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Smart Device Interactivity's Impact on Value Co-creation in the Sport Industry

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Resumen

El propósito de este estudio es investigar el impacto que tienen los dispositivos inteligentes en la interactividad del cliente y la co-creación de productos valiosos en la industria deportiva a través de la implementación del capital social y la eficacia colectiva. Una muestra de 262 estudiantes participaron en este estudio, y un modelo de ecuaciones estructurales (SEM por sus siglas en inglés) fue calculado para medir la relación entre las variables en el modelo conceptual. Los resultados revelaron que la interactividad que consiste de control del usuario, sensibilidad, y sincronización tiene un impacto significativo en el capital social. Además, ambas la interactividad tecnológica y el capital social son asociados positivamente con la eficacia colectiva. Finalmente, la eficacia colectiva tiene una influencia positiva en la co-creación de productos de valiosos, pero el capital social no aparenta afectar directamente la co-creación de productos de valor. Basado en estos resultados, este estudio sugiere la necesidad de aprovechar las nuevas plataformas que apoyen la co-creación de productos valiosos con los clientes en un ambiente de mercadeo constantemente cambiante.

Palabras clave: Dispositivos inteligentes, interactividad, co-creación de productos valiosos, eficacia colectiva, capital social.

Abstract

The purpose of this study is to investigate the impact of smart device's interactivity on customer value co-creation in the sports industry through bridging social capital and collective efficacy. A sample of 262 students participated in the study, and a structural equation modeling (SEM) was carried out to measures the relationship between variables in the conceptual model. The results revealed that interactivity consisting of user control, responsiveness, and synchronicity had a significant impact on bridging social capital. In addition, both technological interactivity and

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bridging social capital were positively associated with collective efficacy. Lastly, collective efficacy had a positive influence on co-creation value, but bridging social capital did not appear to directly affect co-creation value. Based on these results, this study suggests the need to take advantage of new platforms that can build value co-creation with customers in the rapidly changing marketing environment.

Keywords: Smart devices, interactivity, value co-creation, collective efficacy, social capital.

Introduction

As we entered the 21st century, the use of a variety of portable smart devices allowed more advanced portable computing ability and instantaneous connectivity (Chen, Yen & Chen, 2009). Additionally, these devices grant easy access to information on the go (Lee, 2005) and real-time information exchanges anywhere at anytime (Hennig-Thurau et al., 2010). The smartphone is the most recent innovation in portable smart devices (Oulasvirta, Rattenbury, Ma & Raita, 2012). Its growth in the use continues to increase. As of 2012, 54.9 percent of Americans own a smartphone (Nielsenwire, 2012). Microsoft Tag forecasts that Internet usage on smartphones will exceed usage on desktops in the near future (Richmond, 2011).

In line with technology changes, there are changes in the marketing environment. Marketing management has evolved from a mass-market perspective to a customer-centric perspective (Sheth, Sisodia & Sharma, 2000). Consumers are not longer passive recipients of innovation, but partners in the innovation process. The direction of interaction between the firm and the customer is also evolving to a two-way interactive dialogue for value co-creation (Prahalad y Ramaswamy, 2004a; Sawhney, Verona & Prandelli, 2005).

Consumers nowadays play a leading role influencing important decisions, such as manufacturing, distribution, and the service process. With this interaction, firms can progressively learn about their consumers, and learn from them (Sawhney et al., 2005). According to Lin and Huang (2006), individual customers yielded value and services for and from each other by participating in communities of customers. In addition, the information provided by a group of consumers is perceived as more timely, complete, and personalized by their peers than the information provided by commercial media (Schwabe & Prestipino, 2005). Therefore, sport organizations would do well

to implement strategies to allow consumers to participate more actively in value co-creation (see Sigala, 2009).

The current high use of smart devices to exchange information instantly (Hennig-Thurau et al., 2010) would allow organizations to glean the benefits of more active consumers at a faster rate. Despite the importance of interactivity in smart devices, research is still quite insufficient. The primary purpose of this study is to address this gap in the literature by examining how interactivity in smart devices influences customer value co-creation in the sports industry.

