# Media synchronicity in organizational social exchange

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## Abstract

**Purpose** – The purpose of the paper is to examine how media synchronicity facilitates the emergence of social exchange (i.e. trust and reciprocity) in organizations' information and communication technology (ICT)-mediated interactions. A model of media synchronicity in organizational social exchange (MSiOSE) is proposed.

**Design/methodology/approach** – The paper has a design and review approach. The theoretical analysis is based on social exchange theory (SET) and media synchronicity theory (MST).

**Findings** – The authors propose that, in general, social exchange benefits from both asynchronous and synchronous communication processes. However, media synchronicity has different boundary conditions (i.e. pros and cons) in relation to the emergence of social exchange, determined in accordance with the mutually interacting patterns of trust and reciprocity predicted by SET. The authors provide testable theoretical propositions to support the analysis.

**Originality/value** – Social exchange is a critical business factor for organizations due to its well-known positive outcomes, such as the strengthening of social ties. The need for successful social exchange in remote work conditions is particularly emphasized. However, with regard to the communication and behavioral patterns that lead to social exchange via ICT, the theoretical understanding is limited. The study reveals previously unmapped heuristics between social exchange and physical media capabilities. Thus, the study's propositions can be used to study and analyze social exchange in the ever-changing media landscape. As a practical contribution, the study helps organizations to improve their communication strategies and use of ICT.

**Keywords** Media synchronicity, Social exchange, Trust, Reciprocity, Information and communication technology

**Paper type** Research paper

## 1. Introduction

The nature of work is changing rapidly as information and communication technology (ICT) reveals new possibilities for organizations. Physical presence is no longer necessarily required as organizations transfer their tasks and communication processes into virtual environments (e.g. Forman *et al.*, 2014; Chernyak-Hai and Rabenu, 2018). However, managing ICT-mediated interaction in organizations is far more challenging than managing traditional face-to-face work, especially in terms of maintaining and strengthening social ties (i.e. interpersonal relationships) in the workplace (e.g. Dubé and Robey, 2009; Golden, 2006; Kotlarsky and Oshri, 2005; Tietze and Nadin, 2011). This is a major challenge for organizations because the strength of social ties affects how employees carry out their professional duties and, thus, how organizations perform (Maznevski and Chudoba, 2000; Best and Krueger, 2006). The impact of remote work conditions on the building of social relationships and the consequent potential decline in organizational performance were manifested during the COVID-19 pandemic (Gorlick, 2020; NY Times, 2020). Considering these recent observations and prior research, it is thus critical to understand

how ICT-mediated interactions affect the development of social relationships in organizations.

Social exchange theory (SET) is one of the most widely used paradigms for explaining workplace behavior and communication outcomes (Cropanzano *et al.*, 2017). According to Blau (1964), social exchange refers to the various exchanges in our daily lives that result in "unspecific obligations" (Blau, 1964, p. 93) to others. Trust is a critical part of these exchanges (Cropanzano and Mitchell, 2005). Social exchange has a fundamental impact on the strength of social ties, leading to many other positive outcomes as well, such as increased collaboration performance or workplace satisfaction (e.g. Chun *et al.*, 2016; Kamdar and Van Dyne, 2007; Liao *et al.*, 2010; Robert and You, 2018). The importance of successful social exchange in the modern workplace (e.g. in remote work and virtual teams) has been acknowledged as particularly critical because communication depending primarily on ICT results in less direct, and thus more ambiguous, social exchange processes (Cameron and Webster, 2011; Chernyak-Hai and Rabenu, 2018). However, the role of ICT in organizational social exchange is not well understood in literature (e.g. Cameron and Webster, 2011; Chernyak-Hai and Rabenu, 2018; Cortex and Johnston, 2020).

In general, we know that media characteristics have a significant impact on communication processes and outcomes (see Walther, 2011). In this regard, we also know that the use of synchronous (e.g. videoconferencing) or asynchronous (e.g. email) media affects the efficiency of communication (Dennis *et al.*, 2008). However, the connection between media characteristics and social exchange has not been dealt with in depth. This formed the basis for this study's research question: *how does media synchronicity facilitate the emergence of social exchange in organizations' ICT-mediated interactions?*

In this article, we propose a model of media synchronicity in organizational social exchange (MSiOSE). (1) Based on Blau's (1964) view on SET, we operationalize social exchange as mutually reinforcing patterns of trust (i.e. trusting behavior) and reciprocity (i.e. trustworthiness). In addition, (2) we explain how media synchronicity facilitates patterns of trust and reciprocity and develop empirically backed theoretical propositions based on the extant literature. Media synchronicity theory (MST) (Dennis *et al.*, 2008) provides us with a theoretical lens for use in analysis. The utilization of MST offers us a unique way in which to study physical media capabilities as boundary conditions for the emergence of social exchange in ICT-mediated interaction. Our approach thus sheds new light on previously unmapped heuristics between the technological (media synchronicity) and social (social exchange) domains. Ultimately, our goal is to improve the use of ICT in organizations, increase our knowledge of successful virtual collaboration and help managers implement various communication technologies and strategies.

The paper is structured as follows: in the second section, we describe SET (Blau, 1964) and MST (Dennis *et al.*, 2008) as the theoretical background for our analysis. The third section presents the MSiOSE model, in which we conceptualize and operationalize social exchange as patterns of trust and reciprocity. Then, we describe in depth how media synchronicity acts as boundary condition for the emergence of social exchange in ICT-mediated interaction. We provide empirically backed theoretical propositions to support our analysis. Finally, in the fourth section, we conclude our paper with a discussion of the implications in the context of information systems (IS), and in the fifth section, we present the limitations and future research topics.

