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# PAY NOW OR PAY LATER: THE PRESENT-FUTURE DUALITY IN ORGANIZATIONAL COMMUNICATION

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# PAY NOW OR PAY LATER: THE PRESENT-FUTURE DUALITY IN ORGANIZATIONAL COMMUNICATION

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**Pay Now or Pay Later: The Present-Future Duality in Organizational Communication**

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Implicit in fundamental theories of organization regarding issues of change, adaptation, and learning is the acknowledgement of a present-future duality with which organizational members must come to terms. This duality refers to organizational members' need to function in the present while preparing for the future. Five aspects of this duality highlight its importance as a focus of study for scholars of communication, organizations, and groups: a) it is pervasive, b) communication makes a difference in how the duality is managed, c) managing the duality can lead to unintended consequences, d) its costs and benefits are unevenly distributed across organizational members, and e) a focus on the future does not necessarily prepare organizational members for the future because they are not able to predict the specific ways in which the future might be different from the present (Huber, 2004). Members cope with the present-future duality through communication practices designed to help them adapt to their future environment (Brown & Eisenhardt, 1997). This dissertation explores how

clock-based conceptions of time—time as "linear and uniform in its flow, existing independent of objects and events" (Lee & Liebenau, 1999, p. 1038)—relate to communication practices that are linked to the continuous flow of time and not to particular events (Brown & Eisenhardt, 1997). Research suggests that three such practices—proactive information sharing, using real-time information, and employing collective reflexivity—reduce delays in organizational adaptation. These relationships were examined through two studies. The pilot study included 58 respondents from a high technology organization in the Southwest United States. The second study included 186 respondents from a public transportation organization in the Southwest US. Contrary to the proposed framework, conceptions of time were not related to the three communication practices. However, a future focus was positively related to all three communication practices, exploration and communication adequacy.

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# Introduction

The present-future duality in organizations refers to the tension concerning how today's operational choices impact tomorrow's institutional viability. An omnipresent concern in organizational life, it centers on the decision to give up something now—be it time, money, or other resources—in exchange for a presumed reward later. This duality is reflected in common phrases such as "pay now or pay later" and the framing of negative short-term outcomes as "learning experiences" for the future—both prominent themes in issues of adaptation, which are captured in literature on organizational innovation (e.g. Brown & Eisenhardt, 1997), change (e.g. Hannan & Freeman, 1977; 1984, decision-making (e.g. Eisenhardt, 1989) and learning (e.g. Levinthal & March, 1993; March, 1991). These familiar literatures can be complemented with a communicative view that highlights the importance of communication and organizational members' experience of time in shaping organizational adaptation practices. Specifically, this dissertation explores how three specific communicative practices—proactive information sharing, collective reflexivity, and use of real-time information—help organizational members balance the present and the future and reduce delays in organizational adaptation (Brown & Eisenhardt, 1997; Huber, 2004).

Five characteristics of the present-future duality underscore the need for both scholars and practitioners to attend to this taken-for-granted aspect of organizational life. First, *the tension between the present and future is pervasive in organizations.* State transportation planning organizations in high-growth cities decide whether to construct new roads, highways and overpasses to alleviate traffic problems in the future at the cost

of both financial resources and an increase in traffic problems in the present. Organizations of all types need to balance investing in future developments while keeping reserves to face unexpected short-term obligations. Even the Federal Government has to balance the future solvency of Medicare, Social Security, and the budget deficit against our current tax benefits and government expenditures. Importantly, the present-future duality links practical issues, such as economics, with communicative issues, such as reputation and image. For example, when organizations like Johnson & Johnson face a crisis, preserving a future image and reputation might require organizational actions such as product recalls that are costly in the short-term.

Johnson & Johnson's and Exxon's reaction to crises also exemplify a second aspect of the present-future duality: *communication makes a difference in how the duality is managed.* In 1982, when seven people in the Chicago area died due to cyanide-laced Tylenol pills, Johnson & Johnson recalled all Tylenol products—with a retail value of more than 100 million dollars—and alerted the consumers to not use Tylenol until the extent of the tampering was determined (Kaplan, 1994). This very costly short-term decision helped Johnson & Johnson regain its position as market leader, despite a brief drop in sales in the months following the crisis. Johnson & Johnson's crisis management increased its reputation as an organization that cares about its customers and helped the organization regain a leadership position in the market it still holds to this day. In contrast, in 1988, when the Exxon-Valdez tanker spill damaged the environment, Exxon tried to cut its short-term costs by downplaying the extent of the damage, trying to share the burden of the blame with the Coast Guard, and scapegoating the captain (Williams & Treadaway, 1992). These short-term actions effectively hurt the company's reputation in

the long-term, as evidenced by the negative corporate image that for several years led Exxon's executives to avoid mentioning their place of work in social settings (Dutton, Dukerich, & Harquail, 1994; Elsbach & Kramer, 1996). As these examples illustrate, Johnson & Johnson and Exxon managed the tension between a current crisis and the future consequences of that crisis differently. These differences are a function of the communication processes that enable and constrain collective action across organizational and institutional sites.

