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Communication, interactivity, and satisfaction in B2B relationships

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ABSTRACT

This study examines how traditional and new communication media impact satisfaction in business-to-business (B2B) relationships. We develop a conceptual model and empirically investigate hypotheses linking personal face-to-face (F2F), digital, and impersonal communication to buyer and supplier contacts, rationality, social interaction, and reciprocal feedback, and these interactivity dimensions to relationship satisfaction. Structural equation models are estimated with data from the commercial printing and graphic design industry. The findings indicate that personal has a stronger positive association than digital communication with dyadic contact (buyer and supplier contacts), social interaction, and reciprocal feedback, but a weaker positive association than digital with rationality. Digital has a stronger positive association than impersonal communication with dyadic contact, rationality, and reciprocal feedback, but a weaker positive association than impersonal with social interaction. Only rationality and reciprocal feedback have positive associations with satisfaction. Dyadic contact, however, has a negative association with satisfaction that is stronger for personal than digital communication.

1. Introduction

Communication is one of the most effective relationship building strategies and a key determinant of outcomes in business-to-business (B2B) relationships (Anderson & Narus, 1990; Grewal, Comer, & Mehta, 2001; Hung & Lin, 2013; Lindberg-Repo & Grönroos, 2004; Mohr & Spekman, 1994; Palmatier, Dant, Grewal, & Evans, 2006; Palmatier, Gopalakrishna, & Houston, 2006). Effectively listening and responding to buyers can have a dramatic impact on a firm's ability to compete (Duncan, 1972; Ramani & Kumar, 2008) and increasingly occurs on the Internet. Yet as new technologies such as the Internet and social media have spread and use of digital communication has grown rapidly, changing the management of relationships between buyers and suppliers, there has been little academic scholarship on the role of new communication media in B2B relationships (Obal & Lancioni, 2013). A better understanding of the impact of different communication modes on relational exchange between organizations can benefit not only academics but also help managers better satisfy buyer needs and develop competitive advantage.

This study examines how modes of communication that differ in terms of interactivity impact satisfaction in relationships between organizations in supply chains and marketing channels. Web 2.0 social media like Facebook, LinkedIn, Twitter, YouTube, Chatter, and Google Docs have led to increased use of digital communication between buyer and seller organizations. These new media facilitate information sharing within and between organizations by changing the nature and number of communication alternatives available to managers. The information shared can include instrumental information like product specifications and delivery times that are task related (Joshi, 2009; Sheng, Brown, & Nicholson, 2005) as well as social information that strengthens bonds between buyers and suppliers (Berry, 1995; Palmatier, Gopalakrishna, et al., 2006).

We develop a conceptual model to examine the impact of different modes of communication in B2B relationships using research from marketing including Duncan and Moriarty's (1998) communication-based model of relationship marketing, Mohr and Nevin's (1990) model of communication for marketing channels, and Joshi's (2009) collaborative communication and control model as well as research from communication including Daft and Lengel's (1986) media richness theory, Dennis and Valacich's (1999) media synchronicity theory, and Lasswell's model of communication (1948). We distinguish B2B from B2C (business-to-consumer) relationships based on the nature of the transaction: intermediate or final. Intermediate transactions in B2B markets typically occur between organizations and are always followed by a subsequent transaction in an output market in contrast to final transactions in B2C markets where no subsequent output market transaction occurs (Sashi, 1990; Sashi & Stern, 1995). We address two questions about relationships between buyers and suppliers in intermediate transactions:

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1. How interactive is digital communication relative to personal face-to-face (F2F) and impersonal communication?
2. Which dimensions of interactivity are more or less likely to promote satisfaction with the relationship?

We attempt to contribute to theory development about communication in B2B exchanges by developing a model to examine how (1) different modes of communication are related to several dimensions of interactivity, and (2) these interactivity dimensions are related to satisfaction with the relationship. An empirical investigation is conducted with data from the commercial printing and graphic design industry, which provides custom products as well as services and uses all three modes of communication extensively.

2. Model and hypotheses

A mathematical model of communication originally suggested by Shannon (1948) and Lasswell's (1948) verbal version that has been further developed by several researchers in marketing (Andersen, 2001; Duncan & Moriarty, 1998; Mohr & Nevin, 1990; Mohr & Spekman, 1994) may be adapted to study communication between organizations. According to the model, communication is initiated by a source and sent through a medium or channel to a receiver. A source encodes a message or content into a medium or mode of communication and transmits it to a receiver. Feedback was added to the model in the cybernetics literature (Wiener, 1989) to measure the outcome of the communication. Outcomes could include a recipient's reaction to a communication such as a change in attitude or behavior or a message sent from the original recipient to the source. Previous research in marketing has demonstrated the importance of five elements: media or mode used (Hoffman & Novak, 1996), source and receiver (Moriarty & Spekman, 1984), content of messages (Mohr, Fisher, & Nevin, 1996), and feedback (Joshi, 2009). We develop a conceptual model of interactive communication that incorporates all five elements.

Interactivity is a distinguishing feature of relationship marketing (e.g., Morgan & Hunt, 1994) as well as the Internet (e.g., Hoffman & Novak, 1996; Yadav & Varadarajan, 2005). Although interactivity can refer to interaction with a website or a device, in this study interactivity refers to communication that involves back and forth dialogue between sellers and buyers. Interactive communication is a two-way or joint activity (Duncan & Moriarty, 1998). Frequency of communication alone, particularly one-way communication, provides an incomplete picture of communication and its effect on business relationships (Fisher, Maltz, & Jaworski, 1997). We investigate multiple elements of communication including the mode of communication, number of contacts or participants, content, and feedback. Fig. 1 presents a schematic overview of our conceptual model. We distinguish between personal, digital, and impersonal modes of communication, which are expected to differ in terms of interactivity. We identify the dimensions of interactivity from the marketing and communication literature. Buyer and supplier contacts engaged in communication serve as a proxy for source and receiver. Message content is represented by rationality, which is providing information for making decisions, and by social interaction, which is communication that is not directly task related. One form of feedback is reciprocal feedback, which is responses to previous messages in two-way communication between the parties (Joshi, 2009). These interactivity dimensions are expected to differ in their impact on satisfaction with the relationship.

2.1. Modes of communication

The mode of communication refers to how a message is transmitted. Modes of communication have been investigated based on their synchronicity, speed of transmission, ability to transmit rich information, support two-way communication, (Dennis & Valacich, 1999), and formality (Mohr et al., 1996; Mohr & Nevin, 1990). When the mode of communication is appropriate for the communication task, more effective communication is likely to occur (Mason & Leek, 2012), e.g., if the task is a straight rebuy, an online order followed by an invoice may be appropriate, but a modified rebuy or new buy may require F2F interactions to clarify and build a shared understanding of expectations before the order is placed. We use media richness and media synchronicity theory to distinguish modes of communication.