## 2. Theoretical background
### 2.1 Social exchange in ICT-mediated interaction
SET is a paradigm that is widely used to explain individuals' behavior and communication outcomes within an organization (Cropanzano *et al.*, 2017). We adopt Blau's (1964) microlevel

view of SET and focus on exchanges that occur in interpersonal communication. Cropanzano and Mitchell (2005, p. 887) define this type of social exchange as "social transaction in a social relationship" and thus clearly distinguish these exchanges from economic transactions and relationships.

Trust and reciprocity are the conceptual cornerstones of social exchange (Blau, 1964; Cropanzano and Mitchell, 2005). Trust is a widely studied concept in a variety of disciplines, such as psychology, management studies and economics (Hung *et al.*, 2004; Mayer *et al.*, 1995), as well as in the fields of IS and knowledge management (e.g. Hung *et al.*, 2004; Robert *et al.*, 2009). In an organizational context, Mayer *et al.* (1995, p. 712) defined trust as "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party." Reciprocity, in turn, is a fundamentally important principal component, a moral code that binds different social systems together (Blau, 1964; Blumstein and Kollock, 1988; Gouldner, 1960). A certain amount of generalized reciprocity occurs in every social system. We adopt Gouldner's (1960) description of reciprocity as a "pattern of mutually contingent exchange of gratifications" (Gouldner, 1960, p. 161). A large number of experimental studies have demonstrated that strong social ties and individual reputation in a social system are built under conditions of trust and reciprocity, in which trust is the desired outcome of reciprocity and *vice versa* (Lioukas and Reyer, 2015; Molm, 2010; Ostrom and Walker, 2003; Schilke *et al.*, 2015). Thus, we analyze social exchange via patterns of trust and reciprocity, which may or may not occur in various human interaction conditions.

As Lioukas and Reyer (2015) and Cropanzano *et al.* (2017) note, social exchange is not an automatic process that occurs in every repeated interaction between individuals due to certain (and often unexplored) boundary conditions that prevent it from happening. This theoretical framing is thus particularly relevant when studying social exchange in extensive remote work conditions and ICT-mediated interaction (e.g. Chernyak-Hai and Rabenu, 2018; Cortez and Johnston, 2020). In general, communication relying primarily on ICT, and less on face-to-face communication, also results in less direct, and more ambiguous, social exchange processes (Cameron and Webster, 2011; Chernyak-Hai and Rabenu, 2018). This may, in turn, impact negatively on, for example, workplace social ties (e.g. Cameron and Webster, 2011) or employees' attitudes and team climate (e.g. Cortez and Johnston, 2020; Robert and You, 2018). On the contrary, in addition to the strengthening of social ties (Blau, 1964; Cropanzano and Mitchell, 2005), positive social exchange is often linked to organizations' critical success factors, such as increased job performance (e.g. Chun *et al.*, 2016; Kamdar and Van Dyne, 2007; Liao *et al.*, 2010; Robert and You, 2018).

Positive social exchange tends to be dependent on trust, which Cropanzano and Mitchell (2005, p. 886) describe as "the critical social exchange mediator." Building and maintaining trust is often considered a particular challenge in virtual teamwork (e.g. Breuer *et al.*, 2016; Dubé and Robey, 2009). In general, ICT-mediated interaction conveys decreased observation opportunities and fewer social cues (Breuer *et al.*, 2020; Feitosa and Salas, 2021; Robert *et al.*, 2009), which leads to slower and more elaborate trust building processes (Hung *et al.*, 2004), especially when paired with communication between less-acquainted individuals (Jarvenpaa and Leidner, 1999). During the early stages of a team's formation, team members' trusting beliefs have more influence on their trust in the team and aspects such as perceived team cohesiveness (Jarvenpaa *et al.*, 2004). However, when individuals accumulate sufficient information to assess a team member's trustworthiness, the role of "swift" trust declines, and trust is established based on team member behavior (Hung *et al.*, 2004; Robert *et al.*, 2009). However, there is no coherent understanding about the boundary conditions set by ICT for these reciprocal communication patterns and their effect on trust (i.e. social exchange).

Prior studies of social exchange in ICT-mediated interaction have focused on, for example, the effects or emergence of social exchange in information systems use

(e.g. Gefen and Ridings, 2002), online communities (e.g. Jin *et al.*, 2015; Kao *et al.*, 2020; Posey *et al.*, 2010; Yan *et al.*, 2016), online games (e.g. Sharma *et al.*, 2021) and online social networks (e.g. Kim *et al.*, 2018; Surma, 2016), but none of these studies explored the connection between social exchange and media characteristics. In addition, a large number of media theories examine the effect of media characteristics on various communication outcomes (see Walther, 2011) but without using SET as an analytical framework. In this study, we approach social exchange through patterns of trust and reciprocity, which provides us a theoretical frame to analyze boundary conditions for the emergence of social exchange in ICT-mediated interaction. Next, we explain how drawing from MST (Dennis *et al.*, 2008) in our theoretical analysis helps us to identify the communication processes and media characteristics with which the mechanisms of social exchange are associated.

### 2.2 Media synchronicity

Dennis *et al.* (2008, p. 581) define media synchronicity as "the extent to which the capabilities of a communication medium enable individuals to achieve synchronicity." According to MST, media synchronicity constitutes five media capabilities, namely *transmission velocity*, *symbol sets, parallelism*, *rehearsability* and *reprocessability*. Greater transmission velocity and symbol sets are indicative of a medium with higher synchronicity (e.g. videoconferencing), whereas greater parallelism, rehearsability and reprocessability are indicative of a medium with lower synchronicity (e.g. email) (Dennis *et al.*, 2008).