Organizations differ in how they manage the present-future duality in part given the ambiguity of the action-outcome link. Organizational actors have different perceptions about how the duality should be managed and cannot anticipate the consequences of their actions. This leads to a third aspect of the present-future duality: *Decisions about how to manage the duality may lead to unintended consequences*. For example, members' self-interest in gaining powerful positions in future projects might inhibit their performance on a project to which they are currently assigned. Similarly, the short-term strategy of 'restructuring,' 'rightsizing,' or 'reengineering' cuts costs but also implies employee layoffs which can negatively impact future performance (Cravotta & Kleiner, 2001). Although downsizing is assumed to be related to lean and productive organizations (Kinnie, Hutchinson, & Purcell, 1997) "downsizing can have a devastating impact on innovation, as skills and contacts that have been developed over the years are destroyed at a stroke" (Cravotta & Kleiner, 2001, p. 90). In the inaugural issue of Fast Company, Thomas Davenport (1995) illustrates several instances of unintended consequences in 'reengineering' efforts. For example, Davenport mentions how a telecommunications company used 'reengineering' to lay off a large number of people

and thus "alienated many of the organization's brightest people by its almost purposeful insensitivity" (p. 71). Thus, reengineering and 'downsizing' exemplify short-term advantages that are costly to many organizations in the long-term because the long-term costs of losing skills and contacts are unintended consequences of downsizing. These sorts of outcomes center around the issue of organizational members unknowingly creating unintended consequences through overlooking future sustainability based on immediate needs or desires.

A fourth characteristic of the present-future duality *is that the costs and benefits of managing the present-future duality are unevenly distributed across organizational members*. For example, some members avoid engaging in meetings where task-related information is shared and they screen out potentially relevant interactions with others in order to create their own time to get their own job done (Perlow, 1997). However, because these organizational members missed critical information to perform their jobs, they constantly interrupt other organizational members who attended those meetings and engaged in critical interactions in order to acquire new information and learn. As Perlow notes, the result is that the members who interrupt others but do not reciprocate end up being evaluated favorably, while those who spent their time helping others are viewed as unproductive (Perlow, 1997).

Finally, because organizational actors cannot know the specific ways the future will be different from the present, *being future-oriented does not ensure long-term viability* (Huber, 2004, p. 24). Huber asserts that although people expect the future to be different than the present "*in the abstract*" (p. 42, endnote 12) "most people most of the time imagine the future to be much like the present" (p. 24) regarding the specifics.

Huber accounts for this phenomena through what Tversky and Kahneman (1974) described as an *anchoring bias* and illustrates it by quoting statements such as: "Everything that can be invented has been invented" (U.S. Patent Office director, 1899), and "I think there is a world market for about five computers" (Thomas J. Watson, President of IBM, 1959).

These five aspects of the present-future duality illustrate its centrality in organizational research and begin to address its relevance for communication research. In this dissertation, these five aspects are related to conceptions of time, present and future foci, and communication practices. The following paragraphs provide a preview of the four chapters that constitute this dissertation

The theoretical framework developed in the first chapter of this dissertation draws on McGrath and Kelly's (1986) articulation of the three temporal problems inherent in collective action in order to offer a perspective centered on interaction—at the intersection of individuals and organizations. The first chapter begins by exploring the centrality of the present-future duality in these three temporal problems—uncertainty, scarcity of resources, and conflicting interests. Through a brief review of literatures in organizational change (e.g. Romanelli & Tushman, 1984; Tushman & Anderson, 1986), organizational learning (e.g. Levinthal & March, 1993; March, 1991), social psychology (e.g. D'Alessio, Guarino, De Pascalis, & Zimbardo, 2003; Zimbardo & Boyd, 1999), and temporality in communication studies (e.g. Ballard & Seibold, 2003, 2004a) the chapter proposes that conceptions of time and present and future foci foster organizational adaptation. Based on research focusing on the speed of organizational adaptation (e.g. Brown & Eisenhardt, 1997; Huber, 2004) and on organizational learning (e.g. March,

1991) three communicative practices are set forth—proactive information sharing, use of real-time information, and collective reflexivity—and their benefits to adaptation are examined. Because these practices take place in time, the availability of time is the most critical resource that constrains them. Since time allocation depends on our temporal focus (Waller, Conte, Gibson, & Carpenter, 2001), the discussion advances that present and future foci also play a role in adaptive practices. Figure 1 presents the basic arguments set forth in the first chapter.

The literature review presented in the first chapter leads to the development of twelve propositions and fourteen hypotheses that reflect the conceptual framework in this dissertation. The second chapter in this dissertation describes the methodology used to test the twelve hypotheses. This second chapter begins with a brief review of the hypotheses developed to test parts of the framework. Then, the chapter describes the different measures developed to test these hypotheses. Nine scales were used in this dissertation: event-based conceptions of time, clock-based conceptions of time, present focus, future focus, exploration, delay, and three adaptive communication practices—proactive information sharing, collective reflexivity, and use of real-time information. Four of these scales—event- and clock-based conceptions of time, proactive information sharing, and use of real-time information—were specifically developed for this dissertation based on prior conceptual and qualitative research. Additionally, three demographic measures were also considered: age, tenure, and gender.

After describing the measures, the second chapter describes the pilot study performed at a high technology organization. The first step in the pilot study was to gather information about the adequacy of the scales to the organization with two focus

groups of five organizational members each, along with a Delphi methodology group. After incorporating the comments from the focus groups and Delphi methodology, the web-based questionnaire data collection included fifty eight organizational members. The data was used to assess scale reliabilities and perform exploratory factor analyses in order to refine the scales, as well as to test the hypotheses. The insights of the pilot study contributed to improving the questionnaire items included in the main study.

The last section of chapter two describes the data collection and analysis for the main study, performed at a transportation authority organization in the Southwest United States. In this organization, 186 organizational members participated in the web-based questionnaire. Some of the measures were again factor analyzed in order to refine the scales. Then the hypotheses were tested through canonical correlation and linear regression, depending on their multivariate characteristics.

Chapter three describes the results of testing the twelve hypotheses included in this dissertation. The key finding is that a future focus is related to all three communication practices—proactive information sharing, collective reflexivity, and use of real-time information—as well as to exploration and to adequacy of communication across organizational groups. This last measure was included in the questionnaire based on the needs of the transportation authority organization because members believed that it reflected their main communication problem. Table 8 in chapter three summarizes the findings.