Media richness theory aims to explain which channel or mode of communication is best utilized under different conditions (Daft & Lengel, 1984; Daft & Lengel, 1986). According to the theory, if the information being exchanged is ambiguous and does not lend itself to being easily codified, a richer method of communication will be required. The richness of communication depends on the number of additional cues present. Personal F2F communication provides the greatest level of richness by providing the greatest number of cues in addition to the actual words used for communication. These cues are capable of communicating hedonic emotion, surprise, gratitude, anger, and confusion. Examples of cues include tone of voice (Scherer, 1986), posture, head nods (Wallbott, 1998), and facial expressions (Ekman, 1999).

According to Daft and Lengel (1984), formal communication primarily involves text-based letters and documents, while informal communication involves F2F meetings. Mohr et al. (1996) suggest that more formal communication is associated with collaborative communication, while Anderson and Weitz (1989) suggest that informal communication is associated with greater goal congruence and reduced role ambiguity. In relational exchange both types of communication are necessary. Formal communication is essential to carrying out established routines while informal is necessary for developing these routines. Formal communication establishes legitimacy while informal communication contributes to trust (Anderson & Weitz, 1989; Mohr & Nevin, 1990).

The ability of a mode of communication to allow multiple conversations between multiple senders and receivers has been investigated using media synchronicity theory (MST) as an alternative to media richness theory. MST employs two constructs to explain media choice: convergence refers to the ability to enhance mutual agreement, and conveyance refers to the ability to process information (Dennis & Valacich, 1999). These two constructs depend upon five characteristics of the mode of communication: (1) immediacy of feedback, which is similar to synchronicity and refers to the ability of a mode to support fast bidirectional communications, (2) symbol variety, which is similar to media richness and refers to the cues a mode can transmit, (3) parallelism, which is similar to reach and refers to the number of concurrent bidirectional messages a mode can support, (4) rehearsability, which is similar to user control and refers to the ability to edit the message before sending it, and (5) reprocessability, which is similar to recording and refers to the ability of a mode to support reprocessing of a message while retaining the context.

Personal F2F communication requires immediate feedback. In digital communication, rehearsability and reprocessability allow communication to take place with both sender and receiver able to control the timing of a response or feedback. Control over feedback enables users to interact and maintain the original context of the interaction over time (Oviatt & Cohen, 1991; Whittaker, Brennan, & Clark, 1991), and parallelism allows them to take part in multiple dialogues simultaneously. Some of these conversations may require feedback the same day while other conversations can be resumed weeks later. Digital communication is unique in its ability to give all participants in an interaction some degree of control over each of these characteristics.

According to Hoffman and Novak (1996), the Internet can be viewed as an environment where individuals are present and capable of interacting through the medium similar to F2F interaction. It is also an environment where individuals are not always present but they can interact with the medium in a way that is similar to traditional written

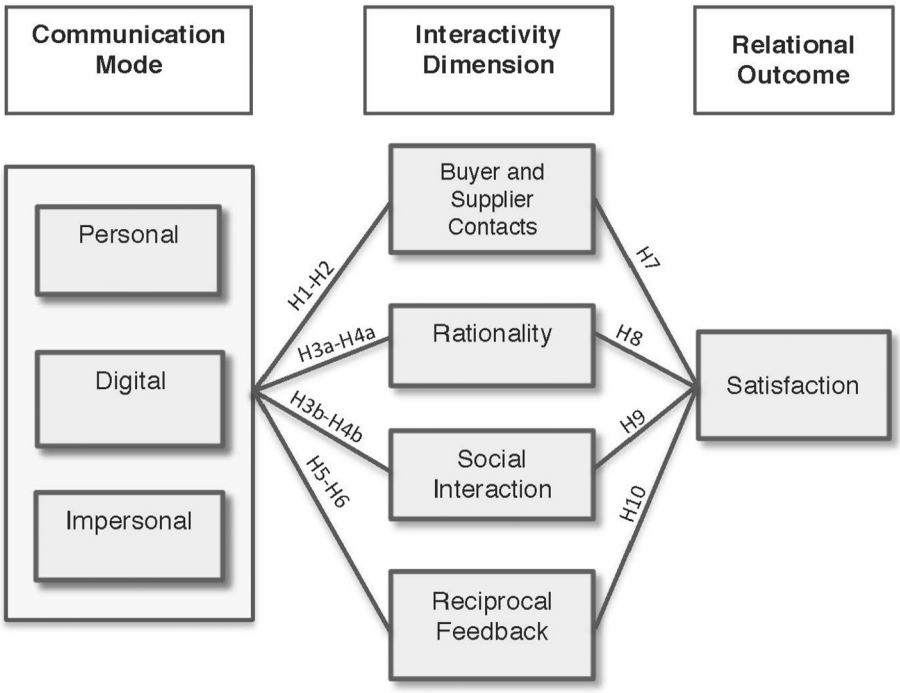

Fig. 1. Conceptual model.

communication. Digital communication is the exchange of information between two or more individuals through or with an electronic device and can mimic F2F communication as well as impersonal communication. The ability of digital communication to allow many dialogues to take place at one time increases the number of interactions beyond what can be accomplished with F2F meetings.

Distinguishing the use of a specific mode based on its capabilities is becoming increasingly difficult with Web 2.0 technologies. Platforms such as Facebook and Salesforce.com's Chatter or Google mail enable multiple forms of communication such as chat, email, video, mobile short messaging, and document sharing from a single platform. Nondigital communication, however, can be examined based upon the distinction between personal F2F communication and impersonal documents including reports, memos, and sales literature. Moriarty and Spekman (1984 p. 138) suggest, "the distinction between personal and impersonal sources of information is discerned rather easily and is based exclusively on F2F versus any other type of communications vehicle." F2F is recognized by researchers as being distinct from other modes of communication (Daft & Lengel, 1986). Our model draws a distinction between three modes of communication: personal F2F, digital, and impersonal communication.

2.2. Buyer and supplier contacts

The source and receiver are conceptualized as buyer and supplier contacts, respectively. The number of contacts is important because it increases the opportunity for information exchange and the likelihood of relational exchange (Macneil, 1981). Increasing the number of relational ties may increase the likelihood of identifying profit opportunities (Palmatier, 2008) and the development of shared expectations (Meyer & Rowan, 1977).

Few B2B studies investigate source or receiver effects in communication. An exception is the work of Moriarty and Spekman (1984), which investigates the functional roles and hierarchical positions of receivers in an organization. They classify sources of information as commercial or noncommercial and personal or impersonal, and receivers as members of the using department or members of top, middle, or junior management. They find that using departments are likely to seek out personal noncommercial sources of information and utilize these sources throughout the purchasing process, and receivers higher in the organizational structure of the firm rely on impersonal noncommercial sources of information.