Dennis *et al.* (2008, p. 583) define media capabilities as "potential structures provided by a medium which influence the manner in which individuals transmit and process information." High transmission velocity relates to the "immediate" or "rapid" exchange of messages and increased "interactivity." A high transmission velocity also enhances feedback and coordination mechanisms, leading to an improved shared focus between communicators. Accordingly, a medium with a greater number of natural symbol sets (physical, visual and verbal) has increased synchronicity, while a medium with fewer natural symbol sets (written or typed) has reduced synchronicity. High parallelism lowers synchronicity and shared focus but allows individuals to send and receive multiple messages simultaneously, without having to commit themselves to specific discussions. Media with lower synchronicity also enable individuals to rehearse (rehearsability) and reprocess (reprocessability) their messages with fewer time constraints and provide an emphasis on increased message elaboration, but with the cost of a lower level of shared focus (Dennis *et al.*, 2008).

According to MST (Dennis *et al.*, 2008), communication needs consist of two primary processes: *conveyance* and *convergence*. Conveyance emphasizes *information processing*, which is usually achieved effectively with a medium of lower synchronicity. This communication process is most effective when the information transmitted is novel and diverse, allowing individuals to encode or decode information as they feel comfortable. Here, the focus is thus within individuals slowly digesting large amount of new and raw information. By contrast, convergence processes emphasize *information transference*, which is best achieved by media that supports high synchronicity. Convergence processes focus on the verification of and/or adjustment to an existing knowledge base among individuals. This involves a discussion on the meaning of information and the interpretation of the information that is shared. Thus, the aim is to reach a shared understanding via dialogue and discussion. Furthermore, both communication processes, conveyance and convergence, require information transference and information processing, but in different relative order of importance (Dennis *et al.*, 2008).

In our theoretical analysis, we apply MST (Dennis *et al.*, 2008) because it provides a unique way in which to study the relationship between social exchange and physical media capabilities. Our basic assumption in this study is that media synchronicity facilitates not

only the processing and transference of "cold" information but social cues as well (i.e. social exchange). The relationships between media synchronicity and social exchange are thus demonstrated throughout our theoretical model.

### 3. The model of media synchronicity in organizational social exchange (MSiOSE)

Our theoretical model (Figure 1) posits that media synchronicity facilitates the emergence of social exchange in ICT-mediated interaction. In this section, we present empirically backed propositions relating to media synchronicity and social exchange. Contiguously with the scope of MST, our goal is to build a model that is broad enough to enable generalizations across contexts but also precise enough to allow for a more detailed analysis.

MST (Dennis *et al.*, 2008) discusses the effectiveness of communication, in which media synchronicity plays a crucial role. However, we argue that media synchronicity affects the communication performance of social cues (i.e. social exchange) as well. For example, in initial trust building processes, people tend to prefer face-to-face interactions with rapid exchange of rich social cues (i.e. a medium of higher synchronicity) (Riedl *et al.*, 2014; Robert *et al.*, 2009). These trust-building processes rely heavily on our natural tendency to build trust based on facial information and other nonverbal behavior (Kock, 2009).

On the other hand, reciprocity tends to manifest in a system that supports collective action (i.e. a medium of lower synchronicity with high parallelism). At the group level, the transparency of reciprocal services tends to lead to a positive feedback loop between individuals (Novak and Sigmund, 2005). Based on these fundamental examples of social exchange (we discuss these examples further in the next sections of our paper), the MSiOSE model posits that *in ICT-mediated interaction, media synchronicity facilitates the communication patterns of trust and reciprocity and, thus, social exchange. This happens when communication needs for effective social exchange involve both conveyance and convergence processes.*
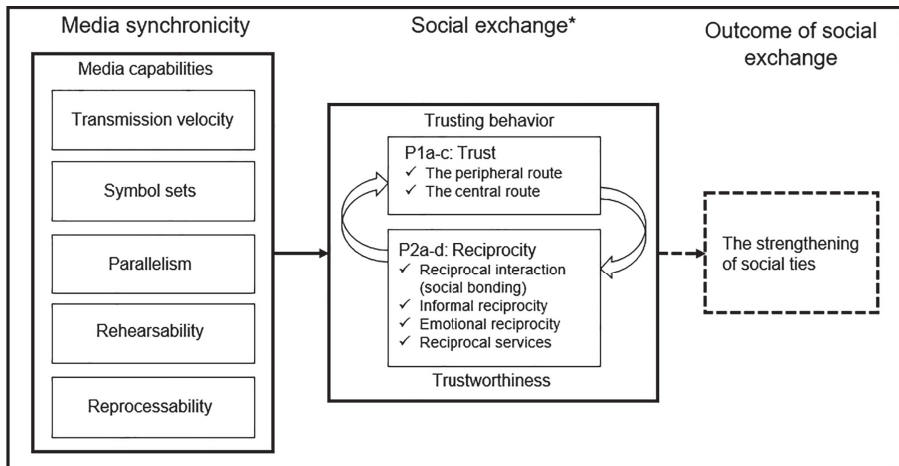


**Figure 1.**
The model of media synchronicity in organizational social exchange (MSiOSE)

**Note(s):** ICT-mediated communication should encompass both information processing (conveyance) and information transference (convergence) for effective social exchange

Next, we make several theoretical propositions. The propositions are about the extent that media synchronicity facilitates the emergence of social exchange in ICT-mediated interaction. Each of the propositions includes key conditions for their realization, which are linked to media capabilities and different aspects of social exchange (i.e. trust and reciprocity).