After describing the results in chapter three, chapter four focuses on the discussion of key findings and the limitations in the empirical studies. Some of the key findings discussed are: a) a future focus is related to exploration and this relationship is

partly mediated by proactive information sharing, collective reflexivity, and use of real-time information; b) inter-group communication is critical for organizational members, and it is nurtured through a future focus and through proactive information sharing; c) research on the present-future duality in organizational communication needs to include communication with external stakeholders; and d) the present-future duality can be conceptualized as *sustainability*. Sustainability complements current conceptualizations of present and future foci because it also includes issues relating to decisions and outcomes, which complement the view of present and future foci as orientations. The chapter concludes providing an optimistic view on the present-future duality by emphasizing that a future focus reduces the costs and increases the benefits of organizational actions over time.

# Chapter 1: Literature Review

## THE PRESENT-FUTURE DUALITY AND TEMPORAL ISSUES IN ORGANIZATIONS

This dissertation focuses on the present-future as a duality that affects organizational members' decisions and collective actions. Scholars have also considered that organizational members have three temporal orientations: past, present and future (e.g. Ballard & Seibold, 2003). Nevertheless, following an institutional perspective, an assumption underlying this dissertation is that the past is embedded in the present through taken-for-granted routines that reflect "the way we do these things" (Scott, 1991, p. 44).

The three issues inherent in collective action identified by McGrath and Kelly (1986)—*uncertainty*, *conflicting interests*, and *scarcity of resources*—illustrate the centrality of the present-future duality in everyday coordinative challenges. Those issues result from the interaction between respective individual and organizational needs such as the need to increase predictability, coordinate activities, and set priorities at the organizational level. Further, these issues also result from the need to reduce role ambiguity, role conflict, and role load at the individual level.

The first problem—*uncertainty*—captures the inherently unstable relationship between the organization and future changes in its environment, as well as the role uncertainty experienced by the individual members that co-construct the organization. When facing this uncertainty about their role, organizational members' orientation toward the present or the future influences whether they are willing to sacrifice their present benefits for future potential outcomes (D'Alessio et al., 2003; March, 1991). For

example, organizational members with a *present temporal focus*[1] may put all of their efforts into the accomplishment of quarterly performance goals, even if these short-term goals compromise their annual goals, because quarterly results are directly related to bonuses and promotions. Organizational members also collectively try to reduce uncertainty by using artifacts such as scheduling and agendas to coordinate the timing of their actions (McGrath & Kelly, 1986; Yakura, 2002). It is important to note that these schedules are based on information known in the present, thus reinforcing organizations' inevitable focus on the short term over long-term goals (Levinthal & March, 1993). The influence of uncertainty permeates the discussion throughout this chapter regarding the relationship between organizational members' present and future temporal foci and organizational adaptation.

The second issue that McGrath and Kelly (1986) describe is *conflicting interests*, which reflects that organizations and their members have different goals. These goals shape and are shaped by members' temporal focus, or their emphasis on the past, present, and future (Bluedorn, 2002). Organizations and their members attempt to manage conflicting interests through coordination and through the development of norms regarding sequencing of activities across organizational functions (McGrath & Kelly, 1986). For example, organizations might decide to sequence their activities according to an assembly line where activities are linear and rigorously sequenced, or decide to have parallel processes which might lead to internal competition. Although McGrath and Kelly focus on the allocation of organizational members' time (sequencing and temporal coordination), conflicting interests are also related to the allocation of other organizational resources over time (March, 1991). For example, a manufacturing

department that perceives the need to quickly expand infrastructure for current production lines might have to compete for investments with the research and development function focused on ensuring future product innovations. These two departments might have different temporal foci (Dubinskas, 1988) which lead to conflicting interests. Conflicting interests also permeate the discussion in this chapter regarding the relationship between organizational members' present and future temporal foci and organizational adaptation.

The third, related, issue inherent in collective action is *scarcity of resources* (McGrath & Kelly, 1986). Time is one such resource. To deal with scarcity of resources, organizational members need to establish priorities, such as focusing on quarterly results rather than turning their attention to long-term projects. To deal with the role load created by temporal scarcity, organizational members need to regulate their interpersonal interactions (Perlow, 1997). Additionally, while time is perceived as a scarce resource whose allocation is critical for both individuals and organizations, other resources also need to be allocated *across time* (Levinthal & March, 1993; March, 1991). For example, financial expenditures to develop new products and processes (i.e. an investment in future needs) might have less priority than maintaining and keeping current processes running (i.e. an investment in present needs). How organizational resources such as "person hours," investments, equipment, and effort are allocated across time depends on the value organizational members assign to the present and to the future (March, 1991). In this chapter, the issue of scarcity of time and other resources is embedded into the discussion regarding the relationship between organizational members' present and future foci and organizational adaptation.

Organizational members develop communication practices that are enabled and constrained by these three temporal issues—uncertainty, conflicting interests, and scarcity of resources. For example, these three problems create two tensions between organizational members and the organization—*autonomy versus centralization* and *static plans versus dynamic improvisation* (McGrath & Kelly, 1986). This means that while individuals desire autonomy, organizations tend toward centralization to control scarce resources and conflicting interests. Additionally, while organizations create "preset plans that have a static character" (p. 115) which cannot be changed online to face emerging situations, individuals might attempt to deviate from these plans to face ongoing situations. Both of the tensions are related because the more discretion individuals have in ongoing situations, the less centralized control the organization exhibits. This frames the central issue of the dissertation: organizational members' communication practices serve as temporal structures (Orlikowski & Yates, 2002) that enable and constrain adaptation processes. The next section discusses the role of organizational members' present and future foci in the development of adaptive communication practices.

