62	.89	.85	Communication quality		.52	.84	.76
Bond1	.74				CommQ1	.52			
Bond2	.66				CommQ5	.72			
Bond3	.79				CommQ6	.60			
Bond4	.81				CommQ7	.52			
Bond5	.65				CommQ8	.81			
Bridging social capital		.55	.88	.84	Perception of control		.52	.87	.82
Bridg1	.72				Con1	.70			
Bridg2	.77				Con2	.73			
Bridg3	.75				Con3	.75			
Bridg4	.73				Con4	.56			
Bridg9	.57				Con5	.60			
Bridg10	.53				Con7	.58			
Social relationship support		.61	.86	.78	Perception of surveillance		.62	.87	.81
SocRel1	.78				Surv1	.79			
SocRel2	.78				Surv2	.88			
SocRel3	.48				Surv3	.66			
SocRel4	.72				Surv5	.55			
Perception of social bandwidth		.67	.89	.83	Perception of synchronicity		.71	.88	.80
SocBan1	.70				Syn1	.73			
SocBan2	.78				Syn2	.80			
SocBan3	.75				Syn3	.74			
SocBan4	.77								

Notes: All t-values are significant ($p < .001$); $\chi^2 = 1749.798$ ($p = .00, df = 601$), $\chi^2/df = 2.91$, GFI = .809, AGFI = .776, RMSEA = .070, CR: construct reliability, AVE: average variance extracted, α : Cronbach's α

Table 2. Results of reliability and convergent validity

Variables	1	2	3	4	5	6	7	8
1. Communication quality	.72							
2. Social relationship support	.43	.78						
3. Bridging social capital	.38	.62	.74					
4. Bonding social capital	.27	.28	.37	.79				
5. Perception of control	.31	.26	.32	.30	.72			
6. Perception of synchronicity	.45	.44	.45	.34	.37	.84		
7. Perception of surveillance	.20	.24	.19	.19	.27	.30	.79	
8. Perception of social bandwidth	.38	.43	.47	.33	.38	.45	.40	.82

Table 3. Results of discriminant validity: Extracted AVE

4.3 The Direct Effects Test on Structural Equation Model (SEM) Analysis

As our sample size was large enough, we used LISREL8.70 to assess the research model. According to Table 4, the goodness of fit statistics was acceptable even though the GFI values were .870. As Table 5 showed, the effects of perception of control, synchronicity, surveillance, and social bandwidth on bridging social capital were significant (control: $\beta = .101, p < .10$; synchronicity: $\beta = .187, p < .05$; surveillance: $\beta = -.133, p < .05$; social bandwidth: $\beta = .267, p < .01$). Therefore, perception of control, synchronicity, and social bandwidth were positively related to bridging social capital whereas surveillance was negatively related to bridging social capital. Thus, Hypothesis 1a, 2a, 3a, and 4a

were supported by the empirical results of this study. Moreover, the effects of perception of control, synchronicity, and social bandwidth on bonding social capital were also significant (control: $\beta = .158$, $p < .05$; synchronicity: $\beta = .180$, $p < .05$; social bandwidth: $\beta = .218$, $p < .01$). Hence, perception of control, synchronicity, and social bandwidth were positively related to bonding social capital. That is, Hypothesis 1b, 2b, and 4b were strongly supported whereas Hypothesis 3b was not supported by the empirical results of this study. According to the above results, we found that perceived surveillance did not have an influence on bonding social capital whereas it had a negative effect on bridging social capital. Furthermore, perceived control, synchronicity, and social bandwidth could raise users' bridging and bonding social capital. Thus, people can cultivate their online social capital through interactivity on social network sites. In addition, the explanatory power of bridging social capital ($R^2 = .550$) was higher than bonding social capital ($R^2 = .236$). It revealed that four dimensions of perceived interactivity could enhance more bridging social capital than bonding social capital. The results also displayed that the explanatory power of communication quality ($R^2 = .386$) and social relationship support ($R^2 = .415$) had strong effects. Based on the findings, they also suggested that communication quality and social relationship support may be a valid mediator for the effects of perceived interactivity onto bridging and bonding social capital. We will further assess the mediating effects of communication quality and social relationship support by way of SEM analysis in the following section.