An in-depth analysis of the extant literature enables us to conceptualize and operationalize social exchange as patterns of trust and reciprocity (as summarized in Table 1). However, it is important to notice that, in general, many social exchange processes include behavior that is at least partly automated or subconscious (e.g. Bargh and Chartrand, 1999). Therefore, social exchanges are not necessarily conscious acts or communication processes in organizational or interpersonal communication. Rather, various aspects of social exchange occur during our daily tasks and are often seemingly casual (e.g. Blau, 1964; Cropanzano and Mitchell, 2005; Duck *et al.*, 1991). We also discuss these implications further in the next section.

*3.1 Trust*
In order to analyze individuals' behavior, attitudes and expectations in social exchange, we treat trust as *trustworthiness*, meaning that it is based on the ability, benevolence and integrity of a trustee and affected by the trustor's propensity (Lioukas and Reuer, 2015; Mayer *et al.*, 1995). Such a propensity may be defined as a general willingness to rely on others. "Ability" is defined as a "group of skills, competencies, and characteristics that enable a party to have influence within some specific domain" (Mayer *et al.*, 1995, p. 717). Thus, this set of knowledge and skills is domain specific in that the trustor has the belief that the trustee has the ability to do what he/she is supposed to. "Benevolence" is based more heavily on the trustee's character and described as "the extent to which a trustee is believed to want to do good to the trustor, aside from an egocentric profit motive" (Mayer *et al.*, 1995, p. 718). Finally, "Integrity" is defined as "the trustor's perception that the trustee adheres to a set of principles that the trustor finds acceptable" (Mayer *et al.*, 1995, p. 719).

| Pattern | Conceptual definition | Operational definition |
|---|---|---|
| Trust | "The willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party" (Mayer *et al.*, 1995, p. 712) | Trustworthiness: building trust based on the trustee's perceived benevolence, ability and integrity<br>The route: building trust via the peripheral, central and habitual routes |
| Reciprocity | "Pattern of mutually contingent exchange of gratifications" (Gouldner, 1960, p. 161) | Reciprocal interaction (social bonding): verbal and nonverbal reciprocity, compliments, problem-solving, mimicry, "doing together"<br>Informal reciprocity: personal/impersonal participation, lack of rules and roles, multiple discussion topics, self-disclosure, rich language and speech register, unscheduled, unarranged agenda, interactive<br>Emotional reciprocity: explicit expression of emotions, emotional support and exchange, discussing of emotions<br>Reciprocal services: an exchange of concrete and uncodified information (e.g. seeking help or potential collaboration), indirect reciprocity, "doing favors for others" |

Table 1.
Conceptual and operational definitions for patterns of trust and reciprocity in ICT-mediated social exchange

Drawing on Petty and Cacioppo (1986), Hung *et al.* (2004) argue that trust is formed via three distinct routes at various stages of a relationship. (1) Individuals who lack a shared history and information about one another (i.e. weak ties) form trust via *the peripheral route*, which relies on various peripheral cues, such as social categories, third-party information, rules, roles and reputation. This form of trust is based more heavily on presumptions than on the deliberate assessment of others' traits. (2) Once individuals have acquired some information from one another, they form trust via *the central route*. The central route emphasizes the building of cognition-based trust [1], requiring more cognitive effort on the part of the trustor, including a more elaborate appraisal of the trustee's abilities, benevolence and integrity. (3) Finally, when individuals have a long-shared history and the relationship has matured (i.e. strong ties), they form trust via *the habitual route*. At this stage, building trust has become a habit that requires less cognitive effort (Hung *et al.*, 2004) [2].

Petty and Cacioppo (1986) state that individuals form long-lasting attitudes toward others mainly via the central route. Using the central route also depends on the individual's motivation and ability to process the message received. If these requirements are not met, the peripheral route, which requires less cognitive effort, is used to process the message, probably accompanied by a less significant change in attitude. However, information acquired via the peripheral route may increase an individual's motivation to activate the central route (Petty and Cacioppo, 1986). For example, if the message sender's professional status is perceived to be sufficient via the peripheral route, others will be more motivated to use the central route for further assessment of his/her abilities and disciplinary competence. Hung *et al.* (2004) also note that the relative importance and perceived value of these trust antecedents (i.e. ability, benevolence and integrity) tends to depend on the communication context.

We draw from Kock (2009) and argue that, in general, the mental alignment between individuals is more effective in face-to-face interactions than via other communication means. Assessing others' behavior is often an automatic process that occurs subconsciously (e.g. Petty and Cacioppo, 1986; Robert *et al.*, 2009). Various social cues, such as appearance, facial expressions, gestures and tone of voice, play an important role in building cognition-based trust (Burgoon *et al.*, 2021; Hung *et al.*, 2004; Robert *et al.*, 2009). To effectively predict others' trustworthiness, the exchange of this information should also be rapid and based on direct observations of others' behavior (Robert *et al.*, 2009). Given these basic premises of trust building, we argue that effective cognitive-based trust building emphasizes convergence processes that benefits from media of higher synchronicity:

> *P1a.* Media of higher synchronicity facilitate cognitive trust building more effectively than those of lower synchronicity.

> *P1a Condition(s).* (1) Faster transmission velocity enables rapid exchange of information, whereas (2) the higher number of symbol sets (physical, visual and verbal) increases the number of social cues.

However, asynchronous media may be used to form trust via the central route as well, although the lack of nonverbal cues and slower message accumulation make this more difficult (Hung *et al.*, 2004). Similarly, Petty and Cacioppo (1986); Carlson and Zmud (1999) and Walther (1992) note that asynchronous interactions, such as texts, enable in-depth message elaboration due to the increased time needed to transfer and process a message. These accumulated perceptions, in turn, influence how individuals perceive others' trustworthiness (Hung *et al.*, 2004; Robert *et al.*, 2009). Accordingly, we argue that trust can be built via a medium of lower synchronicity, but this requires more time, motivation and effort. Therefore,

> *P1b.* Media of lower synchronicity emphasize cognition-based trust building as a conveyance process.