## PRESENT AND FUTURE FOCI AND TEMPORAL PROBLEMS IN COLLECTIVE ACTION

Present and future focus relate to long-term and short-term orientations (Hofstede, 2001; 1991). "Long Term Orientation stands for the fostering of virtues oriented towards future rewards, in particular perseverance and thrift. It's opposite pole, Short Term Orientation, stands for the fostering of virtues related to the past and present, in particular, respect for tradition, preservation of 'face' and fulfilling social obligations" (Hofstede, 2001, p. 359). Short-term orientation thus emphasizes a focus on the present

and immediate actions and obligations. In contrast, long-term orientation focuses on future goals and consequences.

Some scholars studying organizational learning (e.g. Levinthal & March, 1993; Levitt & March, 1988; March, 1991) and organizational adaptation (Anderson & Tushman, 1986; Romanelli & Tushman, 1994; Tushman & Romanelli, 1985) suggest that organizations tend to have a present focus over a future one. Levinthal and March (1993) refer to this preference for the present over the future as *temporal myopia*. Temporal myopia links organizational members' experience of the present and the future to the choice between a focus on future innovation of new ideas and processes, called *exploration*, and a focus on refining current routines and processes to reap the benefits of efficiency, called *exploitation* (Levinthal & March, 1993; March, 1991). Specifically, the tendency to value present needs over future ones shapes and is shaped by a culture of exploitation. Exploitation leads to temporal myopia. Conversely, the tendency to sacrifice benefits now for potential future gains shapes and is shaped by a culture of exploration. Levinthal and March's (1993) views of exploration and exploitation are consistent with a punctuated equilibrium model of change (e.g. Tushman & Anderson 1986) which asserts that organizations engage in exploitation of their current processes as long as these processes are satisfactory (March, 1991). When current processes are not satisfactory, usually due to an abrupt change in environment (punctuated change), organizations engage in innovation and search for alternative processes until they find a satisfactory (not optimal) alternative (Levinthal & March, 1993; March, 1991).

Temporal myopia, the preference for the present over the future, is implicated in the three issues inherent in collective action—uncertainty, conflicting interests, and

scarcity of resources. The next sections describe the link between the three issues inherent in collective action and temporal myopia and leverage this link to frame the remaining discussion and theoretical framework.

**Uncertainty and the Preference for the Present in Organizations**

Organizational scholars describe organizational environments as characterized by inherent instability and change (e.g. D'Aveni, 1994; Bettis & Hitt, 1995; March, 1991; Slocum, McGill, & Lei, 1994). The view of change as the only constant is promoted both in organizational research and in the popular business press (Cunha, 2004). As Huber (2004) suggests "it has become *tiresomely* fashionable for the business press and the management literature to report on the dynamic and turbulent business environment" (p. 2, his italics). Organizational members, recognizing that the future is unpredictable (Crossan, Cunha, Vera, & Cuhna, 2005; March, 1991), tend to focus on the present over the future (March, 1991). For this reason, the benefits of exploration, which reflect organizational efforts to adapt to the future, are seen as uncertain and distant in time (March, 1991). In contrast, the benefits of exploitation, or efforts toward making use of and refining current organizational processes and resources—a present focus—are seen as more certain and closer in time (March, 1991). This view is consistent with findings indicating that emphasizing a future focus is related to a decrease in short-term performance (e.g. Bunderson & Sutcliffe, 2003; Wong, 2004). The choice between allocating—the organizational response to the inherent scarcity of resources—member's time and resources toward outcomes more certain and closer in time rather than to those

more distant and uncertain represents the main tension between exploitation and exploration and is discussed next.

**Resource Scarcity and the Preference for the Present in Organizations**

According to March and colleagues (Levinthal & March, 1993; March, 1991, 1999), two choices exist for resource allocation in organizations: exploration and exploitation. These two alternatives of allocating scarce resources have different temporal implications. Exploitation reflects investing in refining current capabilities, making them more efficient (March, 1999). Exploration implies allocating resources to develop new capabilities, whose benefits are unknown and distant in time (March, 1999). Given that organizational resources are scarce, organizations experience a tension between engaging in exploration or exploitation. Current organizational processes are usually favored over innovation and the development of new processes and routines because the benefits of current organizational processes are perceived as certain. As March (1988, 1991) asserts, organizational members will experiment with new processes only when their current processes and routines become unsatisfactory to cope with contextual demands. At such point in time, they engage in what March called *problemistic search*, defined as the search for alternative courses of action triggered by a decrease in performance below a certain threshold in which the organization engages until it again reaches a satisficing state (March, 1991). However, exploitation efforts are self-reinforcing because success leads to an increased focus on exploitation efforts (Levinthal & March, 1993; March, 1991). Consistent with the popular sayings that "success builds success" and "if it's not broken don't fix it," Bunderson and Sutcliffe

(2003) find that previous performance is the strongest predictor of current performance, and that exploration efforts negatively moderate such relation. Accordingly, organizations have the incentive to keep focusing on what has worked well in the past (i.e. exploitation) instead of allocating resources to new development projects (i.e. exploration).

**Conflicting Interests, Temporal Myopia, and the Tragedy of the Commons**

The interaction of organizational actors with different temporal foci reflects McGrath and Kelly's (1986) third temporal problem—conflicting interests. The consequences of the interaction of these conflicting interests are unevenly distributed across organizational members (March, 1991). The discussion below expands on the uneven distribution of consequences across time and across organizational actors to describe an extreme case in which parochial focus on individual interests leads to a tragedy of the commons.[2] This represents a critical practical outcome of the model proposed in this dissertation and is followed by several theoretical propositions and testable hypotheses.