Vargo and Lusch (2004) suggest that individuals in buyer and seller organizations must interact and adapt to each other and co-creation takes place through these interactions. Mohr and Spekman (1994) find that an increase in the number of individuals participating in these interactions improves information sharing and communication and has a positive effect on sales and satisfaction. Information is dispersed throughout an organization (Hayek, 1945; Jensen & Meckling, 1995) and participation increases decision quality (Jones, 1997; Lawler, 1999; Moriarty & Spekman, 1984). Since F2F communication requires everyone to be at the same place at the same time, it is unlikely that large groups will be able to consistently communicate in this way. Digital communication has the benefit of being able to increase the number of participants who can contribute from different locations at different times. Such online groups facilitate participation in decision making and enable participants to contribute equally (Kiesler & Sproull, 1992).

Sources and receivers of information become indistinguishable when using interactive communication. An individual may begin as a receiver but as soon as the individual responds to a message they become the source of the new message. Separating source from receiver in a conversation becomes problematic during two-way communication. The roles alternate based upon which party is speaking or sending a message and which party is listening or receiving a message. Regardless of which party is the source or the receiver, when we look at a relationship between two firms, we know that each may be a receiver and each may be a source at some point in their interaction. The buyer may be the source of an initial communication and the supplier the receiver, but when the supplier responds to the buyer, these roles are reversed. Rather than source and receiver, we differentiate between the two parties based on their roles as buyer or supplier. Buyer contacts communicate with the supplier and supplier contacts communicate with the buyer.

2.3. Content

The content of a message is what is said or communicated. Content has been examined based on influence attempts such as direct or

indirect and coercive or non-coercive content (Frazier & Rody, 1991; Mohr & Nevin, 1990). Direct content refers to specific behavior requests and does not attempt to verify another participant's understanding or expectations. Indirect content is focused on information exchanged in order to influence by developing a shared understanding. Indirect content is aimed at changing beliefs or attitudes rather than focusing on immediate action and is considered to be more relational (Frazier & Summers, 1986; Mohr & Nevin, 1990). This dichotomy, however, appears to reduce all communication to influence attempts (Duncan & Moriarty, 1998), not joint problem solving or communication concerned with group or relationship benefits.

Another way to examine message content is instrumental versus social content (Sheng et al., 2005). Instrumental content is related to business objectives and tasks that are important for contractual relations but often social content that strengthens bonds is also required because of the complexity involved (Macneil, 1981). The instrumental component aids in the development of shared expectations while the social component aids in the development of shared values. Both are necessary for long-term relationships.

One method of examining the instrumental content of communication is rationality, which refers to the rationale for particular decisions without a direct attempt to influence (Joshi, 2009). Rationality is an indirect attempt to influence and provides information to justify a particular course of action. Social content entails sharing information that may not be directly related to tasks but enhances social bonds. While a B2B relationship requires the instrumental component of communication to deal with goals and tasks, the social component of communication has a significant role in aligning perceptions, setting expectations, and improving coordination (Anderson & Weitz, 1989; Etgar, 1979; Sheng et al., 2005). An examination of social, structural, and financial relationship investments finds social investments, which are special cases of interaction or information exchange like meals, events, or special status such as 'preferred customer' result in the highest customer specific return (Palmatier, Dant, et al., 2006). These findings suggest that social interaction is valuable in an inter-organizational relationship.

2.4. Feedback

Communication with one-way messages may be beneficial up to a threshold but frequent communication that is not bidirectional becomes detrimental (Dawes & Massey, 2005; Maltz & Kohli, 1996). Two-way communication is a measure of the levels of bidirectional communication (Fisher et al., 1997). A response to a previous message is one form of feedback. Although feedback can take many forms including a change in attitude or behavior, following Joshi (2009) we use reciprocal feedback, which is responses to previous messages in two-way communication between the parties. According to Dwyer, Schurr, and Oh (1987), buyer-seller relationships cannot be formed or maintained without bilateral communication. Previous research has investigated feedback in terms of bidirectionality, which is the degree to which communication is bidirectional as opposed to one-way, measured by comparing the amount of communication from seller to buyer and from buyer to seller (Mohr & Nevin, 1990). Two-way communication is a sign of mutual agreement or support and greater shared meaning (Duncan & Moriarty, 1998; Mohr & Nevin, 1990; Sunnafrank, 1986). Rather than unilateral action, two-way action or co-creation requires customer empowerment and one method of empowering customers is to allow them to connect and collaborate with the firm (Ramani & Kumar, 2008).

Bidirectional communication can still be found with one-way communication patterns (Joshi, 2009), e.g., when an email with promotional material sent from a supplier to a buyer is followed by a request for proposal (RFP) sent from a buyer to a supplier, the messages are not necessarily connected unless the RFP is in response to the promotional material or vice versa. Feedback is response to a message and includes references to previous messages or responses (Song & Zinkhan, 2008). Instead of bidirectionality, Joshi (2009) recommends reciprocal feedback as a measure for feedback and two-way communication. Reciprocal feedback measures frequency of responses to previous messages rather than frequency of initiating communications.

2.5. Satisfaction

Satisfaction is a measure of the overall evaluation of an exchange relationship based upon past performance. The evaluation includes economic and noneconomic dimensions (Geyskens, Steenkamp, & Kumar, 1999). Satisfaction does not imply that intermediate transactions between buyer and supplier organizations in B2B markets are relational, though it is necessary for the development of relational bonds (Sashi, 2012). Without satisfaction the relationship may dissolve, but if suppliers satisfy buyers, long-term relationships become possible. When buyers are satisfied with previous transactions, repurchase is more likely. A study of retailer relationships with vendors finds that satisfaction with previous outcomes is associated with the long term orientation of both retail buyers and their vendors (Ganesan, 1994).

Satisfaction has been found to positively impact profitability (Anderson, Fornell, & Lehmann, 1994). Customers who are satisfied purchase more often and are more likely to purchase other goods and services from the same firm. Satisfied customers are less sensitive to price increases and willing to pay for the certainty of satisfaction. Firms with more satisfied customers will need to spend less on customer acquisition due to higher customer retention as well as the potential benefits of positive word of mouth communication. In B2B negotiations between a salesperson and a buying team, simultaneous F2F bargaining results in more integrative agreements with increased profit to the seller as well as increased satisfaction to the buyers (Patton & Balakrishnan, 2012). Buyer satisfaction with technology-mediated communication from suppliers such as e-mail, voice mail, audio/video conferencing, and web-based ordering has been found to have a significant positive effect on future purchase intentions (MacDonald & Smith, 2004).

A meta-analysis of satisfaction in marketing channel relationships shows that satisfaction drives trust, which drives commitment (Geyskens et al., 1999). But a study of interorganizational relationships finds that communication drives trust, which drives commitment (Morgan & Hunt, 1994), while a study of retailer-consumer relationships that considers satisfaction to be a critical indicator of relationship quality finds that relationship quality leads to loyalty (De Wulf, Odekerken-Schröder, & Iacobucci, 2001). The nature of the links among these relational outcomes is not clear and we focus on the relationship between communication and satisfaction in this study.