*P1b Condition(s).* (1) Higher rehearsability and (2) reprocessability make it possible to rehearse and reprocess messages more elaborately.

In addition, a medium with higher parallelism (Dennis *et al.*, 2008) generates a great deal of online content because it allows many people to interact with one another simultaneously (e.g. different social networking services, wikis and mailing lists). These asynchronous channels contain many peripheral cues attempting to capture people's attention, but individuals (especially those with weak ties) do not have the cognitive capacity and/or interest to interpret all of these cues in detail (Hung *et al.*, 2004). In the context of virtual teams, Breuer *et al.* (2020) describe how transparent communication (e.g. in terms of task related information and shared responsibilities) is a critical building block in a team's trusting behavior. Thus, we argue that asynchronous communication channels emphasize trust building via the peripheral route as a sort of "impression management" system, as described by Tidwell and Walther (2002). This connection between a medium of lower synchronicity and the peripheral route is especially relevant in group-level interactions. Therefore,

*P1c.* Media of lower synchronicity emphasizes trust building via the peripheral route.

*P1c Condition(s).* (1) Higher parallelism enables many peripheral cues to be exposed and evaluated between individuals, whereas (2) the lower number of symbol sets decreases the number of social cues and (3) slower transmission velocity slows down the exchange of information.

### 3.2 Reciprocity
In social exchange, reciprocity is a demonstration of an individual's trustworthiness (Lioukas and Reuer, 2015; Molm, 2010; Ostrom and Walker, 2003). According to SET, "reciprocity" refers to as exchanges in our daily lives that are characterized by "unspecific obligations" (Blau, 1964, p. 93) toward others and involve feelings, such as affection, gratitude and (eventually) trust (Blau, 1964; Cropanzano and Mitchell, 2005; Portocarrero, 2019). Trust is thus a desired outcome of reciprocity and vice versa. In a social system, reciprocity tends to evolve into more complex processes, such as group cohesion (Blau, 1964). Based on the extant literature, we operationalize reciprocity into four distinct but closely interrelated phenomena: 1) *reciprocal interaction (social bonding)* (e.g. Blau, 1964; Lakin and Chartrand, 2003; Burgoon *et al.*, 2021), 2) *informal reciprocity* (e.g. Altman and Taylor, 1973; Blau, 1964; Cook *et al.*, 2013), 3) *emotional reciprocity* (e.g. Lawler and Thye, 1999; Portocarrero, 2019) and 4) *reciprocal services* (e.g. Blau, 1964; Gouldner, 1960; Novak and Sigmund, 2005). This operationalization enables us to study each distinct communication pattern of reciprocity in depth and, thus, the effect of ICT on these communication processes.

*3.2.1 Reciprocal interaction (social bonding).* Reciprocal interaction (social bonding) refers to general verbal and nonverbal social bonding behavior (e.g. Blau, 1964; Lakin and Chartrand, 2003), such as simple social exchanges, the provision of respect in exchange for advice (Blau, 1964) or positive sentiments and attitudes toward others (Skågeby, 2010). Various rituals, or "initiation rites", also play an important role in social bonding (Skågeby, 2010). In general, individuals also tend to mimic one another's nonverbal behavior when creating rapport. For example, nonverbal social bonding occurs when individuals respond to one another's behaviors with similar (or otherwise appropriate) behaviors (Burgoon *et al.*, 2021). Much of this behavior is automatic (see, *mimicry* or *mirroring*; Lakin and Chartrand, 2003).

In our analysis, reciprocal interaction as social bonding behavior relates closely to direct collaboration and cooperation ("doing together") and the rapid detection and exchange of rich social cues (e.g. during a dialogue). We argue that reciprocal interaction that involves social bonding is more effective via media of higher synchronicity because they enable the rapid

transmission of both verbal and nonverbal social cues. Individual-level social bonding emphasizes direct personal contact, rapid information exchange and rich nonverbal cues, such as gazes, facial expressions and tone of voice (see Burgoon *et al.*, 1993; Burgoon *et al.*, 2021). Accordingly, we argue that effective social bonding is characterized by a need for information transmission *among* individuals (convergence) rather than information processing *within* individuals (conveyance). Therefore,

*P2a.* Reciprocal interaction (social bonding) is facilitated more effectively by a medium of higher synchronicity.

*P2a Condition(s).* (1) Faster transmission velocity enables rapid exchange of information, whereas (2) the higher number of symbol sets (physical, visual and verbal) increases the number of social cues.

*3.2.2 Informal reciprocity.* Informal reciprocity (i.e. exchanges that occur outside formal work settings) is an elementary part of social exchange (e.g. Blau, 1964; Cook *et al.*, 2013). Informal communication within organizations is also a widely studied topic (e.g. Gulati and Puranam, 2009; Morand, 1995) as is information technology (IT)'s role in informal knowledge sharing (e.g. Alavi and Leidner, 2001; Davison *et al.*, 2013; Zhao and Rosson, 2009). Informality strengthens social ties when participants interact with one another as unique individuals rather than occupants of social positions. Outside formal roles, there are more topics to be discussed, and interaction is more likely voluntary (Blumstein and Kollock, 1988). Multiple discussion topics help individuals to get to know one another better (Altman and Taylor, 1973), and sharing personal matters lays the groundwork for deeper affection (Krackhardt, 1992).

Kraut *et al.* (1990, p. 5) define informality as "[. . .] that which remains when rules and hierarchies, as ways of coordinating activities, are eliminated. More positively, informal communication is communication that is spontaneous, interactive and rich." We draw from Kraut *et al.* (1990) and argue that informality can be operationalized under two main categories: (1) *participating* (personal/impersonal, random and out of role) and (2) *presentation* (multiple topics, personal matters, rich content, language and speech register, unscheduled, unarranged agenda and interactive).