Because organizational members have interdependent goals, the behaviors of each organizational member affect others. Some members can benefit from either the present- and future-oriented efforts of others. This uneven distribution of consequences is illustrated in March's (1991) simulation study. March (1991) asserts that "the tradeoff between exploration and exploitation in mutual learning involves conflicts between short-run and long-run concerns and between gains to individual knowledge and gains to

collective knowledge" (p. 74). March (1991) models knowledge creation and diffusion in an organization by simulating the rate at which individuals learn the practices and beliefs of the organization and how this rate affects the accumulation of practices by the individual and the organization. March's simulation reaches an equilibrium point when both the individual and the organization have the same beliefs.

March's (1991) simulation suggests two effects of the interaction between organizational members and newcomers characterized as slow learners (i.e., individuals taking more time to get socialized into the organization). The first effect is that the organization and the slow learner take longer to reach an equilibrium point in which they share the same beliefs—practices—than if the newcomer is a 'fast learner.' The second effect is that the level of available practices at equilibrium attained by the organization is higher than when the organization interacts with fast learners. In contrast, March's simulation suggests that fast learners of the organizational norms and practices increase efficiency but do not contribute additional knowledge that increases the organization's adaptation capabilities. Further, the additional knowledge slow learners contribute is disseminated and exploited by fast learners (March, 1991). Organizations thus need both to have slow learners that contribute to the development of new practices and fast learners that contribute to the dissemination and implementation of new these practices (March, 1991). Slow learners incur the social and economic costs of contributing to the practices repository of the organization while fast learners benefit from this practices and are more likely to get promotions and recognition (March, 1991). In other words, the benefits of the exploration efforts made by slow learners are realized through fast learners.

The disparity among organizational members who incur the costs of developing new knowledge and practices and organizational members who reap the benefits can lead to the tragedy of the commons. The tragedy of the commons refers to a situation in which all members benefit from a public resource. If all members use the resource responsibly, it is maintained and everybody benefits at little cost. However, because individuals might have incentives to use more than others, the resource is depleted, at great cost to all members (Sheldon & McGregor, 2000). Although knowledge and information in organizations is unlike other organizational resource in that its quantity is not reduced by its use, its value might be reduced over time. Consequently, somebody in the organization needs to keep developing *and sharing* knowledge constantly. If all actors focus on exploiting what they now without developing new knowledge or taking time away from their day-to-day activities to search information and share that information with other organizational members, the organization suffers something similar to the tragedy of the commons. Thus, when most organizational members avoid exploration and information sharing activities, the organization as a whole experiences the tragedy of the commons.

The profile of slow learners implied in March's (1991) simulation is of members who take time to consider and accept an organization's values because they are oriented toward nonconformity. Instead of accepting constraints and routines, slow learners might be impulsive and engage in novelty- and sensation-seeking behaviors, which are related to a present focus (Zimbardo & Boyd, 1999). In other words, organizational actors who increase an organization's knowledge and its capacity to adapt to a different future environment, ironically, are often present-focused. Slow learners take risks by engaging in experimentation and innovation (i.e., exploration) because they do not consider the

future consequences of their actions. In contrast to slow learners, fast learners, or organizational members who rapidly conform to the organization's practices and beliefs, might do so because they possess a higher degree of conscientiousness and ambition, and feel a greater pressure to use time effectively. Since these characteristics are related to a future focus (Zimbardo & Boyd, 1999), organizational actors that exploit and leverage organizational knowledge tend to be future-oriented. These organizational actors are typically more focused on their career advancement and on emphasizing their individual performance within the organization.

It is important to note that temporal focus at the individual level has been considered both as an enduring trait and as a temporary state induced by the specific context (Zimbardo et al., 1997). Accordingly, the level of conformity and pace of socialization is influenced not only by individual characteristics but also by organizational culture and the cues newcomers receive through their interactions with current organizational members (Ashforth, Blatt, & VandeWalle, 2003; Miller & Jablin, 1991; Mignerey, Rubin, & Gorden, 1995). Further, temporal focus is also shaped by organizational members' role and task characteristics (Ballard & Seibold, 2003). Accordingly, both conformity to organizational norms and temporal focus are influenced by both individual predispositions and individuals' interactions within the organizational context.

Interaction not only shapes temporal focus and speed of socialization, it is also necessary to leverage the practices contributed by slow learners. In order for organizational members with a high future focus to reap the benefits of the practices introduced by sensation-seeking members with a high present focus (Zimbardo et al.,

1997), organizational members need to interact within an organizational context (March, 1991). Future-focused individuals cannot exploit innovations to enhance their careers if those innovations are not first created by risk-taking, sensation-seeking individuals unaware of the future consequences of their actions. Similarly, because the risk-taking, sensation-seeking individuals probably move on to new projects as soon as the innovation becomes intrinsically uninteresting for them, their innovations would remain unexploited if it were not for the future-oriented individuals. Therefore, the interaction between organizational members with different temporal foci leads to the creation and dissemination of organizational practices. As in the case of cognitive diversity research in organizational groups (e.g. Amason, 1996; Pelled, Eisenhardt, & Xin, 1999), it is the interaction process of organizational members with different temporal foci and not the diversity of temporal foci per se that leads to knowledge creation in the organization.