Theoretical framework

New Media Environment in Modern Society

New media is a broad term used to describe diverse forms of communication through digital devices with Internet access, such as computers, smart devices, etc. (Smith, 2005). Introduced by McLuhan, the term new media was used to distinguish the digital media from the analogue media from the 1980's, such as publishing, print communication and so on (Hendricks, 2010; Peters, 2009). Nowadays, the term new media has a more complicated meaning than ever before (Hendricks, 2010; Manovich, 2002).

Hennig-Thurau et al. (2010) list the properties of new media as a way to advance our understanding of it: Digital, pro-active, visible, real-time and memory, ubiquitous, and networks. Digital is the key characteristics of new media, not requiring costs to produce additional copies. Furthermore, individual users post without difficulties and draw international attention (Hennig-Thurau et al., 2010). Pro-active refers to the consumers as provider of innovative ideas regarding comments, product ratings and reviews, idea sources, or beta testers (Hennig-Thurau et al., 2010; Hoyer, Chandy, Dorotic, Krafft & Singh, 2010; Krishnamurthy, 2009). Visibility refers to the observability and traceability of consumer activity by other consumers or by companies. Real time refers to the accessibility to content as soon as it is created, and memory refers to the availability of the content well after it has been created. User's ability to access and post information, opinions, reviews and impressions while shopping for a product or watching a game is what is referred to as the ubiquitous characteristic of new media (Hennig-Thurau et al., 2010). A final characteristic is the consumers' ability to create networks by participating in social media, page creation, and

sharing stories or pictures (Gordon, 2010; Hennig-Thurau et al., 2010; Libai et al., 2010). As a result, new media can be considered a viable platform for customers to engage in interactive dialogue with both other customers and organizations and the use of smart devices could be one avenue to maximize these interactions.

Social network services have been effectively used by a large number of sport organizations to communicate with their customers or fans. Facebook, Twitter, and Blogs used by 30 Major League Baseball (MLB) franchises, 32 National Football League (NFL) teams, 30 National Basketball Association (NBA) teams, and 30 National Hockey League (NHL) teams. Individual athletes also attract large followings. According to Tweeting-Athletes.com (2012), 7217 NFL, NBA, MLB, NHL, and soccer players use Twitter to interact with their fans. In addition, sports news channels use blogs to interact with fans (Martin, 2012). As such, new media is considered as a core platform where sports organizations, teams, and individual athletes interact with their fans or customers (Flew & Smith, 2011). Through portable smart devices, new media is facilitating interactivity between consumers and with organizations (Lee & Lan, 2007).

This rapid growth of new media requires changes in the way organizations have traditionally operated (Hennig-Thurau et al., 2010). Organizations recognize the need for platforms to facilitate value co-creation with customers in the virtual environment (Sawhney et al., 2005), and focus on interactivity and management of value co-creation with their customers (Prahalad & Ramaswamy, 2004a).

Interactivity

Interactivity is defined as "the relationship between two or more people who, in a given situation, mutually adapt their behavior and actions to each other" (Jensen, 1998, p. 188). In marketing it is an important variable that has played a supportive role in relationship with customers (Hoffman & Novak, 1997; Hoffman, Novak & Chatterjee, 1995; Sheth & Paravatiyar, 1995) and advertising effectiveness (Hoffman & Novak, 1996; Lee, 2005; Liu & Shrum, 2002). Current interactivity research focuses on reciprocity and participation, mutual action, action-reaction, and two-way communication (Kioussis, 2002; Johnson, Bruner, & Kumar, 2006; Rafaeli, 1988). Other studies have focused on interactivity as an aspect of technology or a system function (Steuer, 1992; Markus, 1990). Yet another strand of studies have integrated both perspectives of interactivity

(Domagk, Schwartz, & Plass, 2010; Morris & Organ, 1996). McMillan (2002) suggested the need for investigating new approaches that can explain interactivity in new media as the technology addition to human communications brought about many changes (Chilcoat & DeWine, 1985; McMillan, 2002).

Interactivity dimensions in new media. Interactivity in new media has been classified in three types: user-to-user, user-to-documents, and user-to-systems (Kayany, Wotring, & Forrest, 1996; McMillan, 2002; Szuprowicz; 1995). Research articles focusing on user-to-user interactivity in new media investigate interactivity between users in computer-mediated communication (CMC; Domagk et al., 2010; Hoffman & Novak, 2000; Johnson et al., 2006; Massey & Levy 1999; McMillan, 2002; McQuail, 2005). Research regarding user-to-documents interactivity asserts users interact with both, contents and people who create those contents (Cho & Leckenby, 1997; Massey & Levy, 1999; Jensen, 1998; McMillan, 2002). The last form of interactivity in the new media environment is user-to-systems interactivity that has focused on the interaction between human and the new media systems such as a computer, a mobile device, or other type of systems (Burgoon et al., 2000, 2002; Hanssen, Jankowski & Etienne, 1996; Huhtamo, 1999; McMillan, 2002; Murray, 1997; Reardon & Rogers, 1998). This study focuses on user-to-system; the system being smart devices.

Technological interactivity components. Many researchers have conceptualized interactivity and examined its components of interactivity consisting of a multi-dimensional concept in diverse fields (see Johnson et al., 2006; Kiouisis, 2002; Lee, 2012; Zafiroopoulos, Vrana & Karystinaiou, 2007). These various components refer to user-to-user, user-to-documents, and user-to-systems interactivity. This study brings into focus only user-to-systems interactivity as a mediated technological environment through smart devices. Therefore, only components associated with machine interactivity among the components examined by researchers in diverse fields are used as variables. Namely, user control, responsiveness, and synchronicity were included.

User control refers to individuals controlling the timing, content, and sequence of communication; adding information; and maximizing efficiency (Dholakia, Zhao, Dholakia & Fortin, 2000; Heeter, 1989). Responsiveness is related to the reactions to earlier messages, and the extent to which messages in a series are related to each other (Dholakia et al., 2000; Rafaeli & Sudweek, 1997).

Users measure these responses directly or indirectly, for example as responses to Emails or changes in a website based on user feedback respectively (Dholakia et al., 2000). Finally, synchronicity refers to the speed of the interactions (Dholakia et al., 2000, Steuer; 1992). Users perceive greater interactivity when responses are faster (Dholakia et al., 2000).

Smart devices may have an effect in these interactivity dimensions in new media. Information can be spread quickly and widely through mobile devices (Kim, Park & Lee, 2010). The properties of mobile devices improve Internet based interactivity (Lee, 2005). Therefore, positively influencing user control and responsiveness of technological interactivity through ubiquitous connectivity and user control (Lee, 2005). Speed and user control can also benefit from the use of smart devices through the immediate feedback and access to information (Lee, 2012).

Social Capital

Social capital has been defined diversely by scholars who study in various academic fields (see Adler & Kwon, 2002; Claridge, 2004; Eastis, 1998; Field, Schuller & Baron, 2000; Robison, Schmid & Siles, 2002). Despite multidimensional definitions of social capital in the literature, they commonly focus on social relations that bring about productive benefits (Adler & Kwon, 2002; Claridge, 2004; Eastis, 1998; Field et al., 2000; Robison et al., 2002).

Adler and Kwon (2002) classified social capital into three groups: external relation, internal relation, and both. External relations, also called the bridging view, focuses on networking between people who previously did not know each other (Yuan & Gay, 2006). By expanding their networks to a large number of actors from diverse backgrounds, individuals gain resources from people outside their immediate family and close friends (Adler & Kwon, 2002; Kavanaugh, Reese, Carroll & Rosson, 2005; Leonard, 2004; Putnam, 2000). Internal relation, or the bonding view, focuses on internal relations between strongly tied individuals, such as family and close friends (Beane, 2012; Granovetter, 1973; Kobayashi, 2010; Putnam, 2000; Williams, 2006, 2007). The last group focuses on synthetic relations that include the view of external and internal relations.