Leveraging informality creates many benefits in organizations. For example, informal interaction is closely associated with enhanced innovation capabilities (e.g. Aalbers *et al.*, 2014). A great deal of organizational knowledge is shared informally (e.g. Krackhardt, 1992; Zhao and Rosson, 2009), especially the form of knowledge that is otherwise difficult to capture formally without losing context and richness of information (Davison *et al.*, 2013; Zhang *et al.*, 2011). This seemingly casual interaction is important because it affects the very basis of organizational performance (Alavi and Leidner, 2001; Davison *et al.*, 2013).

Additionally, IS scholars have suggested that collaborative systems should be designed to bridge the gap between organizations' formal and informal structures (Alavi and Leidner, 2001; Zhang *et al.*, 2011). The empirical literature also indicates that both asynchronous tools (e.g. microblogging) and synchronous tools (e.g. instant messaging) can be successfully used to support informality in organizations (Hung *et al.*, 2004; Davison *et al.*, 2013; Zhao and Rosson, 2009). We argue that media of lower and higher synchronicity have different advantages and disadvantages in relation to informal communication.

Technically, a medium of lower synchronicity enhances informal communication because it supports multitasking and does not necessarily interrupt formal work processes (Davison *et al.*, 2013; Walther, 1995). Thus, there is no need for an immediate response (Brown *et al.*, 2010), and communicators may observe the environment before contributing to the discourse (Spagnoletti *et al.*, 2015). In this way, the message is conveyed, but the actual interaction is more voluntary (Zhao and Rosson, 2009). Individuals also tend to compensate for the lack of

nonverbal cues with increased self-disclosure (Walther, 1992). Visual anonymity has been found to increase self-disclosure when compared to face-to-face settings (Clark-Gordon *et al.*, 2019; Sia *et al.*, 2002). It seems that, in general, weak ties especially are more willing to engage in discussions with others via a medium of lower synchronicity and more confident when doing so (Tidwell and Walther, 2002).

Accordingly, increasing the number of social cues does not necessarily enhance informality (Zhao and Rosson, 2009). A medium of higher synchronicity, such as video or telephone conferencing, is often felt to be formal and intrusive (Fish *et al.*, 1992; Kraut *et al.*, 1990). It may also be possible that videoconferencing is felt to be too intimate and/or interruptive for casual or informal interaction, especially that between acquaintances or previously unknown individuals. This may be due, for example, to pauses, interruptions, simultaneous speech and problems with turn taking or with the "over-use" of the visual channel, which may increase cognitive load among participants (O'Malley *et al.*, 1996). Bailenson (2004, p. 3) suggests that the disruption of our "simultaneously effortless and incredibly complex" nonverbal behavior due to extensive amounts of videoconferencing may lead to a nonverbal overload or "Zoom fatigue."

Nevertheless, informality is also leveraged if *more* synchronous communication is used, such as instant messaging without audio or video connections. For example, Davison *et al.* (2013) describes how interactivity and (near) real-time nature of instant messaging enables the capturing of contextual richness and direct personal connection that are often considered critical in informal knowledge sharing and communication. By definition, interactivity is also an important part of informal communication (Kraut *et al.*, 1990).

Based on our theoretical analysis, it seems that synchronicity itself, as a sum of transmission velocity and symbol sets (Dennis *et al.*, 2008), does not predict the communicative effectiveness of informal reciprocity that well. Lower synchronicity and higher synchronicity media have their own unique and nuanced benefits in terms of informal reciprocity. Some emphasize conveyance of information (e.g. sending links to informal web sites), and some convergence on meaning (e.g. joking together). However, our analysis suggests that boundary conditions for the effective communication of informal reciprocity, synchronously or asynchronously, can be traced down to physical media capabilities. Therefore,

*P2b.* Media synchronicity has nonlinear associations with informal reciprocity.

*P2b Condition(s), lower synchronicity.* (1) Higher rehearsability and (2) reprocessability enhance the ease of making connections informally, (3) a higher parallelism enables participants to engage in multiple discussion topics and (4) a lower number of natural symbol sets enhances informality due to increased self-disclosure.

*P2b Condition(s), higher synchronicity.* (1) A faster transmission velocity and (2) higher number of symbol sets enhance informality due to increased interactivity and more direct personal connection.

*3.2.3 Emotional reciprocity.* Emotional reciprocity (i.e. emotional exchanges) has a central role in the SET's theoretical framework (e.g. Lawler and Thye, 1999; Portocarrero, 2019). In this paper, we define emotional reciprocity as "the recognition, expression and sharing of emotions or moods between two or more individuals" (Derks *et al.*, 2008, p. 767). Informal and emotional reciprocity are often gradually evolving, overlapping communication processes. For example, as individuals begin to connect with one another, "superficial" discussion topics,

such as the weather and entertainment, may overlap with or gradually move toward emotional communication (Altman and Taylor, 1973; Lawler and Thye, 1999).