Nevertheless, organizational members who are focusing on the present might also not engage in flow, but rather fall into established routines and the exploitation of current capabilities (March, 1991). In contrast with Zimbardo and colleagues' (e.g. Zimbardo et al., 1997) view of present oriented individuals as looking for immediate gratification and flow, March's (1991) alternative interpretation relates to the possibility that organizational members focus on short-term consequences such as quarterly results. This leads to the following competing hypotheses:

*Hypothesis 1a:* *Organizational members with a high present focus engage in more exploration than members with a high future focus.*

*Hypothesis 1b:* *Organizational members with a high future focus engage in less exploration (and more exploitation of their current capabilities) than members with a high present focus.*

Hypothesis 1a appears to be counter-intuitive; future-oriented individuals engage in actions that increase the efficiency of the organization in the short-term while present-oriented individuals create the variance-increasing knowledge that helps organizations adapt to changes in their environments. Experimentation and sensation seeking does not help present-focused organizational members advance in their careers because they rarely have tangible results that would help them get promoted. In contrast, when those benefits are achieved, they are quickly assimilated and reaped by future-oriented organizational members who then get the recognition by managers (Perlow, 1997).

An extreme example of fast learners in organizations is the case of those who use impression management—"any behavior by a person that has the purpose of controlling or manipulating the attributions and impressions formed of that person by others" (Tedeschi & Riess, 1981, p. 3). Impression management is the ultimate instance of fast learning as described by March (1991) because it is purposive behavior by individuals who adapt to the context and audience in order to act a desirable role and achieve their ends (Bozeman, & Kacmar, 1997; Goffman, 1959). Impression management has been found to positively influence ratings of employees made by their superiors (Bolino, Varela, Bande, & Turnley, 2006). Accordingly, fast learners of the organizational norms—who commonly tend to have a future focus—will likely receive better performance evaluations than slow learners—who tend to have a present focus.

The previous discussion links March's (1991) 'slow' and 'fast' to specific temporal foci. The rate at which organizational actors 'learn' the code has to do less with traditional ways of understanding 'learning' as intelligence and more with risk-taking, sensation-seeking, nonconforming behaviors that characterize organizational actors with a present focus (Zimbardo et al., 1997). Organizations could enforce current practices and weed out these non-conformers. The more organizational actors conform to the current structure of organizational action, the more efficient and well coordinated organizational processes become (March, 1991). However, an organization who weeds out non-conformers might be sacrificing the future for the present because the efficiency effects might be offset by the unintended consequence of inhibiting the organization's capacity to adapt (March, 1991; Tushman & O'Reilly, 1996).

The previous discussion about present and future foci in organizations proposes that organizational members might unknowingly reinforce the present organizational structure as a means of efficiency and inhibit the organization's ability to adapt. The reason for this seemingly counter-intuitive suggestion is that present and future foci are related to the distribution of consequences across time (e.g. D'Alessio et al., 2003; Zimbardo et al., 1997). At the organizational level, a temporal focus shared by an organizational group reflects how organizational members orient to present or future events through their interactions (Ballard & Seibold, 2003). However, both these individual and shared temporal foci are based on a conception of time that *assumes that actions that lead to future success are very similar to those that lead to present successes*. Huber (2004) notes that, although most people recognize that the future will likely be different from the present, "most people most of the time imagine the future to be much

like the present" (p. 24) regarding the specifics. Hence, valuing the future more than the present is not necessarily related to the capacity to imagine the specific details in which the future will be different to the present. Indeed, Wenger (1998) defines imagination as the "process of expanding our self by transcending our time and space and creating new images of the world and ourselves." Without imagining how the future will be different from the present, organizational actors orient to the present by allocating resources toward a *present-like future*. Focusing on a present-like future reinforces the present and inhibits organizational adaptation. This creates a paradox, reflected in the following proposition:

> *Proposition 1: The more organizational actors lack imagination about the specific ways in which the future could be different to the present, the more holding a present focus will reinforce the status quo and inhibit organizational adaptation.*

As suggested in the prior discussion, the present focus of some organizational members interacts with the future focus of others to promote experimentation. Because experimentation and innovation increase the variance of resources and hence the number of potential organizational responses, exploratory efforts might indeed help organizations adapt to future events (March, 1991). However, experimentation by itself does not help organizations imagine the specific ways in which the future will be different from the present. Imagining how the future will be different from the present is necessary because "…prediction is necessary in a non-benign world" (Huber, 2004, p. 4). However, because the future is inherently unpredictable, organizational actors will have a hard time adapting to the future. Organizational actors might be able to identify and even predict

some events in the future. However, organizational members cannot predict both the timing and characteristics of specific future events. Given the insufficiency of a future focus in terms of fostering adaptation, an alternative view for organizational adaptation can be developed based on how organizational members understand and define time.

How organizational members orient to time—their temporal focus—depends on how they define and understand time. Accordingly, in order to explore the effects of temporal focus on adaptation, the role of conceptions of time must also be examined. Conceptions of time refer to how organizational members make sense of time as a unit/group (Ancona, Okhuysen, & Perlow, 2001). Although there are different dimensions along which time can be conceptualized (Ancona et al., 2001), the most common dimensions are event-based and clock-based conceptions of time (e.g. Ancona et al., 2001; Bluedorn, 2002; Clark, 1985). An event-based conception of time suggests that "time is *in* the events, the events do not occur *in* time" (Bluedorn, 2002, p. 31, his italics). In contrast, a clock-based conception of time relates change to "the passage of time" (Brown & Eisenhardt, 1997, p. 25) and not to the occurrence of events.

An event-based conception of time is still the prevalent view in theories of organizational change and adaptation because most groups link time to environmental events such as discontinuities (e.g. Tushman & Anderson, 1986), environmental jolts (e.g. Meyer, 1982; Meyer, Brooks, & Goes, 1990), and timing relative to competitors' actions (March, 1991; Porter, 1980). Therefore, the present discussion and related theoretical framework takes an event-based temporal conception as implicit in several theories and treatments of organizational change and adaptation. By conceiving time as

based in the events, these theories depict change and adaptation as punctuated and reactive.