2.6. Hypotheses

The importance of contacts has been shown in research on participation (Kiesler & Sproull, 1992; Moriarty & Spekman, 1984), relational exchange (Macneil, 1981), and network theory (Palmatier, 2008; Slater & Narver, 1995). Palmatier (2008) investigates the impact of contact density, which refers to the number of interfirm relational ties, and demonstrates that the number of interfirm contacts has a direct positive impact on customer value. According to network theory, more interorganizational ties are positively associated with enhanced communication efficiency (Rowley, 1997), greater coordination and cooperation (Oliver, 1991), and the development of shared expectations (Meyer & Rowan, 1977). As the number of interpersonal ties between organizations increases, uncovering and sharing information increases. The benefits of increased ties are available to both buyers who are able to communicate their needs and suppliers who are able to uncover more profit opportunities (Palmatier, 2008). As the number of buyer and supplier contacts increase, the number of relational ties will increase as

well. These ties lead to greater participation, improving decision quality and customer value.

Personal F2F communication often entails interaction with individuals not originally intended to be part of the planned communication. In many cases it would be unusual to walk into a buyer's place of business and move straight to a F2F meeting with the individual you plan to meet. F2F meetings can lead to additional introductions that may not occur digitally. These introductions increase the network of contacts and potential opportunities. Digital communication permits introductions to take place simply by copying coworkers on emails or inviting other departments to online meetings or forums. These digital introductions, however, are unlikely to involve individuals outside the buying center, restricting the number of contacts and opportunities. Traditional impersonal communication that in the past relied on an endorsement letter, memo, or request for introductions is least likely to lead to an increase in contacts and potential opportunities. All three modes of communication are expected to have a positive relationship with buyer and supplier contacts but the number of contacts and relational ties are greater with personal than digital than impersonal communication. Therefore, we propose the following hypotheses:

H1. Personal communication has a stronger positive relationship than digital communication with (a) buyer and (b) supplier contacts.

H2. Digital communication has a stronger positive relationship than impersonal communication with (a) buyer and (b) supplier contacts.

Rationality is instrumental and aids customers and suppliers in making and justifying their own decisions while social interactions aid in developing trust and positive feelings for a partner. Rationality and social interaction both contribute to relational exchange. The former is necessary to acquire information for decision making while the latter can increase understanding and confidence in that information. Personal F2F communication provides additional cues that are not available digitally. These cues are rich sources of information that may better convey the information sought. For example, when responding to a question from a buyer, the seller may respond with a simple “yes” but the facial expression and tone of voice may indicate a need for more information. As the cues available in a mode of communication increase, the communication becomes richer and clearer resulting in greater sharing of both instrumental and social information. All three modes of communication are expected to have a positive relationship with rationality and social interaction but the acquisition and understanding of information is greater with personal than digital than impersonal communication.

H3. Personal communication has a stronger positive relationship than digital communication with (a) rationality and (b) social interaction.

H4. Digital communication has a stronger positive relationship than impersonal communication with (a) rationality and (b) social interaction.

Feedback can occur in a F2F meeting, a digital setting where past messages are often automatically recorded permitting an asynchronous response, or in response to impersonal communication. In F2F communication, feedback is unavoidable because cues like body language available in personal interactions can be interpreted as feedback. Digital communication allows several forms of feedback but it is not automatic and can even be avoided. All three modes of communication are expected to have a positive relationship with reciprocal feedback but the frequency of responses is greater with personal than digital than impersonal communication.

H5. Personal communication has a stronger positive relationship than digital communication with reciprocal feedback.

H6. Digital communication has a stronger positive relationship than impersonal communication with reciprocal feedback.

The communication process enables buyers and suppliers to share expectations and adjust to successes and failures over time. Satisfaction in a buyer-seller relationship is the result of multiple evaluations of events, people, and objects related to the exchanges between buyer and supplier organizations and communication plays a unique role in driving satisfaction. Communication may have a positive impact on overall satisfaction with the relationship even in the presence of a service or product failure. As the level of effective communication increases, the negative impact of relationship conflict on satisfaction decreases, but the positive impact of task conflict on satisfaction also decreases (Hung & Lin, 2013). The use of appropriate modes of communication for performing different tasks leads to high levels of satisfaction with the process and outcome of the communication (Mason & Leek, 2012). As frequency of contact increases, buyers report greater relationship strength (Dagger, Danaher, & Gibbs, 2009) and a stronger positive attitude towards suppliers (Davies & Treadgold, 1999). Each of the interactivity dimensions is expected to have a positive relationship with satisfaction.

H7. Buyer and supplier contacts have a positive relationship with satisfaction.

H8. Rationality has a positive relationship with satisfaction.

H9. Social interaction has a positive relationship with satisfaction.

H10. Reciprocal feedback has a positive relationship with satisfaction.

In summary, personal, digital, and impersonal modes of communication are expected to differ in their relationship with several interactivity dimensions: buyer and supplier contacts, rationality, social interaction, and reciprocal feedback. Our model has developed a typology of communication modes based on media richness and media synchronicity theory. Personal communication is richer and always synchronous, digital communication is less rich and offers some control over the degree of synchronicity, and impersonal communication is least rich, asynchronous, and often one-way. We empirically investigate the relationship between the modes of communication, dimensions of interactivity, and satisfaction with the relationship.

3. Method

3.1. Measures

Measurement scales are developed based on existing scales where possible, modified as appropriate, and tested for the constructs in the study. A summary of the constructs and items is shown in Appendix A. Our method of distinguishing between modes of communication is new and scales are developed for personal, digital, and impersonal communication. Previous scales do not differentiate between modes of communication but sum the frequency of communication across modes (Mohr et al., 1996). Two academics and two practitioners were interviewed to determine the clarity and face validity of the items. In addition, 30 managers responsible for purchasing in different firms were contacted and asked to complete a survey and provide feedback on the items. On the basis of this feedback, several items were revised and edited and the instructions modified to indicate that impersonal communication included paper copy and digital included telephone (an electronic device used to exchange information).

3.2. Pretest

A link to the survey was sent to 100 business owners or managers for a pretest using a network of personal contacts. The survey instrument described the modes of communication and asked respondents to choose one major supplier whose relationship with the company was familiar to them in order to respond to the survey items. Responses were measured with a 5 point Likert scale. Of the 100 businesses

contacted, 61 completed the survey. Exploratory factor analysis (EFA) was conducted using principal components analysis. All items were examined for reliability and several items identified for deletion. The items for buyer and supplier contacts loaded on a single factor. The buyer and supplier contacts are a proxy for the sources and receivers of communications and separating source from receiver becomes problematic with two-way communication. The roles tend to alternate and merge. The buyer and supplier communication variables were recoded into a single variable called dyadic contact by summing each buyer communication item with the corresponding item in the supplier communication scale. Palmatier's (2008) measure for contact density asked respondents to estimate the number of relational ties between their organization and a supplier organization. Dyadic contact is an alternative method of measuring the number of relational ties between buyer and supplier organizations. Based on the results of the exploratory factor analysis our scales are purified. Cronbach's alpha for the final scales in the pretest range from 0.71 to 0.95.