Indicators	χ^2 / d.f.	GFI	AGFI	SRMR	CFI	RMSEA	NFI	NNFI	IFI
Suggested value	< 3	> .9	> .8	< .1	> .9	< .08	> .9	> .9	> .9
Results	1191.682/578 = 2.062	.870	.842	.059	.968	.049	.940	.963	.968

Table 4. Goodness of fit statistics results of SEM analysis

Independent variables	Dependent variables									
	CQ		SRS		Bridging social capital			Bonding social capital		
	Direct effect	Direct effect	Total effect	Direct effect	CQ Indirect effect	SRS Indirect effect	Total effect	Direct effect	CQ Indirect effect	SRS Indirect effect
Control	.112 ⁺ (.061)	.005 (.058)	.105 ⁺	.101 ⁺ (.056)	.002	.002	.163**	.158* (.063)	.005	.0003
Synchronicity	.425** (.078)	.430** (.069)	.372**	.187* (.078)	.006	.179**	.222**	.180* (.086)	.020	.022
Surveillance	-.048 (.065)	-.026 (.062)	-.145*	-.133* (.061)	.001	.011	-.045	-.042 (.067)	.002	.0001
Social bandwidth	.235** (.072)	.315** (.068)	.401**	.267** (.070)	.003	.131**	.245**	.218** (.076)	.011	.016
CQ				.014 (.071)				.047 (.079)		
SRS				.417** (.076)				.051 (.079)		
R-square	.386	.415	.550				.236			

Note: () Standard deviation; + $p < .10$; * $p < .05$; ** $p < .01$; CQ: Communication quality; SRS: Social relationship support.

Table 5. Results of SEM Analysis

4.4 The Mediating Effects Test on Structural Equation Model (SEM) Analysis

To test Hypothesis 6 and 7, we used the SEM analysis mentioned in previous studies (Baron & Kenny, 1986; Iacobucci, Saldanha, & Deng, 2007) to test the mediating effect of communication quality and social relationship support. Iacobucci et al. (2007) suggested that adopting SEM analysis could simultaneously consider the whole model and relationships among constructs. Therefore, it would become a more ideal method than adopting multiple regression analysis step by step. There is no mediation effect when either the path between the independent variable and mediator or mediator and the dependent variable were not significant (or if both are not significant). Then, we calculated the z-value of each path according to the formula in Iacobucci et al. (2007). The mediating effect is complete when z-value is significant and the direct path is not. On the contrary, the mediating effect is partial when both z-value and the direct path are significant. Moreover, the mediating effect is also

partial when the z-value is not significant but the direct path and mediated path are significant. Based on Table 5, the results showed that communication quality had no influences on bridging ($\beta = .014$, *n.s.*) and bonding social capital ($\beta = .047$, *n.s.*). Therefore, communication quality had no mediation effect. However, social relationship support impacted bridging social capital. Moreover, the effects of perception of synchronicity and social bandwidth on social relationship support as well as z-value (synchronicity: z-value = 4.118, $p < .01$; social bandwidth: z-value = 3.540, $p < .01$) were significant. That is, social relationship support partially mediated the effects of perception of synchronicity and social bandwidth onto bridging social capital. Thus, Hypothesis 7a was partially supported whereas Hypothesis 6a, 6b, and 7b were not supported by the empirical results of this study. This study found that the social relationship support played mediating roles between two dimensions of perceived interactivity (i.e. synchronicity and social bandwidth) and bridging social capital.

As mentioned above, this study found that three out of four dimensions of perceived interactivity (control, synchronicity, and social bandwidth) positively affected bridging and bonding social capital whereas perceived surveillance negatively influenced bridging social capital. Furthermore, perceived interactivity had stronger effects on bridging than on bonding social capital. In addition, the relationships between the two dimensions of perceived interactivity (synchronicity and social bandwidth) and bridging social capital could be mediated by social relationship support.

5. CONCLUSION, MANAGERIAL IMPLICATIONS, LIMITATIONS AND FUTURE RESEARCH

This study examines how the four dimensions of perceived interactivity affect users' bridging and bonding social capital. The empirical results revealed that bridging and bonding social capital can be cultivated by interactivity on social network sites. Moreover, the four dimensions of interactivity have different degrees of importance. The perceptions of control, synchronicity, and social bandwidth increased both user bridging and bonding social capital. However, perceived surveillance decreased users' bridging social capital. Even though the perception of interactivity has difference results, it has stronger effects on bridging social capital than on bonding social capital. On the other hand, bridging social capital can also be built by the perceptions of synchronicity and social bandwidth through social relationship support.