This discussion has examined present and future temporal foci assuming an event-based conception of time. The next section explores how organizational adaptation is inhibited by an event-based conception of time. Specifically, it contrasts event-based and clock-based conceptions of time and proposes that the continuity of a clock-based conception of time reduces delays in organizational adaptation. As described below, an adaptive, clock-based conception of time leads to adaptive communication practices.

## CONCEPTIONS OF TIME AND CONTINUOUS ADAPTATION

Conceptions of time refer to how organizational members make sense of time (Ancona, Okhuysen, & Perlow, 2001). This dissertation focuses on event-based and clock-based conceptions of time. Specifically, it focuses on two conceptions of time and argues that a clock-based conception of time benefits organizational adaptation. The section closes by asserting that varied conceptions of time lead to the development of different communicative practices including proactive information sharing, use of real-time information, and collective reflexivity.

### Event-based Conception of Time and Organizational Adaptation

As mentioned previously, an event-based conception of time considers that "time is *in* the events, the events do not occur *in* time" (Bluedorn, 2002, p. 31, his italics). Organizational members holding an event-based view of time enact time using events as frames because events become "a reference point for things that happen before and after"

(Ancona et al., 2001, p. 515). Following the example of Exxon, executives might talk about Exxon's image before or after the Exxon Valdez spill, just as in economics we talk about the Reagan era and Reagonomics. This is precisely the drawback of an event-based conception of time because events are epochal (Bluedorn, 2002); and epochs, by definition, are discrete or digital. The drawback of discrete events is illustrated by the statistical fact that transforming continuous variables into discrete categorical variables results in information loss (Kennedy, 1998). The same thing happens to organizations when they try to adapt to their environments assuming time is discrete: important information about "non-events" (March, Sproull, & Tamuz, 1991; Weick & Sutcliffe, 2001) is lost. A further example in business organizations is the premise given by some managers to their subordinates to "not bother them unless there is a life or death issue." Sometimes this premise leads subordinates to call managers only when a potential crisis has become a real event.

As these examples illustrate, event-based conceptions of time direct organizational members' attention toward certain phenomena and away from other aspects of the environment. Thus, some trends or potential threats are ignored. In contrast, high reliability organizations (HROs) learn from "near failures," issues that are considered non-events in traditional organizations (Weick & Sutcliffe, 2001). High reliability organizations include aircraft carriers and nuclear plants for which the effects of "failure" have life threatening consequences. Therefore, these organizations model behaviors of constant learning and adaptation. Thus, an event-based conception of time inhibits mindfulness, or a state of continuous vigilance, novel information processing through multiple perspectives, and an appreciation of context which leads to foresight

(Fiol & O'Connor, 2003; Langer, 1989; Stuart, 1990; Weick & Sutcliffe, 2001), the hallmark of HROs. The work of Weick and Sutcliffe leads to the following proposition:

*Proposition 2: Organizations with an event-based conception of time have less information about emerging trends in their environments.*

**Clock-based Conception of Time and Organizational Adaptation**

In contrast with an event-based conception of time, in which the future is conceived as a series of discrete events, a clock-based conception regards the future as continuous (Ancona et al., 2001). Continuous, or analogic, clock-based time retains more information than event-based time because it captures all activities, including near-events. A clock-based conception of time relates change to "the passage of time" (Brown & Eisenhardt, 1997, p. 25) and not to the occurrence of events. This suggests that, although we cannot predict the future, if we can monitor potential trends continuously we have a sense of where the future is moving.

The communication implications of this continuous monitoring is that, instead of waiting until an issue becomes critical, organizational members are continually giving each other a "heads up" about potential issues. In this sense, identifying the present trends of non-events provides direction for continuous adaptation (Brown & Eisenhardt, 1997). Therefore, when organizational actors conceive of change as continuous, the timing of future events becomes less important than the direction of those events. Knowing the direction of change and planning internal events vis-à-vis a continuous conception of time allows organizational actors to use this continuity to link the present to the future (Brown & Eisenhardt, 1997).

It is important to note that some scholars have a different interpretation of Brown and Eisenhardt's (1997) time-paced evolution. Specifically, Crossan et al. (2005) view Eisenhardt and Brown's (1998) subsequent time-pacing as advocating event-time because it provides greater flexibility than clock-based time. Brown and Eisenhardt (1997) explicitly suggest time-paced evolution as linking change to "the passage of time" (p. 25) regardless of particular events. In contrast, Crossan et al. (2005) reinterpret time-paced evolution as event-clock time—"manipulative flexibility" (p. 136)—where incremental change is related to local improvisations leading to long-term discontinuities. Crossan et al.'s depiction of their *event-clock-time* reflects a clock-based conception of time that includes improvisation. The link between improvisation and event-based time provided in their review is tenuous: they do not include Brown & Eisenhardt's (1997) findings that those product development groups who tried to change their time-pacing evolution to accommodate an unexpected event (improvise) reported a decrease in performance. Accordingly, although Crossan et al.'s different interpretation of clock-based time and time-paced evolution is acknowledged in this study, the arguments set forth consider the advantages of clock-based time as the time-paced evolution concept originally depicted by Brown & Eisenhardt.

As described in detail below, the continuous link between the present and the future characteristic of a clock-based conception of time leads organizations to develop adaptive communicative practices. Three practices—proactive information sharing, using real-time information, and group reflexivity—are a central focus of this dissertation and related theoretical framework. They represent organizational members' attempt to

cope with the inherent tension between the present and the future in everyday organizational life.