This study focuses on bridging social capital of the actors based on weak ties in the new media environment. This is because external assets with different backgrounds in the new media environment are considered beneficial to information diffusion (Donath & Boyd, 2004; Putnam,

2000; Williams, 2006). Furthermore, we would expect bridging social capital with other users with similar interests will have a positive influence on reinforcing collective efficacy, and will also act as the power to have a voice in the marketing activity of sport firms because people interact with others and build networks and social groups in the communication environment mediated by social software giving rise to positive affective bonds (Steinfeld, Ellison & Lampe, 2008; Williams, 2006). These in turn lead to creating positive outcomes such as encouraging, supporting social interaction, and mobilizing others in online communities (Lee, 2012; Williams, 2006). In other words, the characteristics of the new media environment facilitate building social capital.

Collective Efficacy

Self-efficacy is considered the basis of human agency (Fernandez-Ballesteros, Diez-Nicolas, Caprara, Barbaranelli & Bandura, 2002). It is defined as a person's belief in their ability to perform a task and influence events that affect their life (Bandura, 1994). It influences how individuals feel, think, motivate themselves, and act; facilitates goal setting, investment, and persistence (Ahmad & Safaria, 2013; Armitage, Conner, Loach & Willetts, 1999; Bandura, 1993, 1994; Hackett & Betz, 1981; Scholz, Gutierrez-Dona, Sud & Schwarzer, 2002; Schwarzer & Fuchs, 1995).

Social cognitive theory extends the concept for mechanisms in human agency to collective efficacy through shared beliefs by diverse group members from diverse backgrounds (Bandura, 2000). Bandura (1977) referred to collective efficacy as an extension of self-efficacy defined as the shared belief of group members in their ability to achieve goals collectively by allocating, coordinating, and integrating their resources (Bandura, 1997; Zaccaro, Blair, Peterson & Zazanis; 1995). This requires interaction, interdependence, and cooperation between members to perform tasks (Martinez, Guillén & Feltz, 2011). Collective efficacy is not an aggregation of perceived individual efficacies. It is a group-level property because it accompanies interactive, coordinative, and synergetic social dynamics not found in individual efficacy (Bandura, 2000, 2001). As such, shared beliefs in collective efficacy allow people to pool knowledge, capability, and resources they have, to rely on each other for support and mutual backing, and to work together to make a solution and to seek a better life (Fernandez-Ballesteros et al., 2002). In other words, collective efficacy of group members have an effect on the types of futures they endeavor to attain through group effort and action (Bandura, 2000).

In the new media environment, customers can participate in diverse communities. Through the properties of mediated communication, such as information openness, connectedness, and community interaction, their collective efficacy may improve their participation in marketing process (Lim & Yang, 2006). This study focuses on collective efficacy in the new media environment, and it expects properties of media interactivity that comprise user control, responsiveness, and synchronicity will bring about information sharing and improve collective efficacy in groups.

Co-Creation Value

The traditional market concept is firm-centric, and in this perspective, the process of value creation arose from companies (Prahalad & Ramaswamy, 2004a; Sharma & Sheth, 2004). Their roles between firms and customers were also clearly distinguished into producers and consumers (Prahalad & Ramaswamy, 2004a; 2004b). Therefore, the firm carried out the whole process of product design, product development, and creating marketing strategies for sales with little or no interaction with their consumers (Normann & Ramirez, 1994; Prahalad & Ramaswamy, 2004a; Wikstrom, 1996).

The role of customers between them and firms in the new media environments, however, became more significant in innovation and value creation with the development of new communication technologies (Bitner, Brown & Meuter, 2000; Dahan & Hauser, 2002; Nambisan & Baron, 2009; Sawhney et al., 2005; Thomke & Hippel, 2002). Firms recognized the power of the new media as a platform for co-creating value with their customers (Sawhney et al., 2005), and the process of value creation shifted from a firm-centric perspective to personalized customer experiences by informed, networked, empowered, and active customers (Prahalad & Ramaswamy, 2004a).

In virtual environments, customers participate in product design, testing, and support through online discussion (Nambisan, 2002; Nambisan & Baron, 2009). For example, people who use sports applications (apps) to improve their health review the apps they download and share problems, inconveniences, and nice features with other users or post ideas on discussion boards. Developers then use this information to improve their product.

Customers generate value and services for and from each other by participating in diverse online communities (Lin & Huang, 2006). The participation can be divided into two categories: 1) Passive participation, when customers share information with other consumers; and 2) active participation,

when they suggest strategies or ideas directly to firms (Lim & Yang, 2006). This study focuses on active customer participation in marketing activities for the firms and regards these customer participation as value co-creation.

Based in the aforementioned literature, we advance the following hypotheses:

H1: Interactivity is positively correlated to a) bridging social capital and b) collective efficacy.

H2: Bridging social capital is positively correlated to a) collective efficacy and b) value co-creation.

H3: Collective efficacy is positively correlated to value co-creation.

Methods

Procedure

Data was collected from a random group of students in a university in the Southeast United States. We used face-to-face and online self-administered surveys. A mixed-mode survey in social science research is frequently used to minimize the likelihood of mode effects and biases on the study results (Groves et al., 2004). The results of a two-sample T-test indicated the means of the two groups were not significantly different ($p > 0.05$ in all variables).

Online participants were randomly drawn from a list of all students in the University and sent a link to the online questionnaire using google docs. Face-to-face participants were recruited in the campus library, gym, and dining area in an attempt to obtain responses from students with diverse majors. Both groups were given a consent form stating the purpose of the study, the voluntary nature of participation, confidentiality, and instructions.

Instrument

The demographic questions consisted of 10 items: Gender, major, age, academic classification, race, marital status, number of people in household, household income, smart device possession, and type of smart devices. The four variables measured were: Technological interactivity, bridging social capital, collective efficacy, and value co-creation. Participants rated each item on a 7-point Likert scale ranging from 1 = *Strongly Disagree* to 7 = *Strongly Agree*.

Technological interactivity was measured in terms of user control, responsiveness, and synchronicity. Three items measured user control: (1) I felt that I had a lot of control over my visiting experiences at the community web, (2) while I was on the community web site, I could choose freely what I wanted to see, and (3) while surfing the community web site, my actions decided the kind of experiences I got (Liu, 2003). Responsiveness was measured by the three items adopted from: (1) The community web site had the ability to respond to my specific question relevantly, (2) the community web site had the ability to respond to my specific question appropriately, and (3) then you clicked on the specific information in the community web site, you expected to get information that met your expectations (Johnson et al., 2006). Synchronicity was measured with four items: (1) The community web site processed my input very quickly, (2) Getting information from the community web site is very fast, (3) I was able to obtain the information I want without any delay, and (4) When I clicked on the links, I felt I was getting instantaneous information (Liu, 2003). Items were prefaced with the statement “The purpose of this study is to examine how interactivity in smart devices influences customer value co-creation in the sport industry through bridging social capital and collective efficacy. In this study, community web sites refer to all places related to the sports industry in the virtual environments where people get and create resources and communicate with others”.

Bridging social capital was measured by five items: (1) I feel I am part of the community, (2) I am interested in what goes on at the community, (3) interacting with people at the community make s me want to try new things, (4) interacting with people at the community makes me feel like a part of a larger community, and (5) I am willing to spend time to support general activities of the community (Lee, 2012). There were three collective efficacy items from Jung and Sosik (2002): (1) The community web site I participate in has above average ability, (2) the members of the community web site has excellent ability, and (3) community members can find solutions to problems with their performance. The value co-creation variable had four items: (1) I let the webmaster know of ways that they can better serve my needs, (2) I make constructive suggestions to the webmaster on how improve their products or services, (3) if I have a useful idea on how to improve products or services, I give it to the webmaster, and (4) when I experience a problem about the products or services, I let the webmaster know so they can improve service (Bettencourt, 1997).

Data Analysis

The first step in the data analysis involved validating the reflective measurement model using an exploratory factor analysis (EFA) in SPSS and then a confirmatory factor analysis (CFA) in AMOS. Then testing of the structural model in AMOS. To test for mediation, we employed the approach recommended by Baron and Kenny (1986).

Results

Participants

Research participants were randomly selected students from a university in the Southeast United States. The target population was those who have a smart device that can be connected to the Internet anywhere at anytime. Moreover, the study included students who have used community web sites related to the sports industry in the virtual environments where people get and create resources and communicate with others through smart devices (e.g., (a) online bulletin board or posting board for sports products, events, or mobile apps, (b) blogs or review websites, (c) social network services such as Facebook or Twitter, or (d) anywhere that customers can suggest their opinions in networked environment).

Gorsuch (1983), recommends at least 5 respondents per measured variable. In this study we have 22 items and targeted a minimum of 220 participants to ensure the accuracy and quality of our data. Two hundred and seventy four questionnaires were collected (92 face-to-face survey and 182 online). Twelve questionnaires were discarded after data screening due to missing values.

The sample consisted of 118 males (45.0%) and 144 females (55.0%) containing 53 freshmen (20.2%), 52 sophomores (19.8%), 64 juniors (24.4%), 77 seniors (29.4%), 15 graduate students (5.7%), and 1 other (.4%). The mean age of them was 22.996 years ranging from 18 to 63 (SD = 6.94). In addition, of the 262 participants who had at least one smart device, 153 participants (58.4%) owned only smart phones, 10 (3.8%) had tablets, and 99 (37.8%) had both. The sample demographics are included in Table 1.

The online response rate of 5% was relatively low. It may have happened because respondents participated in the survey voluntarily, and the study did not offered participating incentives. Also, there were no reminders sent as the data collection stopped after surpassing the target sample size after the first Email was sent. However, Templeton and colleagues (1997) asserted that a low response does not affect the validity of the data collection, and a high response is not necessary.

Measurement Model

We conducted an EFA and CFA using Maximum Likelihood to establish reliability and validity of the constructs in the study. All loadings are above the 0.40 threshold recommended by Hair et al., (2010). The Chronbach alphas for all variables were also above the 0.70 threshold recommended by Fornell and Larcker (1981). The Chronbach's alphas for each variables are included in Table 2. Total variance explained was 60.36%. Items loading poorly or failing to load in the expected factor were dropped. The CFA confirmed the factor structure revealed by the EFA and provided additional validity and reliability measures. The construct correlation matrix is also included in Table 2. To establish convergent validity the AVE should be greater than 0.50 (Kline et al., 2011). All factors met this threshold. To establish discriminant validity, the square root of the AVE should be greater than the correlation with any other factor. We met this criterion for all but one variable. Bridging social capital was red flagged for future analyses based on this criterion, as the square root of its AVE (0.729) was not greater than its correlation to collective efficacy (0.729). It was kept in the study because it met the other validity and reliability criteria. The goodness of fit statistics for the final measurement model are detailed in Table 3. All suggested thresholds were met (Hu & Bentler, 1999).

Structural Equation Modeling

A structural equation modeling (SEM) in AMOS 18.00 was carried out to measure the relationship between variables in the conceptual model. The Chi-square value was significant, and the normed chi-square was lower than the 3.0 threshold ($X^2 = 119.460$, $df = 60$, $p < .001$, $X^2 / df = 1.991$). The path coefficients among the variances and their significance are illustrated in Figure 2.

Hypothesis 1 was supported. The direct path from interactivity to bridging social capital was significant (H1a, $\beta = .588$, $p < .001$), and accounted for 34.6% of the variance in bridging social capital. The path from interactivity to collective efficacy was significant (H1b, $\beta = .328$, $p < .001$).

Hypothesis 2 was partially supported. Bridging social capital influenced by interactivity showed a direct positive impact on customers' collective efficacy (H2a, $\beta = .535$, $p < .001$), supporting the mediating role of bridging social capital between interactivity and collective efficacy. Interactivity and bridging social capital explain 60.0% of the variance in collective efficacy. However,

hypothesis 2b was not supported. The direct path from bridging social capital influenced by interactivity to value co-creation was not significant (H2b, $\beta = .207, p > .05$).

Lastly, the direct path from collective efficacy to value co-creation was significant (H3, $\beta = .287, p < .05$), and accounted for 21.2% of the variance in co-creation value. Social capital and collective efficacy influenced co-creation value. These findings were summarized in Table 5.

Discussion

The main purpose of the study was to examine the relationship between smart device's interactivity and customer activity in the sport industry. Specifically, this study focused on the components of user-to-systems interactivity as mediated technological environment in the new media environment. Therefore, the study distinguished the components of technological interactivity in the new media environment (user control, responsiveness, and synchronicity), and studied their effects on bridging social capital, collective efficacy, and value co-creation.

Theoretical implications

First, the results showed technological interactivity had a significant impact on bridging social capital. This is because information can spread quickly, widely, and easily through smart devices anywhere at anytime in new media environment (Kim, Park & Lee, 2010). These properties of new technological communication in virtual environments allow people to build numerous social relations (Donath, 2007) and maintain these connections cheaply and easily (Donath & Boyd, 2004). The finding was parallel to the study conducted by Wu, Wang, Su and Yeh (2013), who found interactivity affected social capital.

Second, interactivity and bridging social capital were positively associated with collective efficacy. This finding parallels Kavanaugh et al.'s (2005) study. They found communication technologies in virtual environments improved social relations and information exchange, bridging social capital in communities. In addition, groups with bridging social capital based on weak ties were efficient in organizing for collective action. Thus, in new media environments, bridging social capital mediated by components of technological interactivity enhances collective efficacy in online communities.

Also, according to several studies, users who control information and sequence have improved efficacy (Jaffe, 1997; Maibach & Flora, 1993). Our results parallel the previously found positive relationship between technological interactivity in new media environment and collective efficacy. Lastly, collective efficacy had a positive influence on co-creation value, but bridging social capital did not. These indicated that perceived collective efficacy had a positive impact on group effectiveness and performance, but bridging social capital without a group's shared belief in collective efficacy did not. This could be because user's shared beliefs in collective efficacy allow them to gather resources (i.e. knowledge and abilities) and collaborate towards a shared goal (Fernandez-Ballesteros et al., 2002).

Practical implications

The study suggests several significant implications for managers, marketers, and communication and information systems' professionals. For example, technological interactivity in virtual environments leads to customer participation in marketing activities of firms by building social capital based on weak ties and by reinforcing shared efficacy in a group, and it has a positive influence on co-creation value in the corporate management activity. It would be helpful for marketers to understand and strategically consider the relationship between interactivity and customer activity in new media environment as reverse marketing.

Specifically, diverse platforms where customers can develop relationships with others are needed. When providing these platforms consideration needs to be given to user control, responsiveness, and synchronicity in smart devices interactivity for bridging social capital and strengthening shared collective efficacy in virtual environment. By improving interactivity, these platforms can be used to collect customers who interest in their products or services and acquire information easily and cheaply from their target customers.

Limitations and Future Studies

In spite of the contributions of the study, there are some limitations that need to be considered. First, data were collected from students in a university in the Southeast United States. This limits the generalizability of the study. Therefore, future studies should include broader sampling frames in diverse locations.

Second, this study focused on the impact of technological interactivity. There is a need for follow-up research on user-to-user and user-to-documents interactivity. In addition, the study operationalized interactivity as a single factor including three variables (user control, responsiveness, and synchronicity). Future studies could analyze the relationship between each interactivity factor and the outcome variables. Additionally, information on other outcome variables could be beneficial (i.e. purchase intentions, actual purchase, negative effects of collective efficacy, etc.).

Finally, the participants answered self-reported questionnaires. This can lead to biases in their responses. For example, household income responses may be over-inflated as many of the students who answered the survey may have reported the income of their parents and not their personal income. Future self-reported studies should specify what income we want participants to report. However, other studies could use an experimental design to avoid collecting self-reported data.

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