There is a great deal of empirical evidence that individuals communicate emotions very similarly via ICT and face to face (e.g. Derks *et al.*, 2008; Walther, 1996). However, a narrower communication channel and a lack of mimicry (i.e. individuals mimicking one another's nonverbal gestures, face or posture) create a different communication dynamic. As a communication pattern, emotional reciprocity can be broken down into two different phenomena: emotion talk and expressing emotions (Derks *et al.*, 2008). Derks *et al.* (2008, p. 773) point out the difference: "socially sharing one's emotions and seeking support for one's point of view is not the same as directly expressing emotions to the object of one's feelings." Therefore, we operationalize emotional reciprocity using two categories: (1) *emotion talk* and (2) *expressing emotions.*

In parallel with informality, media synchronicity is not a straightforward predictor of the effectiveness of communicating emotions. In general, visual anonymity makes media with low synchronicity "safer" for emotion talk (Riordan and Kreuz, 2010; Hertel *et al.*, 2008). A medium of lower synchronicity also enables emotion talk without time constraints, allowing individuals to have more time to describe their feelings (Derks *et al.*, 2008; Hertel *et al.*, 2008). Therefore, text-based interactions have been reported to provide opportunities for those who avoid emotion talk in face-to-face situations (Clark-Gordon *et al.*, 2019; Hertel *et al.*, 2008; Riordan and Kreuz, 2010). Expressing emotions is also more explicit in text-based interaction (Derks *et al.*, 2008). For example, people are inclined to use various emoticons and acronyms (Derks *et al.*, 2008). This may be a form of overcompensating for the limitations of the narrower communication channel (Derks *et al.*, 2008; Tidwell and Walther, 2002).

However, while expressing emotions and emotion talk are relatively effortless in text-based interactions (Derks *et al.*, 2008), emotions (especially negative ones) are often harder to recognize (Riordan and Kreuz, 2010). The use of a medium of lower synchronicity may also create challenges in crisis situations due to the lack of real-time corrections of misinterpretations (Dennis *et al.*, 2008; Derks *et al.*, 2008; Lawler and Thye, 1999). Text-based media that are more synchronous (e.g. chats) are thus perceived to be relatively effective when communicating emotions (Clark-Gordon *et al.*, 2019; Riordan and Kreuz, 2010).

Taking into account many similarities with informal communication but also considering emotional reciprocity as a distinct phenomenon and communication pattern, our theoretical analysis suggests that media synchronicity does not clearly predict the communication effectiveness of emotional reciprocity. However, our analysis suggests that physical media capabilities determine distinct boundary conditions for its effective communication. Therefore,

*P2c.* Media synchronicity has nonlinear associations with emotional reciprocity.

*P2c Condition(s), lower synchronicity.* (1) The lower number of natural symbol sets (physical, visual and verbal) leads to more "safe" emotion talk and more explicit expression of emotions, whereas (2) higher rehearsability and (3) reprocessability enable more elaborate emotion talk.

*P2c Condition(s), higher synchronicity.* (1) A greater number of natural symbol sets lead to more "rich" expression of emotions and decrease misinterpretations of expressed emotions, whereas (2) higher transmission velocity permits a faster conflict resolution mechanisms and correction of possible misinterpretations.

*3.2.4 Reciprocal services.* Reciprocal services form the core of SET, emphasizing reciprocal actions driven by the norm of reciprocity (Blau, 1964; Gouldner, 1960). Reciprocity thus tends to be manifested in systems that support transparency and collective action. In ICT-mediated interaction, this collective action is often enhanced via asynchronous interaction (Spagnoletti *et al.*, 2015). For example, in the context of information systems, individuals may use tools, such as wikis, blogs and social networking services, when seeking help or potential collaboration (Alavi and Leidner, 2001; Zhao and Rosson, 2009). Reciprocal services emphasize the actual "doing" of tasks for others (and looking for help from others and for those who need help). This kind of exchange typically includes the conveyance of abstract, uncodified and relatively diffused information (Spagnoletti *et al.*, 2015), which can be most effectively communicated via an asynchronous medium (Dennis *et al.*, 2008). Many asynchronous tools with powerful search features may also provide a *faster* way to complete tasks than attempting to find a shared time and focus for communicating (Alavi and Leidner, 2001; Brown *et al.*, 2010).

In addition, *indirect* reciprocity ("you help me, and I help someone else") is a fundamental reputation management mechanism in our social networks (Novak and Sigmund, 2005). Interestingly, Walther *et al.* (2009) noticed that other-generated information is more effective than self-generated information when we form impressions from others in a social network. Thus, we tend to obtain mutual benefit from certain "impression management favors" (such as appreciation, gratifications, or nonverbal textual cues that are visible to others). Our theoretical analysis thus suggests that reciprocal services tend to lean on conveyance processes, which, eventually, may or may not manifest into mutually desirable actions or responses. Therefore,

*P2d.* Reciprocal services are facilitated more effectively by a medium of lower synchronicity.

*P2d Condition(s).* (1) Higher rehearsability and (2) reprocessability provide an opportunity to consider potential cooperation or assistance, whereas (3) higher parallelism enables both efficient means to seek and provide help and the emergence of indirect reciprocity in a social network.

## 4. Discussion and contribution

While social exchange is widely used to explain different behavior and communication outcomes in a workplace, prior studies have not investigated how technology contributes to the emergence of social exchange in depth. The lack of understanding of this issue can hinder the effectiveness and enjoyability of our remote communication and collaboration and, thus, also affect our workplace relationships. The present study aims to provide heuristics for understanding the relationship between media synchronicity and social exchange. This study thus seeks to investigate *how media synchronicity facilitates the emergence of social exchange in organizations' ICT-mediated interactions?*

In this paper, we describe via the MSiOSE model how ICT can be used effectively in order to reach a positive cycle of social exchange through patterns of trust and reciprocity. In our theoretical analysis, we propose that media of higher synchronicity facilitates cognitive trust building more effectively than do those of lower synchronicity due to the former's higher level of shared focus, faster transmission velocity and increased number of social cues. On the other hand, a medium of lower synchronicity emphasizes cognition-based trust building as a conveyance process, which can be beneficial when there is a need for more elaborate message rehearsing or reprocessing. However, in general, the use of a medium with lower

synchronicity emphasizes trust building via the peripheral route because parallelism enables vast amounts of peripheral cues to be displayed to and evaluated by the participants.

In addition, we propose that trustworthiness can be achieved effectively by using a variety of synchronous and asynchronous ICTs: first, reciprocal interaction, as a social bonding mechanism, emphasizes the use of more synchronous media due to their direct personal contact, rapid information exchange and rich nonverbal cues (e.g. mimicry). Second, informal reciprocity and emotional reciprocity are communicated effectively through the diverse use of various ICTs due to their nonlinear associations with media synchronicity. Third, reciprocal services emphasize asynchronous communication due to their higher parallelism while also increasing the amount of indirect reciprocity in a social system.

The main theoretical contribution of this study lies in its explanation of the way in which media synchronicity facilitates social exchange. We do this with the MSiOSE model by connecting the physical media capabilities adopted from MST (Dennis *et al.*, 2008) with Blau's (1964) microlevel view of SET. We believe that connecting social behavior (i.e. social exchange) with media synchronicity allows for generalizability with fewer contextual limits. Therefore, we believe that our approach produces a more nuanced understanding in that regard than if we had studied various media technologies and aspects of social exchange separately. By studying "conceptual relationships between IT, information and its (semiotic) representations and social behaviors" (Grover and Lyytinen, 2015, p. 271), we have taken steps toward producing new knowledge in information systems. We believe that MST (Dennis *et al.*, 2008), which we did not contradict, provides a solid basis for studying social exchange without reducing the actual IS problems to a restricted interpretation of SET (Blau, 1964). Our second theoretical contribution is the conceptualization and operationalization of social exchange in ICT-mediated interaction, where we diversified the concept of reciprocity so as to range from simple (and often subconscious) nonverbal exchanges (e.g. mimicry) to more explicit acts of reciprocal services, which all contribute to an individual's perceived trustworthiness. Despite the strong interconnectedness, every operational definition of these constructs is its own nuanced well-studied phenomenon. A third important theoretical contribution lies in the testable propositions, which provide heuristics for effective social exchange via ICT. These empirically backed predictions of individuals' behavior and communication advance SET by directly examining an exchange process in a specific context. The lack of such theoretical analysis has been one of the most critical shortcomings of SET (see Cropanzano *et al.*, 2017). However, these propositions are intended as rules of thumb and are not to be interpreted strictly. Many communication patterns of trust and reciprocity may act as determinants of one another, meaning that they may be communicated simultaneously or that one may affect another.

As a practical contribution, we believe that our study offers justificatory knowledge for the further design and development of ICT solutions in organizations. We believe that understanding social exchange and media synchronicity can provide organizations with a way to improve their communication strategies and use of existing ICT, especially in extensive remote work conditions. Our study is thus particularly relevant to organizations that manage globally distributed virtual teams with increased demand for strong social relations and mental alignment between individuals. Our key message for these organizations is twofold: 1) the possible negative effects from the lack of face-to-face communication can be mitigated, but this requires the versatile use of different communication tools and technologies and that 2) media synchronicity affects the online group dynamics of virtual teams, and many of these effects can be traced back to physical media capabilities. Ultimately, we also believe that our study helps organizations to develop completely new collaboration tools and technologies, which take into account the various dimensions of social exchange holistically.

# 5. Limitations and future research

We acknowledge that media synchronicity does not fully explain the facilitation of social exchange in ICT-mediated interactions. Future research could study the characteristics of an IS (i.e. system quality) and the characteristics of the system outputs (i.e. information quality) (Petter *et al.*, 2013) as facilitating conditions for social exchange. For example, the physical media capabilities of email and asynchronous electronic conferencing are identical (see Dennis *et al.*, 2008), but it seems obvious that they facilitate collaboration (i.e. reciprocity) differently. Accordingly, the way technology is used and appropriated in relation to personality types, skills/competencies and the cultural backgrounds of individuals must be studied more deeply. Different organizations may also have different rules and norms for communication, which may alter the use of ICT and, therefore, social exchange processes.

In this study, we have argued that media synchronicity, which is determined by different media capabilities, acts as a boundary condition for social exchange in ICT-mediated interaction. However, one interesting stream of future research relates to how media capabilities affect the dynamics of our social networks. For example, various social media platforms facilitate countless social interactions that accumulate into social relationships. In general, media of lower synchronicity perform well in simple conveyance processes, such as when weak ties reciprocate via "Likes" or "Retweets" on Twitter. However, the building of trust through these asynchronous social bonding mechanisms emphasizes reliance on associative social categories, indirect reciprocity, impression management and the peripheral route. It is thus possible that media capabilities themselves (in addition to the often-discussed social networking features and algorithms) act as a macrolevel boundary condition of social exchange, thus shaping our collective behavior and communication outcomes. The potential relationship between media capabilities and various negative social epidemics, such as filter bubbles and network polarization, is among the promising avenues for future research. We strongly encourage researchers to examine these topics further.

We also encourage the study of avatar-based communications in virtual reality (e.g. Bailenson *et al.*, 2004; Miller *et al.*, 2021; Torro *et al.*, 2021). Combining the advantages of asynchronous and synchronous communications in an immersive 3D environment may provide interesting perspectives for the development of social exchange, especially in context of geographically dispersed virtual teams. We believe that this kind of merging of the physical and the virtual will provide IS scholars with many important research topics in the future.

## Notes

1. We acknowledge the absence of affective-based trust (McAllister, 1995) in our model, but we do not explicitly handle how emotions evolve in communication. However, affective-based trust, such as "emotional ties," may be an indirect outcome of social exchange itself.

2. It is also possible that media synchronicity does not play that important a role at this point because "over the long run, communication transcends media" (Dennis *et al.*, 2008, p. 578).

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