3.3. Data collection

A national sample of firms in the commercial printing and graphic design industry is used to collect data for the empirical analysis. Limiting the study to this "somewhat homogeneous population minimizes extraneous sources of variation" (Morgan & Hunt, 1994, p. 27). Firms in the industry provide printing and graphic design services for business purposes in intermediate transactions with buyers. Key buyers include retailers that are major users of catalogs and direct mail, magazine and book publishers who outsource printing, finance and insurance firms, and providers of professional, scientific, and technical services that are major users of stationery, brochures, and reports. Key suppliers include paper and cardboard mills, and providers of prepress and postpress services, ink, computer, and peripheral equipment. The industry is highly fragmented and characterized by a rapid pace of change that necessitates continual monitoring of the environment by members for changes in customer preferences as well as design and production technology (McKenna, 2014).

Data was collected from middle and upper level managers familiar with the firm's supplier relationships. We use Campbell's (1955) criteria of drawing upon a sample population of key informants who are knowledgeable about the phenomena of interest and are willing and able to respond to an online survey. Our study investigates communication in B2B relationships and discussions with managers indicate online communication is often utilized and frequently preferred, suggesting that an online survey is an appropriate method for data collection. Online surveys have gained credibility as a valid and reliable method of collecting data from business managers (Dillman, 2011). Our method of collecting contact information allowed us to screen a priori for job title and industry in order to minimize sampling frame error.

A web scraper was used to gather email addresses from firms in the industry. This collection procedure resulted in one email address for each firm's website. The web scraper program resulted in 4988 email addresses identified as decision makers in their respective companies. These individuals had one of the following words in their job title: buyer, purchasing, president, chief, or owner. The initial distribution resulted in 272 completed surveys. A second distribution and reminder resulted in an additional 56 completed surveys for a total of 328 surveys. Also, 321 respondents indicated they were not qualified to participate. The only reason given for not being qualified was not having personal knowledge of the company's communication with suppliers.

3.3.1. Response rate

The overall response rate is calculated by first estimating the number of eligible respondents in the sample following Malhotra (2010, p. 384). Using the total number of contacts (completed surveys and not qualified messages), this formula estimates the total number of eligible respondents in the sample. Contact was made with 649 potential respondents who either completed the survey or sent an email response, leaving 4339 potential respondents whose eligibility has not been ascertained. Out of 649 contacts, 328 were eligible respondents and 321 were ineligible. This suggests the number of eligible respondents is 2521, so the response rate is 13%, which is acceptable when compared with the response rate of 9 to 13% for similar studies (Morgan & Hunt, 1994; Palmatier, Houston, Dant, & Grewal, 2013).

3.3.2. Assessing non-response bias

Early and late respondents were compared to assess non-response bias (Armstrong & Overton, 1977). There were 253 complete responses from the first request for participation and 56 responses followed the second request. Forty percent of respondents worked at firms with 5–50 employees and over 50% of respondents reported 2012 revenues > 5 million. There were no statistically significant differences in the number of employees or revenues of early and late respondents. We also looked for differences between our key variables of interest by summing the items for the key constructs and looking for differences between early and late respondents and none were found to be statistically significant.

3.3.3. Assessing common method variance

Common method variance could be an issue because the data is self-reported and collected using the same method at the same time. Harman's one-factor test was used to investigate the presence of common method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). An exploratory factor analysis with all items resulted in an unrotated solution of 7 factors with eigenvalues > 1 that explained 75% of the variance, the first factor accounting for 33% of the variance. If common method variance is a problem, a single factor should emerge or one factor will account for the majority of the variance (Podsakoff et al., 2003). The results suggest that common method variance is not a problem in this study.

3.4. Confirmatory factor analysis

Confirmatory Factor Analysis (CFA) with Lisrel 8.8 (Jöreskog & Sörbom, 2006) is used to test the reliability and validity of the variables before examining the relationships between them. Using a two-step structural equation modeling (SEM) approach allows the researcher to first test a measurement model linking the observed variables to the latent factors that they reflect. Once a satisfactory measurement model has been identified, the relationships between the latent variables can be tested using a structural model (Anderson & Gerbing, 1988; Novak, Hoffman, & Yung, 2000).

3.4.1. Measurement model

Table 1 presents the results of the CFA and includes item means and standard deviations. The items should have a factor loading of at least 0.50 (Hair, Anderson, Tatham, & Black, 1995) and loadings > 0.70 would be ideal (Hair, Black, Babin, Anderson, & Tatham, 2010). On the basis of the initial CFA, several items with low loadings (shown in italics in Appendix A) were removed to improve construct validity. One item, item 4 for digital communication with a loading below 0.70 (but > 0.50) was retained to maintain the standard of three items per latent variable. The remaining observed variables have loadings ranging from a minimum of 0.63 to a maximum of 0.95. These factor loadings provide evidence of item reliability. Additional evidence has been provided by our preliminary exploratory and reliability analyses conducted in the pilot studies. The elimination of items with cross loadings in the pilot study helped ensure unidimensionality, which is an assumption of SEM and reliability analysis (Hair et al., 2010; Kline, 2010).

Hu and Bentler (1999) recommend a combination rule for fit indices and provide evidence that a cutoff rule utilizing both Root Mean Square Error of Approximation (RMSEA) and Standardized Root Mean Square Residual (SRMR) result in the lowest sum of Type 1 and Type 2 error

Table 1
Confirmatory factor analysis results.

Construct	Item	Standardized loading	*t* Value[a]	Mean	SD
Personal communication	1	0.94		3.48	1.13
α = 0.94	2	0.88	26.66	3.50	1.08
	3	0.95	33.81	3.56	1.12
	4	0.81	21.38	3.41	1.14
	5	0.75	17.98	3.58	1.25
Digital communication	1	0.88		3.42	1.08
α = 0.82	3	0.83	13.87	3.49	1.09
	4	0.63	11.15	3.32	0.99
Impersonal	1	0.77		3.25	1.18
communication	2	0.92	18.00	3.27	1.11
α = 0.92	3	0.89	17.35	3.40	1.10
	4	0.86	16.44	3.28	1.10
Dyadic contact	1	0.82		3.84	0.76
α = 0.87	2	0.83	15.48	3.52	0.84
	3	0.83	15.47	3.61	0.86
Rationality	1	0.82		4.04	0.86
α = 0.84	2	0.76	14.15	3.81	0.76
	4	0.84	16.11	3.41	1.00
Social interaction	1	0.71		3.10	1.05
α = 0.78	3	0.75	10.67	3.53	1.00
	4	0.77	10.80	3.01	1.15
Reciprocal feedback	1	0.70		3.41	1.00
α = 0.77	3	0.75	10.91	4.03	0.91
	4	0.77	12.21	3.84	0.84
Satisfaction	1	0.87		4.08	0.84
α = 0.87	2	0.79	16.24	4.14	0.78
	3	0.86	18.18	4.09	0.77
	4	0.69	13.20	4.30	0.90

[a] All *t*-values are significant $p < 0.01$.

rates. They recommend a cutoff rule of RMSEA ≤ 0.06 and SRMR < 0.09. Our RMSEA = 0.059 and our SRMR = 0.078. The SRMR and RMSEA meet the criteria for a good fit as well as minimizing error rates. Overall the fit indices provide evidence of a good fit.