## ADAPTIVE COMMUNICATION PRACTICES

This section develops the concept of adaptive practices based on Huber's (2004) insights into practices that can help firms adapt to the future, as well as based on Eisenhardt and colleagues' (Brown & Eisenhardt, 1997; Eisenhardt, 1989, 1999) research on *time-paced evolution.* It: a) explores the importance of these practices in managing the present-future duality; b) considers the relationship of these practices to a clock-based conception of time; and, c) emphasizes their communicative nature. The main premise herein is that the speed at which organizations respond to opportunities and threats in their environment is more related to continuous vigilance (achieved through certain communication practices) than to the pace of a specific process (Huber, 2004).

Although pace and speed are usually confounded, organizational researchers usually talk about speed in terms of the duration of time it takes organizational groups to develop products (Brown & Eisenhardt, 1997), make decisions (Bourgeois & Eisenhardt, 1988; Eisenhardt, 1989), or react to competitors' moves (Hambrick, Cho, & Chen, 1996), regardless of the pace of specific activities. In contrast, pace has been defined as "tempo or rate of activity" (Ballard & Seibold, 2004, p. 141) and does not include the frequency or the timing of the activity. Thus, what scholars (e.g. Brown & Eisenhardt, 1997; Eisenhardt, 1989) have conceived of as speed of decisions or actions has more to do with delays in setting in motion those organizational actions than with the pacing of the actions themselves (Huber, 2004).

There are several kinds of delays: First, there are delays in sensing the environmental signals that suggest the need for action (Huber, 2004). Next, organizational actors are often delayed in interpreting those signals (Huber, 2004). Once signals have been interpreted two types of additional delays still exist: delays due to decision task neglect and delays due to decision avoidance by organizational actors (Huber, 2004). These delays in setting in motion organizational adaptation can be associated with a lack of continuity which is related to event-based conceptions of time.

The adaptive communication practices identified in this dissertation illustrate how a clock-based conception of time overcomes the types of delays described above. The adaptive practices drawn from prior research are: a) proactive information sharing, b) use of real-time information, and c) collective reflexivity. The following paragraphs describe each of these three practices.

*Proactive information sharing* is related to Huber's (2004) concept of *eclectic sensor responsibility,* which requires organizational actors to be "alert for firm-relevant information unrelated to their specific job responsibilities, and to communicate it to the relevant parties in the organization" (p. 55). Examples of proactive information sharing can be "FYI" messages about information that organizational actors believe might be relevant to others in the organization. These organizational actors do not wait to assess whether a trend they perceive from the environment is really an event, but forward the cue to others before it becomes an event. Thus, these actors reduce potential delays in organizational actions.

*Hypothesis 2:* *Proactive information sharing is negatively related to delay in organizational activities*.

Proactive information sharing—implies a clock-based conception of time because it requires organizational members' continuous vigilance of information related to the organization even if it is outside the specific scope of their job (Huber, 2004). It is through this continuous vigilance that organizations can avoid the delays in sensing signals in their environment (Huber, 2004). However, continuous vigilance is not enough; organizational members then need to engage in proactive information sharing in order to communicate those signals to the organizational decision makers (Gómez, 2006; Huber, 2004). Proactive information sharing is critical to decision making because organizational members cannot wait until they understand an event to request information in order to react to the event. Most views of information sharing suggest that it happens during formal group interaction (see Wittenbaum, Hollingshead, & Botero, 2004 for a review) or when someone requests information (e.g. Constant, Sproull, & Kiesler, 1996). A proactive view is needed to understand why organizational members share information with others that may not even know they need it. Organizational messages such as FYIs or heads-ups are common practices that allow organizational members to keep moving continuously. The continuous nature of proactive information sharing leads to the following proposition:

*Hypothesis 3:* *A clock-based conception of time is positively related to proactive information sharing.*

The second communication practice considered in this dissertation—*real-time information*—is defined as "information about a firm's operations or environment for which there is little or no time lag between occurrence and reporting" (Eisenhardt, 1989, p. 549). The use of real-time data is related to proactive information sharing because

organizational members send the raw information before interpreting it. In other words, it is continuous information which is used and/or shared before it has been codified into formal reports, before the organization classifies it as an event.

When relying on real time information, organizational members report the information while it is occurring (Eisenhardt, 1989). Instead of waiting for forecasts or formal reports, organizational members can identify potential dangers and treat them before they become negative events. For example, organizational members in a factory could wait for the finance department's weekly formal report on cash flow. Alternatively, they could check the daily inventory levels and have a sense of the cash flow, which would enable them to make better informed decisions. For this second option they would use real-time information, which has not been interpreted and codified, but could be helpful in identifying trends early and reducing delays in organizational actions. Thus, the following two hypotheses are advanced:

*Hypothesis 4:* *The use of real-time information is negatively related to delay in organizational activities.*

*Hypothesis 5:* *A clock-based conception of time is more positively related to the use of real-time information.*

Finally, the third communication practice considered here—*collective reflexivity*—can be defined as a practice through which organizational members pause from their daily routines to reflect on their actions through interaction with other members in order to understand the link between their practices and organizational outcomes (Barge, 2004; Huber, 2004). In order to learn through collective reflexivity, a group of organizational members needs to pause from the daily routines and assess the

link between their actions and their desired outcomes by interacting and discussing (Barge, 2004). This practice is continuous because it allows organizational members to continually adapt their work instead of waiting until they face a more dramatic disruption to their activities brought about by the oversight of trends and potential problems. Because reflection happens immediately after an action, learning happens through a cycle of action and reflection (Argyris & Schön, 1996; Gavetti & Levinthal, 2000; Schön, 1983; Weick & Sutcliffe, 2001): "All learning depends on the reflexive interpretation of one's experience together with the experience of others" (Lafitte, 1957, p. 17). The more proximal in time reflection is to action or experience (tending toward continuity) the higher likelihood of learning from non-events (Weick & