The Impact of Social Media Technologies on Supplier and Customer Relationship Management: An Empirical Analysis in the U.S.

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ABSTRACT Social media has received considerable research attention in various academic disciplines but is still in its infancy in operations management. In particular, the existing literature does not provide sufficient empirical evidence on how social media technologies affect a company’s supply chain relationships. Thus, this study conceptualized the role of social media in forming supply chain networks between a focal company, suppliers, and customers, based on social network theory. This study also empirically investigated the impact of social media technologies on supplier and customer relationship management using sample data from U.S. industrial organizations. Hypotheses were verified through the structural equation modeling analysis. Sample analysis has proven that social media has a significant positive impact on the operational efficiency of supplier and customer relationship management. In addition, the evidence from this study suggests that social media networks built into supply chain relationships function as a source of knowledge resources that can create a competitive advantage, especially for focal companies. This study also contributes to research methodology by introducing alternative mitigation methods for common method biases that often occur in survey-based data collection. Finally, we discussed the implications of the study findings for practice and research, along with limitations and future research directions.

INDEX TERMS Customer relationship management, empirical research, social media, social network theory, structural equation modeling, supplier relationship management, supply chain network.

I. INTRODUCTION

Increasingly, evolving supply network management and technology contribute to the formation of highly specialized networks worldwide [1]–[4]. With a widely available dynamic technology network, social media has become an essential concept in most business models [5]–[8]. According to the Nielsen Company’s [9] survey, the U.S. consumers spent nearly a quarter of their Internet time on social networking sites. As of January 2018, active social media users are estimated at 3.2 billion and 42% of the world’s population [10]. Organizations now use social media platforms as tools to improve profitability, identify problems, promote innovation, interact with customers, respond quickly to what they want, and improve organizational performance [11], [12]. Social media also enables employees to seamlessly communicate information and knowledge within an organization by facilitating customer interactions with external organizations, as well as providing job updates and best practices through improved business intelligence [13], [14].

Although social media has received considerable attention in a number of academic communities, including marketing [15] and information systems [16], it is still at an early stage in operations management research [17]. Further, it is reported that research on social media remains incomplete and existing literature does not provide sufficient empirical evidence of the impact of social media on organizational performance [18]. However, over the past decades, the nature of competition between companies has shifted to supply chain management [19]–[21]. As such, numerous previous studies have shown that supply chain relationships are one of the top priorities that must be managed efficiently and systematically so as not to lose competitive advantage in the market [3], [22], [23]. Therefore, this study aims to explore the role of social media
technologies in supplier and customer relationship management in the context of operations management research.

To empirically investigate this research question, the rest of the paper proceeds as follows. In the next section, we develop our understanding of social media effects on supply chain relationships from a social network perspective to establish a theoretical framework and hypotheses. This is followed by a description of the measurement scale and sample data. Next, this paper shows the results of several validation tests, including the confirmatory factor analysis for measurements and the common method variance assessment for data. The hypotheses are then tested through structural equation modeling analysis. Finally, we discuss our findings’ theoretical and managerial implications, along with research limitations and future research directions.

II. THEORETICAL FRAMEWORK
A. DEFINITIONS
1) SRM AND CRM PRACTICES
Previous literature supports that supplier relationship management (SRM) and customer relationship management (CRM) are prerequisites for optimizing business operations in order to maintain a competitive advantage [24]–[26]. From an information system perspective, SRM and CRM can be described as an integrated information system of people, processes, technologies, and all business activities to improve supplier and customer relationships [27]–[29]. However, at the strategic level, SRM and CRM can be viewed as a company’s organizational processes and routines to develop and maintain effective relationships with suppliers and customers [26], [30]. In this study, CRM and SRM are discussed in terms of supply chain relationships between supply network parties rather than an information system perspective. Therefore, in this study, SRM and CRM are considered organizational relationship practices that focus on building, maintaining, and strengthening long-term relationships with suppliers and customers [26], [32]. In other words, strategic SRM and CRM practices focus on strengthening relationships with various suppliers and customers to improve collaboration, processes, quality, and forecasting while reducing inventory, risk, and cost [33], [34].

2) SOCIAL MEDIA TECHNOLOGY
Social media technology is described as “an online resource that people use to share content: video, photos, images, text, ideas, insight, humor, opinion, gossip, news” [36] (p. 274). Social media technology can be used to share information, seek entertainment, and express an opinion about a product or an issue [36]. Examples of popular social media platforms in the industry include Blogger, Twitter, Facebook, LinkedIn, Flickr, YouTube, Ning, and Igloo. Previous research has shown that social media can be used to improve financial performance [37], [38], organizational learning [39], [40], employee performance [41], [42], and innovation [14], [43]. Rodriguez et al. [44] claimed that social media positively guided customer orientation activities and ultimately affected sales and business performance. Trainor et al. [2] found that using social media could improve the company’s operational efficiency by promoting internal and external collaboration. Lam et al. [14] found that social media initiatives enhanced operational efficiency and helped corporate innovativeness. Social media can have a massive impact on consumer behaviors, and buying decisions are influenced by optimism, innovation, discomfort, and anxiety about social media usage [8]. Table 1 summarizes major findings on the impact of social media usage on various organizational performance over the past decade.

| Article | Area | Sample | Key Findings |
|---------|------|--------|--------------|
| Luo et al. [45] | IS | Hardware & software companies | Social media is a primary predictor of companies’ equity values. |
| Abdari et al. [46] | MK | Automaker customers | Social media positively impact customers’ buying intentions. |
| Du and Jiang [37] | IS | S&P 1500 companies | Companies using social media achieve better financial results. |
| Parveen et al. [18] | MK | Senior managers | Social media improves customer relationships, improves access to information, and reduces marketing costs. |
| Ainin et al. [38] | IS | 259 SMEs owners in Malaysia | Social media has a positive effect on customer service, access to information, and financial performance. |
| Lam et al. [14] | OM | 281 firms’ social media initiatives between 2006-2011 | Social media initiatives positively affect operational efficiency and innovativeness by enhancing firms’ knowledge-based advantages. |
| Wu [40] | MK | 327 chain and franchise stores in Taiwan. | Organizational culture, leadership, and social networks relate to social media strategies that positively impact performance. |
| Cao et al. [47] | OM | 285 companies in China | The technical-organizational-environmental (TOE) factors influence social media adoption and are subsequently related to performance outcomes. |

IS = Information system, MK = Marketing, OM = Operations management.

B. SOCIAL NETWORK THEORY
This research is grounded in social network theory [48]. Social network theory focuses on analyzing patterns of relationships between actors that can combine to form networks [49]. In the network perspective, network systems are represented by a set of nodes representing interrelated actors (such as individuals, organizations, and communities) and by the connection lines representing exchange relationships [50], [51]. Hence, in terms of networks relationship, the structural relations between a focal company, suppliers, and customers
C. HYPOTHESES DEVELOPMENTS

1) THE ROLE OF SOCIAL MEDIA IN CRM PRACTICE

Social media has become an essential method for communicating with customers [52]. Corte et al. [53] showed that companies use social media to track customer feedback and product loyalty. According to Lee et al. [54], social media is also useful for information dissemination during product recalls. Trusov et al. [55] showed that social media usage could enhance customer relationships by increasing interactive conversation opportunities. In a similar vein, Parveen et al. [18] reported that social media could improve customer relationships by increasing access to information. Acker et al. [56] argue that if social media is effectively managed and used with CRM, it can contribute positively to customer satisfaction and financial rewards. Evidence from previous research also suggests that social media can help improve customer relationships by enhancing customer trust through information sharing [57]–[59]. Based on these arguments, we propose the following hypothesis regarding the relationship between social media technologies and CRM practices:

Hypothesis 1: Social media technologies have a positive impact on customer relationship management practices.

2) THE ROLE OF SOCIAL MEDIA IN SRM PRACTICES

According to the literature, in the early stages of product development, companies can benefit from using virtual communities by engaging users with similar interests in the development process and sharing experiences and knowledge [60], [62]. Swain and Cao [62] claim that partners in the supply chain can improve operational productivity and performance using more social media. Lam et al. [14] also argue that social media enables companies to enhance intelligence across their supply chain networks through a visual approach to external knowledge and information. Singh et al. [63] reported that companies could proactively identify various ways to work with suppliers in improving product quality and safety by analyzing social media data. In short, evidence supports social media’s vital role in strengthening partnerships with suppliers through knowledge and information sharing. Thus, this discussion leads to the following hypothesis:

Hypothesis 2: Social media technologies have a positive impact on supplier relationship management practices.

3) CRM, SRM, AND MARKET PERFORMANCE

Kuei et al. [64] noted that improved organizational performance improvements are related to improved supplier relationships. Kiarie [65] pointed out that SRM has a significant relationship with companies’ operational performance and productivity. Previous studies have also shown that SRM can help companies remain competitive and improve profitability [32], [66].

In addition, according to the literature, CRM helps companies build and maintain long-term relationships with customers based on customer satisfaction [67]. The evidence also supports that effective CRM practices are positively

in CRM and SRM can be diagrammed, as shown in Fig. 1 (Case A). Here, it is likely that social networking already exists between the focal firm and individual customers and suppliers through CRM and SRM operations. However, at this stage, not only relationships between individual suppliers but also relationships between individual customers are likely to remain as two separate “clusters” based on similarity, not social networks, because there is no open channel for mutual information exchange and interaction.

On the other hand, Case B in Fig. 1 shows a social network that has expanded due to social media effects on CRM and SRM. Here, customers and suppliers can share and interact with information and knowledge through the social media platform, which leads to forming “social networks” based on “soft” ties (e.g., information sharing and favoritism) rather than “hard” ties (e.g., money and materials flow) [48]. In Fig. 1, the dotted line represents the soft tie between actors in the newly expanded supply chain network under social media’s influence, while the solid line represents the hard tie already existing in the classic supply chain network. As a result, expanded social networks among the customers and the suppliers are expected to benefit the focal company because the actor at the top of the network chain has the most significant information advantage when the type of tie is “soft” according to social network theory [48]. In short, the social network perspective supports that social media platforms help customers and suppliers form social networks, ultimately improving the effectiveness of CRM and SRM practices. Therefore, we assume that social media technology will positively impact effective CRM and SRM implementation from a network perspective. The development of more specific hypotheses based on the literature review continues in the next section.

FIGURE 1. The evolution of supply chain networks based on social media technology.
associated with a company’s competitive advantage by improving customer retention and customer loyalty [68]. In other words, CRM’s customer-centric approach can improve customer interaction, increase the value of products and services, and ultimately improve customer satisfaction and market performance [69], [70]. In summary, a company’s CRM and SRM practices are expected to be positively associated with customer satisfaction, ultimately contributing to market performance. Therefore, the following hypotheses are proposed:

Hypothesis 3: Customer relationship management is positively related to customer satisfaction.

Hypothesis 4: Supplier relationship management is positively related to customer satisfaction.

Hypothesis 5: Customer satisfaction is positively related to market performance.

III. METHODOLOGY

A. MEASUREMENTS

All of the measuring scales used in this study were prepared based on previous studies; however, scale items have been slightly modified to suit our study objectives. Survey items measured the degree of respondents’ consent to a given statement based on a 7-point Likert scale. Social media metrics were developed based on the studies of Jayachandran et al. [31] and Trainor et al. [2]. In particular, social media technology was measured in two dimensions: social media functions and social media usage. Social media function measured how widely companies used social media channels, while social media usage measured how actively they used the information and knowledge gained from social media when managing customers and suppliers. The study of Reinartz et al. [67] was employed to evaluate the company’s CRM practices, and Swink et al. [32] was used to assess the company’s SRM practices. These measures captured information, cost, technology, and long-term relationships with customers and suppliers. Various prior studies were used to measure customer satisfaction [71], [72], and market performance [73]. Besides, this study adopted three control variables; (i) the number of full-time employees was used to measure company’s size (ii) the length of time in business was used to measure the age of the company, and (iii) two-digit SIC codes were applied to categorize the company’s industry groups.

Further, to minimize the likelihood of common method variance (CMV), this study applied a marker variable that measures the severity of the respondent’s insomnia problem based on the study of Bastien et al. [74]. Details of all the measures used in this study are given in the Appendix.

B. SAMPLE

Following the work of Dillman et al. [75], we designed our survey to collect primary data. In particular, the following criteria were established to obtain the appropriate sample data from eligible survey respondents: (i) companies participating in the survey must run at least one social media channel for their customer and supplier management, (ii) survey participants must have full-time positions in their companies, and (iii) If there are two or more respondents in the same organization, the highest-ranked respondents are selected [73]. Survey invitations were sent out to 241 operations managers in the United States. Finally, a total of 117 responses were collected, showing a response rate of 48.52%. The demographic profile of the sample is summarized in Table 2.

IV. DATA ANALYSIS

A. TESTING OF SCALE RELIABILITY AND VALIDITY

First, the scale reliability was examined by Cronbach’s alpha. The alpha coefficients for all variables were between .710 and .901, which met the suggested threshold of .70 or higher [76], [77]. Next, Confirmatory Factor Analysis (CFA) was conducted to test the construct validity [78]. The CFA results (Chi-square = 381.183; d.f. = 215; Normed Chi-square = 1.773; CFI = .895; PNFI = .673; RMSEA = .082; RMSEA 90% confidence interval:.068 ~ .095) indicated that all measure items satisfied the suggested threshold of .50 or higher [77]. The results of these measure assessments are summarized in Table 3. Descriptive statistics and correlations between variables are also reported in Table 4.

B. TESTING OF COMMON METHOD VARIANCE

Since this study’s data were obtained from a single source from each company, this study may not be free from common
TABLE 3. Results of CFA.

| Factor and Items                                      | Loadings | S.E. | t    | Sig. | α   |
|-------------------------------------------------------|----------|------|------|------|-----|
| Social media technology (Adapted from [2], [31])      |          |      |      |      |     |
| function                                             |          |      |      |      |     |
| sf1                                                   | .616     |      |      |      | ***|
| sf2                                                   | .556     | .183 | 4.533|      | ***|
| sf3                                                   | .752     | .236 | 5.285|      | ***|
| sf4                                                   | .572     | .202 | 4.621|      | ***|
| usage                                                 |          |      |      |      |     |
| su1                                                   | .835     |      |      |      | ***|
| su2                                                   | .855     | .127 | 8.088|      | ***|
| Customer relationship management (Adapted from [67])  |          |      |      |      |     |
| cr1                                                   | .700     |      |      |      |     |
| cr2                                                   | .818     | .152 | 8.242|      | ***|
| cr3                                                   | .783     | .148 | 7.911|      | ***|
| cr4                                                   | .775     | .136 | 7.833|      | ***|
| cr5                                                   |          |      |      |      |     |
| Supplier relationship management (Adapted from [32])  |          |      |      |      |     |
| sr1                                                   | .650     |      |      |      |     |
| sr2                                                   | .744     | .153 | 6.589|      | ***|
| sr3                                                   | .786     | .148 | 6.852|      | ***|
| sr4                                                   | .575     | .135 | 5.347|      | ***|
| sr5                                                   | .740     | .151 | 6.566|      | ***|
| Customer satisfaction (Adapted from [71], [72])       |          |      |      |      |     |
| cs1                                                   | .783     |      |      |      | ***|
| cs2                                                   | .910     | .089 | 11.050|     | ***|
| cs3                                                   | .775     | .110 | 9.029|      | ***|
| cs4                                                   | .892     | .094 | 10.793|     | ***|
| Market performance (Adapted from [73])                |          |      |      |      |     |
| Sales growth                                          | .948     |      |      |      | ***|
| Market share growth                                   | .821     | .068 | 12.229|     | ***|
| Net profit margin                                     | .824     | .061 | 12.306|     | ***|

N=117; *** p < 0.001; * standardized regression weights; S.E. standard error (not estimated when loading set to fixed value: i.e., 1.0)

TABLE 4. Correlations and descriptive statistics.

| Variables                      | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | Mean | SD  |
|--------------------------------|------|------|------|------|------|------|------|------|------|------|-----|
| 1. SM function                 | 3.90 | 1.42 |
| 2. SM usage                    |      | .423 |     |      |      |      |      |      |      |      |     |
| 3. CRM                         |      |      | .283 | .556 |     |      |      |      |      |      |     |
| 4. SRR                          |      |      |      | .233 | .433 | .670 |     |      |      |      |     |
| 5. Customer satisfaction       |      |      |      |      | .306 | .303 | .510 | .333 |     |      |     |
| 6. Market performance          |      |      |      |      |      | .186 | .261 | .383 | .277 | .645 |     |
| 7. Insomnia                     |      |      |      |      |      |      | .083 | -.035 | -.001 | .063 | -.016 | .151 | 2.43 | 1.05 |
| 8. Firm age                     |      |      |      |      |      |      |      | .094 | -.022 | -.136 | -.073 | -.233 | -.116 | .064 | 4.78 | 1.79 |
| 9. Firm size                    |      |      |      |      |      |      |      |      | .125 | .193 | .179 | .235 | -.017 | .134 | .166 | .541 | 4.61 | 2.02 |
| Industry                       |      |      |      |      |      |      |      |      |      | -.007 | .033 | -.046 | -.078 | .077 | .036 | .036 | .192 | .128 | .90 | .028 |

N=117; * significant at the .05 level; ** significant at the .01 level; # marker variable (to assess CMV); # length of time in business; # number of full-time employees; SM = social media technology.

method variance (CMV) [79]. Hence, as an ex-ante remedy for minimizing the CMV threat, we included the “marker variable” in our survey questionnaire [79]–[81]. According to the guidelines of Simmering et al. [82], “insomnia” was chosen as a marker variable for this study because the variable is not theoretically related to other variables in this study; the smallest correlation with other variables was also reported, as shown in Table 4. The insomnia measures used in this study are presented in the Appendix.

As an ex-post approach, we also investigated the potential threats of CMV in our data by performing the “common latent factor” analysis after completing data collection [72], [79], 2003; Richardson et al., 2009. We examined changes in the structural parameters when adding the common latent factor (CLF) to the measurement model. The test results demonstrated that the changes in parameters were minimal, and CMV accounted for less than 1%, indicating that the CMV threat is not a pervasive problem in this study. Fig. 2 shows the results of this CMV test performed by IBM AMOS 24 (N = 108, 9 missing responses in the marker variable; Chi-square = 507.392; d.f. = 302; Normed Chi-square = 1.680; CFI = .879; PNFI = .647; RMSEA = .080 (90% confidence interval: .067 ∼ .092).

C. RESULTS OF STRUCTURAL EQUATION MODELING

To examine the hypotheses proposed in this study, we conducted a structural equaling modeling (SEM) analysis. The model fit was assessed by several different fit indices. The fit statistics reached or were very close to the desired threshold for each fit index (Chi-square = 395.565; d.f. = 223; Normed Chi-square = 1.774; CFI = .890; PNFI = .691; RMSEA = .082). Fig. 3 illustrates the test results of the structural model hypothesized in this study. SEM test results demonstrate that social media has a significant positive effect on both CRM (β = .907, t = 2.921, p = .003) and SRM (β = .780, t = 2.863, p = .004) practices, supporting H1 and H2. In addition, SEM test results indicate that CRM has a significant impact on customer satisfaction (β = .665, t = 4.113, p < .001) while there is no significant relationship between SRM and customer satisfaction (β = −.162, t = −1.104, p = .270); therefore, H3 is supported, but H4 is rejected. Finally, the results also show that customer satisfaction significantly contributes to the company’s market performance (β = .709, t = 7.673, p < .001), supporting H5.

D. POST HOC STUDY

Although our sample did not support the direct effect of SRM practices on customer satisfaction (H4), as shown in Fig. 3, Table 4 shows that SRM significantly correlates with both CRM and customer satisfaction. It is inferred that SRM indirectly affects customer satisfaction through CRM. Accordingly, we tested this relationship with the modified SEM, as shown in Fig. 4 (Chi-square = 387.509;
Managing social media in conjunction with CRM would positively impact customer satisfaction and firm performances [45], [46], [56].

Second, when a new technology solution comes out, many companies tend to imitate and adopt it unconditionally, but the actual business effect varies widely. This phenomenon is called isomorphism, and social media technologies can be an example [73]. This study’s post hoc analysis showed that using social media itself did not directly impact organizational performance, indicating that technology alone is not sufficient to gain a competitive advantage [84]. In other words, the results of this study empirically revealed the limitations of imitation strategies that companies often take in market competition. On the other hand, the results demonstrate that through the combined operation of social media platforms and CRM practices, companies can better respond to customer needs and gain feedback on products or services, thus providing better products or services to customers. Therefore, managers are advised to consider integrating the existing CRM program with a social media platform to create synergies between the two initiatives while increasing their social media infrastructure investment.

Third, this study also showed that social media had a significant positive effect on a company’s SRM implementation. This finding implies that social media technology can improve SRM capability by allowing companies to quickly deliver their customers’ real-time interests and changing needs to their suppliers, thereby reducing unnecessary inventories and improving lead times and operational efficiency. Additionally, the study result provides practitioners with initial empirical evidence that social media can help strengthen business-to-business (B2B) relationships beyond business-to-consumer (B2C) relationships. For instance, buyer companies can more broadly and quickly communicate their needs to potential vendors via social media platforms, so buyer companies can find the best vendors more efficiently and at a lower cost. Besides, through social media platforms, buyers and suppliers can share all records and information such as past Q&A communications, business profile, status, and new product developments, consequently enhancing transparency and trust in B2B relationships.

Forth, the study results showed that SRM practices did not directly affect the company’s operational benefits. Instead, the post hoc study has shown that CRM positively mediated the relationship between SRM and customer satisfaction. This result means that the benefits of SRM practices for organizational performance can be realized conditionally when effectively combined with the operations of CRM practices.

In addition, this research makes some contributions to the theory. This study conceptualized the role of social media technology in forming a social network between a focal company, customers, and suppliers, which contributes to integrating and applying social network theory into operations management literature [50], [85]–[87]. This study also supports the knowledge-based view of the firm by showing that the combined framework of social media technologies,
CRM, and SRM can be a strategic resource that drives knowledge creation and superior organizational performance. Last but not least, by validating the insomnia scale as a marker variable, this study demonstrated an alternative mitigation method for CMV threat arising from survey-based data collection, which is expected to contribute to the research methodology as well.

B. LIMITATIONS AND FUTURE RESEARCH DIRECTION
Despite some meaningful contributions to practice and theory, this study has limitations that can lead to future research. All samples in this study came from U.S.-based companies operating under state-of-the-art social network infrastructure. However, given that many companies today are doing business globally in diverse social media infrastructure and regulatory environments, a fundamental question arises as to whether this study’s results will be useful for business operations in other countries. Further, previous studies have shown that cultural and perceptual differences significantly impact information sharing behaviors [90]–[92]. Thus, future research should verify the social media effects on CRM and SRM implementations in various social media environments by using other country samples.

Next, Lam et al. [14] argued that social media initiatives could improve knowledge-based benefits (e.g., information flow and knowledge sharing) within an organization and enable organizations to access external knowledge and information outside their supply chain networks, ultimately driving operational efficiency and innovativeness. As such, instead of customer satisfaction and market performance used in this study, future research may adopt other criterion variables (e.g., new product development, product quality improvement, demand forecasting, and product and process innovation) in order to better understand how the combined operations of social media, CRM, and SRM practices contribute to organizational performance.

Another limitation is that our study was conducted in the context of cross-sectional data. Consequently, it is not possible to observe the specific process of how relationships with suppliers and customers evolve as social networks are formed through social media channels. In particular, as the importance of non-face-to-face communication has rapidly increased due to the recent COVID-19 pandemic, understanding how the rise of such non-face-to-face manner has changed the role of social media in supply chain relationship management is expected to be an essential research topic [93], [94]. Therefore, we expect that future research will find more impressive results by using longitudinal data to explore the evolution of social media effects on CRM and SRM implementations.

VI. CONCLUSION
As discussed earlier, research on social media’s role has received considerable attention in various academic disciplines, but it is still in the early stage in the field of operations management. In particular, existing literature does not provide sufficient empirical evidence on how social media use affects the company’s supply chain relationships. Thereby, the present study explored this relationship empirically, based on sample data from U.S.-based companies. Sample analysis has proven that social media has a significant positive impact on the operational efficiency of SRM and CRM practices. The evidence from this study also suggests that social media network built into a company’s supply chain relationships can be a source of strategic knowledge resources that create competitive advantages. We hope that our research will help motivate future researchers and practitioners to pay more attention to the catalytic function of social media in maximizing the operational efficiency of businesses.

APPENDIX
A. SURVEY QUESTIONNAIRE

1) SOCIAL MEDIA TECHNOLOGY
Does your company use any forms of Social Media? YES ☐ NO ☐ If YES, please indicate your agreement with each statement on a scale of 1 to 7 (1 = strongly disagree, 7 = strongly agree):

Social media function
- Our company uses Social Media for conversation support (e.g., Blogger, Twitter). (sf1)
- Our company uses Social Media for relationship support (e.g., Facebook, LinkedIn). (sf2)
- Our company uses Social Media for sharing support (e.g., Flickr, YouTube). (sf3)
- Our company uses Social Media for groups and community support (e.g., NING, IGLOO). (sf4)

Social media usage
- Our company uses Social Media to detect changes in customers’ product or service preferences. (su1)
- Our company uses Social Media to collect customer complaints and supplier feedback. (su2)

2) CUSTOMER RELATIONSHIP MANAGEMENT
Please indicate your agreement with each statement on a scale of 1 to 7 (1 = strongly disagree, 7 = strongly agree):

- We invest in technology to acquire and manage real-time customer information and feedback. (cr1)
- We have a formal system to assess the value of our customers. (cr2)
- We have a formal system to identify potential customers. (cr3)
- We have a formal system to differentiate our communication objectives based on the value of our prospects. (cr4)
- We continually update customer information to assess the true value of our customers. (cr5)

3) SUPPLIER RELATIONSHIP MANAGEMENT
Please indicate your agreement with each statement on a scale of 1 to 7 (1 = strongly disagree, 7 = strongly agree):

- We provide technical support to our suppliers. (sr1)
- We share our cost information with our suppliers. (sr2)
● We require cost information sharing by our suppliers. (sr3)
● We make long-term contracts with our suppliers. (sr4)
● We seek joint investments with our suppliers. (sr5)

4) CUSTOMER SATISFACTION
Please indicate your agreement with each statement on a scale of 1 to 7:
• Customer satisfaction with our products/services has increased over the past 3 years (1 = strongly disagree, 7 = strongly agree). (cs1)
• Customer retention in our products/services has increased over the past 3 years (1 = strongly disagree, 7 = strongly agree). (cs2)
• The best description of your company’s customer satisfaction level (1 = low end of the industry, 2 = much worse than average, 3 = worse than average, 4 = average, 5 = better than average, 6 = much better than average, 7 = superior). (cs3)
• The best description of your company’s customer retention level 1 = low end of the industry, 2 = much worse than average, 3 = worse than average, 4 = average, 5 = better than average, 6 = much better than average, 7 = superior). (cs4)

5) MARKET PERFORMANCE
Evaluate your company’s market performance for competitive products or services in the industry on a scale of 1 to 7 (1 = low end of the industry, 2 = much worse than average, 3 = worse than average, 4 = average, 5 = better than average, 6 = much better than average, 7 = superior):
• Sales growth
• Market share growth
• Net profit margin

6) INSOMNIA (MARKER VARIABLE TO MITIGATE COMMON METHOD VARIANCE)
Please rate the current severity of your insomnia problem:
• Difficulty falling asleep (1 = none, 2 = mild, 3 = moderate, 4 = severe, 5 = very severe)
• Difficulty staying asleep (1 = none, 2 = mild, 3 = moderate, 4 = severe, 5 = very severe)
• How satisfied are you with your current sleep patterns? (1 = very satisfied, 2 = satisfied, 3 = moderately satisfied, 4 = dissatisfied, 5 = very dissatisfied)
• To what extent do you think there is a sleep disorder that interferes with your daily life? (e.g., ability to function at work/daily chores, mood, concentration, memory) (1 = not at all interfering, 2 = a little, 3 = somewhat, 4 much, 5 = very much interfering)

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Y. S. Cho et al.: Impact of Social Media Technologies on Supplier and Customer Relationship Management

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