Table 2 presents the composite reliability (CR), average variance extracted (AVE), endogenous variables R^2, and correlations of the latent variables. A composite reliability (CR) value of at least 0.70 is required for a construct to be reliable (Hair et al., 2010). Our CR scores range from a low of 0.86 to a high of 0.96, indicating construct reliability. The *t*-values in our measurement model range from 10.67 to a high of 33.81, demonstrating convergent validity. An average variance extracted (AVE) value > 0.50 provides additional evidence of convergent validity (Fornell & Larcker, 1981; Hair et al., 2010). The AVE for all our latent variables is > 0.50.

If the correlation between two constructs is 1 (or close to 1), discriminant validity is poor. One method of demonstrating discriminant validity is to compare the AVE of each latent variable to the shared variance of that variable with each of the other variables in the measurement model. When the AVE is greater than the shared variance of constructs or alternatively, when the square root of the AVE for each latent variable is greater than each of the bivariate correlations of that variable with others (Fornell & Larcker, 1981), discriminant validity is established. The square root of the AVE for each construct is greater than the bivariate correlation in every case.

Anderson and Gerbing (1988) recommend an alternative method of establishing discriminant validity that estimates for each pair of latent variables a model with the latent variable correlation constrained to 1 and a separate model with the correlation free to vary. Following their recommendation, 56 CFA models were estimated to establish discriminant validity. A chi square difference test was performed for each pair of models. A significant chi square difference provides evidence of discriminant validity (Anderson & Gerbing, 1988). All of our Chi square differences are significant at the 0.01 level and in each case the model with the better fit (lower Chi square) was the unconstrained model providing additional evidence of discriminant validity.

The measurement model demonstrates adequate item reliability, a good fit utilizing several indices and combinations of indices, composite reliability, convergent validity, and discriminant validity. The second portion of the two-step procedure is to estimate the structural model.

Table 2
CR, AVE, R^2, and correlations of latent variables.

	Correlations							
	1.	2.	3.	4.	5.	6.	7.	8.
1. Personal communication	**0.87**							
2. Digital communication	0.15	**0.79**						
3. Impersonal communication	0.49	0.08	**0.86**					
4. Rationality	0.43	0.28	0.31	**0.81**				
5. Social interaction	0.47	0.15	0.34	0.24	**0.74**			
6. Reciprocal feedback	0.73	0.40	0.46	0.41	0.39	**0.74**		
7. Dyadic contact	0.41	0.23	0.26	0.23	0.22	0.37	**0.82**	
8. Satisfaction	0.39	0.25	0.28	0.74	0.46	0.46	0.08	**0.81**
CR	0.96	0.89	0.95	0.91	0.87	0.86	0.92	0.93
AVE	0.76	0.62	0.74	0.65	0.55	0.55	0.68	0.65
Endogenous variables R^2				0.26	0.25	0.65	0.21	0.60

The bold diagonal on the correlation matrix is the square root of the AVE.

3.4.2. Structural model

The hypothesized paths are evaluated using structural equation models with Lisrel 8.8 and Maximum Likelihood (ML) estimation (Jöreskog & Sörbom, 2006). We present the results below and discuss the implications in the next section.

The χ^2 for the model is 958.4 ($p < 0.001$), which is significant but sensitive to sample sizes and therefore not a reliable test of model fit in models with larger than 100 observations (Hair et al., 2010). Kline (2010) recommends the χ^2/df, RMSEA, and at least one incremental index such as the non-normed fit index (NNFI) or comparative index such as CFI. Table 3 shows a summary of the fit statistics, all of which are acceptable.

In order to test hypotheses in a structural equation model, the path coefficients are examined with the sign and significance of the path coefficient providing support for the hypothesized relationships (Bentler, 1990; Kline, 2010). Sixteen paths were examined and the standardized path coefficients and their *t*-values are presented in Table 4. Personal, digital, and impersonal communications have a significant positive relationship with each interactivity dimension as expected except for the relationship between impersonal communication and dyadic contact, which is not significant. The only dimensions of interactivity with a significant positive association with satisfaction are rationality and reciprocal feedback. The other significant path is dyadic contact, which has a negative coefficient, contrary to expectation. Social interaction does not have a significant association with satisfaction.

Table 4 facilitates comparison of the coefficients. The path coefficients from personal communication to three of the four dimensions of interactivity are stronger than those for digital communication, but the path coefficient from personal communication to rationality is weaker than that from digital communication to rationality. The path coefficients from digital communication to three of the four dimensions of interactivity are stronger than those for impersonal communication, but

Table 3
Structural model fit statistics.

Fit	Value	Acceptable value
χ^2/df	2.69	< 3
RMSEA	0.072	< 0.08
CFI	0.96	> 0.9
NNFI	0.96	> 0.9

Table 4
Standardized path coefficients and *t*-values.

	Personal	Digital	Impersonal	Satisfaction
Dyadic contact	0.31**	0.23**	0.12	− 0.16**
	4.33	*3.63*	*1.71*	*2.99*
Rationality	0.28**	0.30**	0.19**	0.69**
	4.02	*4.71*	*2.80*	*10.45*
Social interaction	0.36**	0.13*	0.17*	− 0.03
	4.71	*2.01*	*2.32*	*0.61*
Reciprocal feedback	0.55**	0.39**	0.21**	0.24**
	8.40	*7.11*	*3.73*	*3.66*

* $p < 0.05$.
** $p < 0.01$.

the path coefficient from digital communication to social interaction is weaker than that from impersonal communication to social interaction.

Table 5 presents a summary of the hypotheses and results. The results provide support for six hypotheses, partial support for two hypotheses, and fail to support two hypotheses.

Table 6 shows the total indirect effects of the paths from personal, digital, and impersonal communication to satisfaction. The total indirect effects of personal, digital, and impersonal communication are the sum of the compound paths beginning with each variable. The strength of a compound path is the product of the coefficients along the path. Comparing the total effects of personal and digital communication on satisfaction, we see that the positive association of each mode of communication with satisfaction is attenuated when dyadic contact is taken into account. The path from digital via rationality to satisfaction is stronger than the path from personal via rationality to satisfaction, while the path via reciprocal feedback to satisfaction is stronger for personal than for digital communication. Overall, the indirect effect of personal communication on satisfaction is slightly stronger than that of digital communication despite the stronger negative impact of dyadic contact and the weaker positive impact of rationality, because of the stronger positive impact of reciprocal feedback. These results and their implications are discussed in the next section.

4. Discussion

This research sought to answer two questions: (1) how interactive is digital communication relative to personal F2F and impersonal communication, and (2) which dimensions of interactivity are more or less likely to promote satisfaction with the relationship. For the first question, the results indicate that personal F2F communication is more interactive than digital communication with respect to dyadic contact, social interaction, and reciprocal feedback; digital communication is more interactive than impersonal communication with respect to dyadic contact, rationality, and reciprocal feedback. Personal F2F communication leads to more participation, social or nontask related communications, and back and forth dialogue than digital while digital leads to more participation, instrumental or task related communications, and back and forth dialogue than impersonal communication. Digital communication, however, appears to be better than personal F2F communication for sharing task related information but not for sharing nontask related information.

Table 6
Indirect effects.

Relationship to satisfaction	Via dyadic contact	Via rationality	Via social interaction	Via reciprocal feedback	Total indirect effects
Personal	(− 0.049)	0.193	0	0.116	0.260
Digital	(− 0.037)	0.207	0	0.082	0.252
Impersonal	0	0.124	0	0.042	0.166

For our second question, the results show that the only dimensions associated positively with satisfaction are rationality and reciprocal feedback. Social interaction is not associated with satisfaction, and dyadic contact is inversely associated with satisfaction. In order to promote satisfaction, it appears that communication should focus on task related information, specifically, information that helps justify a course of action. Feedback should be encouraged and the number of participants involved in the interaction should be limited if possible.

4.1. Implications for theory

Digital is more effective than personal communication in terms of rationality, contrary to expectation. Rationality refers to the provision of information to justify a course of action and includes facts, figures, and logical arguments (Joshi, 2009) and does not require cues available only with F2F communication. When such information is shared digitally, it is readily available for comparison across competing information sources and the likelihood of it being false may actually be less than if it is shared F2F (Jap, Robertson, & Hamilton, 2011). Also, the path from digital communication to social interaction is not stronger than the impersonal communication to social interaction path, suggesting that social or nontask related communication is more likely to occur offline. This may be related to the recording and monitoring capabilities of digital communication. Digital does not appear to offer any advantages relative to impersonal communication if nontask related interaction is required. Although previous research has shown that social investments can improve mutual understanding as well as customer specific returns (Palmatier, Dant, et al., 2006), our results suggest that from a buyer's perspective, nontask related communication is not associated with satisfaction in B2B relationships.

The path from personal communication to reciprocal feedback is stronger than the path from digital communication to reciprocal feedback, which in turn is stronger than the path from impersonal communication to reciprocal feedback. In a F2F meeting, feedback is synchronous, giving participants little opportunity to rehearse, edit, or control the timing of responses. Even if it is not verbal, feedback is usually immediate with personal communications. In digital

Table 5
Summary of hypotheses and results.

H1	Personal communication has a stronger positive relationship than digital communication with dyadic contact.	*Supported*
H2	Digital communication has a stronger positive relationship than impersonal communication with dyadic contact.	*Supported*
H3	Personal communication has a stronger positive relationship than digital communication with (a) rationality and (b) social interaction.	*a. Not supported* *b. Supported*
H4	Digital communication has a stronger positive relationship than impersonal communication with (a) rationality and (b) social interaction.	*a. Supported* *b. Not supported*
H5	Personal communication has a stronger positive relationship than digital communication with reciprocal feedback.	*Supported*
H6	Digital communication has a stronger positive relationship than impersonal communication with reciprocal feedback.	*Supported*
H7	Dyadic contact has a positive relationship with satisfaction.	*Not supported*
H8	Rationality has a positive relationship with satisfaction.	*Supported*
H9	Social interaction has a positive relationship with satisfaction.	*Not supported*
H10	Reciprocal feedback has a positive relationship with satisfaction.	*Supported*

communications, although users can control the timing of communications, feedback is still expected to occur. Reciprocal feedback, which has a positive association with relationship satisfaction in our study, has been found to increase understanding and satisfaction with communications (Mohr & Sohi, 1995).

Dyadic contact has a negative association with satisfaction indicating that as the number of contacts involved in communications increases, satisfaction decreases. Greater dyadic contact may lead to interactions becoming inefficient and a buyer's perception of inefficient interactions is positively related to the propensity to switch (Palmatier, Scheer, Evans, & Arnold, 2008). The indirect effects of personal communication show that it has a positive association with satisfaction via rationality but as dyadic contact increases, this positive association is diminished. When the total impact of both dyadic contact and rationality is taken into account, digital has a stronger positive association than personal communication with relationship satisfaction. However, when the indirect effects of personal and digital communication via reciprocal feedback are included as well, personal has a stronger positive association than digital communication with relationship satisfaction. Thus when immediate feedback is required in addition to task related information and reciprocal feedback, personal has a stronger association with satisfaction.

4.2. Managerial implications

Our findings enable managers to determine the appropriate mode of communication and the content of communication for a particular influence strategy. Table 7 highlights the managerial implications of our study. Personal has a stronger positive impact than digital communication on dyadic contact but the impact of dyadic contact on satisfaction is negative, suggesting that F2F communication would be preferred for fewer contacts while digital would be preferred for many contacts. However, digital has a stronger positive impact than personal communication on rationality, which has a positive impact on satisfaction. Thus digital communication would be the preferred mode for sharing task information. Personal has a stronger positive impact than digital communication on social interaction but the impact of social interaction on satisfaction was not significant. Personal F2F communication would be preferred for sharing nontask information. Personal has a stronger positive impact than digital communication on reciprocal feedback, which has a positive impact on satisfaction. Personal F2F would be preferred when immediate feedback is required while digital is more suitable for obtaining planned feedback.

Managers can choose a particular mode of communication by comparing the benefits and drawbacks of different modes. Digital communication provides several benefits that include ease of use, speed, recording capabilities, rehearsability, control over synchronicity, and the ability to interact with a large number of contacts but cannot provide instantaneous feedback in terms of nonverbal cues like facial expression and body language. On the other hand, personal F2F communication provides immediate feedback, social interaction, and nonverbal cues but its relative unsuitability for task related communication and its limited ability to control synchronicity, growth in contacts, and message content as well as travel and time costs are drawbacks. As a consequence, information sharing may not be accurate or pertinent to a relationship. Personal communication appears to be the best method for reciprocal feedback and social interaction. Digital is as effective as personal communication when social interaction and immediate feedback are less important. If immediate feedback is not required and multiple contacts are involved, then digital becomes the more effective communication method. Rationality has a positive impact on relationship satisfaction and can be better achieved through digital communication. A study of partner selection in B2B information service markets indicates that good personal relationships are more important in the selection process if a service is subjective in nature and less important if a service is strategically important, but interpretation and advice are more important for subjective as well as strategically important services (Wuyts, Verhoef, & Prins, 2009), suggesting that personal communication is more important for subjective services while digital communication is more important for strategically important services.

F2F meetings because of their innate nature can be a drain on resources and time and the success of these interactions depends on the number of contacts involved. Increasing the number of interorganizational contacts reduces the positive impact of personal relative to digital communication. For communicating with larger groups, digital communication appears to be the better alternative. When several contacts are involved, managers should first decide if it is necessary to “read” the other parties' tone, expressions, and body language or if it is necessary to be “read” in order to effectively communicate and then consider the number of participants.

The study shows that digital communication has a stronger association with rationality than personal, and rationality is positively associated with satisfaction. Often F2F sales calls do not make a direct appeal to purchase but share additional information that helps managers justify a particular purchase or decision. Such sales calls can be more effective online than F2F. Digital communication offers the advantage of sharing messages outside a F2F exchange and the ability to include or exclude others as needed. These messages can be viewed and responded to immediately or after contemplating a response. Digital can mimic personal communication while adding the ability to control timing, rehearse responses, and maintain the context of a conversation over time. Thus digital can offer more benefits than a F2F conversation in situations where nonverbal cues are unimportant. Digital communication is an effective method of sharing and communicating task related information in B2B transactions and might be a more efficient method especially when the cost of F2F communication is taken into account.

This study confirms the importance of personal communication and shows that under certain conditions digital communication offers advantages in B2B relationships. Both personal and digital communications promote satisfaction in B2B relationships. As the number of

Table 7
Managerial implications.

Interactivity dimension	Mode comparisons	Impact on satisfaction	Implications	
			Personal F2F	Digital
Dyadic contact	Personal has a stronger positive impact than Digital	−	More effective for fewer Contacts	More effective for many Contacts
Rationality	Digital has a stronger positive impact than Personal	+	More effective for less Task Information	More effective for more Task Information
Social interaction	Personal has a stronger positive impact than Digital	Not significant	More effective for more Nontask Information	More effective for less Nontask Information
Reciprocal feedback	Personal has a stronger positive impact than Digital	+	More effective for immediate unrehearsed Feedback	More effective for planned Feedback

people involved in these communications increases, digital becomes more beneficial to the relationship than personal communication. If immediate feedback is necessary, however, personal is more beneficial. Digital can provide many of the interactive benefits of personal communication as well as added benefits such as rehearsability, control over timing, and many-to-many capabilities. In order to improve satisfaction with a relationship, communication content should focus on task related information. Messages that provide facts, figures, and logic for making a decision is the type of content best shared via digital communication and positively impacts satisfaction.

4.3. Limitations and future research

A specific industry was chosen for the research in order to minimize the influence of extraneous sources of variation that might confound the results, but this limits generalizability. We were not as concerned about generalizability because it was an initial test of a theoretical model. Future research can use the model and scales developed in this study to replicate the research in other contexts.

We were unable to distinguish between buyer and supplier contacts. Our measures for the number of buyer and supplier contacts were highly correlated making it impossible to distinguish between the two measures. Rather than examining the separate impacts of buyer and supplier contacts, the measures had to be combined into a single variable measuring dyadic contact. Further research is required to distinguish between buyer and supplier contacts, and can help improve our understanding, for example, of how buying center size influences the communications decisions of suppliers.

Increasing dyadic contact has a negative impact on satisfaction for both personal and digital communication, but the negative impact is greater for personal than for digital communication. Further research is required to determine the optimum or maximum number of participants for effective communication using different modes. For instance, the number of possible participants may depend on the level of expertise of individual contacts and their experience with a mode of communication (Carlson & Zmud, 1999).

Future research may also seek to investigate differences among types of digital communication. A study of communication between buyers and suppliers engaged in new product development found that both F2F and email communication had a positive relationship to knowledge exchange between them, but video conferencing was not significant and the effect of web-based tools was significant and negative (Thomas, 2013). Differences among types of digital media may make them more or less appropriate for different tasks and further research is required to better understand these differences.

How communication modes change over the course of a relationship between buyer and supplier is another question for future research to address. Future research may also investigate how relationship satisfaction can lead to desired outcomes that are objective measures such as profits and new accounts.

Appendix A. Constructs and items

Construct	Items
Personal communication	1. We have frequent F2F interactions with this supplier.
	2. We frequently share information with this supplier in F2F meetings.
	3. We often have F2F contact with this supplier.
	4. We often collaborate with this supplier in F2F meetings.
	5. We rarely have F2F meetings with this supplier. (R)
Digital communication	1. We have frequent online interactions with this supplier.
	2. We frequently share information with this supplier using interactive communication.[a]
	3. We often have online contact with this supplier.
	4. We often collaborate with this supplier using interactive communication.
	5. We rarely have interactive communications with this supplier. (R)[a]
Impersonal communication	1. We frequently communicate with this supplier using traditional nondigital media.
	2. We frequently share information using traditional nondigital media.
	3. We are often in contact with this supplier using traditional nondigital media.
	4. We often collaborate with this supplier using traditional nondigital media.
	5. We rarely use traditional nondigital media to communicate with this supplier. (R)[a]
Dyadic contact	1a. This supplier is in contact with several individuals at our company.
	1b. We are in contact with several individuals at this supplier.
	2a. This supplier communicates with members of several departments at our company.
	2b. We communicate with members of several departments at this supplier.
	3a. This supplier communicates with members of several levels of management at our company.
	3b. We communicate with members of several levels of management at this supplier.
Rationality	1. This supplier provides us with information that helps guide our decisions.
	2. This supplier provides us with reasons for choosing a particular action.
	3. This supplier shares the results of their experience with us.[a]
	4. This supplier provides us with information we can use when deciding between alternative courses of action.
Social interaction	1. We have close personal relationships with members of this supplier.
	2. This supplier interacts with members of our company socially.[a]
	3. This supplier treats some members of our company like friends.
	4. Some of our communication with this supplier is personal.
Reciprocal feedback	1. This supplier solicits our views on an ongoing basis.
	2. This supplier provides us with a lot of feedback on our performance.[a]
	3. This supplier has frequent two-way communication with us.
	4. This supplier has regular dialogues with us.
Satisfaction	1. We are very satisfied with this supplier.
	2. We would choose this supplier if we had to do it over again.

3. We are pleased with the relationship we have with this supplier.
4. We are unhappy with this supplier. (R)

(R) Indicates reverse coded item.
[a] Items in italics were dropped due to low factor loadings.

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