Synchronicity is an important feature no matter whether we are in the age of Web 1.0 or Web 2.0. Moreover, it has become more refreshing after being combined with newly developed concepts like being brought ubiquitously by mobile phones or other mobile devices. It is a common phenomenon that people connect to Internet by their smart phones, and initiate instant social interactions with their communication partners. Also, social bandwidth brings a breakthrough to website users. It doesn't provide them with information like the content on online shopping pages or product catalogs, but with rich cues about someone's social identity and social relationships. On account of the high extent of social bandwidth, users can recognize each other's identity, and start a communicating or collaborating right away (Tanis & Postmes, 2003). Regarding the media richness theory, social site users can reach a level of communication closer to face-to-face conditions today when combining both synchronicity and social bandwidth (Trevino, Lengel, & Daft, 1987). Furthermore, control provides enough freedom to choose what content to read and who to communicate with. It may help users lower communication cost and have more time to interact with online friends. Today, the Internet is not a plain, insufficient communication medium anymore. The fast supply of rich social cues within the interactivity a reality to the social interaction. Moreover, the common use of mobile phones magnifies the effect because users are able to connect to the Internet and share information with greater convenience. These modern interactivity features are not expected by users, and their existence delights them, which bring an apparent influence on coefficients between them and the two kinds of social capitals. However, surveillance allows users to broadcast their opinions and locations through pages like blogs (Consolvo, Smith, Matthews, Lamarca, Tabert, & Powledge, 2005). Through they may still have privacy concerns. Therefore, it has a negative effect on bridging capital.

Moreover, our finding is consistent with the earlier findings of Ellison and their colleagues that Facebook would have a more profound influence on affording latent and weak tie creation and management than strong ties (Ellison, et al., 2007; Ellison, et al., 2011). People use social sites as

supplements to their social relationship management, and increasing the frequency of lightweight contact with a broad set of acquaintances (Pempek, Yermolayeva, & Calvert, 2009; Steinfield, Ellison, & Lampe, 2008; Subrahmanyam, et al., 2008). It costs them little effort to give emotional support to extensive weak ties, which is more than a simple information exchange (Cummings, et al., 2002). However, in order to contact close friends, one can combine diversified communication media (Boyd, 2011; Haythornthwaite, 2005), and social sites like Facebook are not the only choice. For instance, a college student may have a face-to-face talk with his college sworn follows or through mobile phones. There is no need to rigidly adhere to CMC. However, on social sites, the college student may stay in touch with some acquaintances because it is rare to meet them or have a face-to-face chat, and the rich resource like social cues gives a good supplement to get to know each other further and initiate further friendship development (Tanis & Postmes, 2003). In addition, this study also found that the perceived interactivity on social sites like Facebook has a primarily indirect effect on bridging and bonding social capital, which is significant when being mediated by communication quality and social relationship support. They both play important mediation roles for social capital development. Thus, Web 2.0 interactivity features should support users to express more about themselves and participate more in online social interactions.

As communication technology has grown so rapidly, consumers now enjoy many of these fruitful results. According to our findings, some newly developed concepts and functions did impress these technology users a great deal, and they brought out more significant effects on users' social capitals compared to some traditional interactivity features that have existed for a while, like control and synchronicity. People now will consider these features and conditions as one of the essential parts when they have a mediated communication. They don't consciously sense these things' presence, but they would get annoyed when they don't function well. It strikes mobile phone user when finding out they can connect to social sites and initiate an instant communication with the aid of the phone, but the usually upset when they cannot freely share or view what they want to say or read on the site which would lead to a huge lost to the service provider.

Nowadays, service providers not only need to supply a steady communication environment that enables customers to read and share news according to their desires, but also services that can promote their social ties management. Today, users utilize the CMC for more than information seeking usage, and it has been a growing trend to apply CMC on social relationship support usage when combining it with mature technology development like wireless Internet and smart phones. Thus, synchronicity has been turned into a vigorous interactivity feature with a more contemporary look. When putting synchronicity and social bandwidth together, users can start mediated social interactions similar to face-to-face at anytime and anyplace, even during the 90 seconds waiting at a traffic light. These interactivity services bring something to users that they have hardly been able to experience in the past. Modern service providers may consider adding a little bit of creativity to make applications regarding to these concepts, and shifting the extensive CMC demands into huge revenue.

There are some limitations in this study. First, we conducted this study primarily in student samples. Second, participants evaluated their perceived interactivity, communication quality, social relationship support and social capitals on Facebook. It can be extended to other occupations or nationality groups since social network sites get more and more prevalent these days. In addition, researchers can expand it to other social sites like Google⁺ or Twitter. In addition, they can increase interactivity features they would like to investigate in this study when considering the swiftly changing technological environment.

Future studies can further put this study in use of directions about commercial usage. Marketing researchers may be interested in how to develop a marketing strategy on social network sites, or how to manage good word-of-mouth (WOM) for the site. For example, lots of Taiwanese enterprises create fan pages on Facebook, and users can receive abundant notifications about their recent activities such as sales. With the use of users' personal networks, news can be spread to a much larger audience, and the marketing department can obtain a great result more easily. Also, managers would like to find out whether they can apply social network sites on internal and external communication, and if this application can boost enterprises' efficiency and effectiveness.

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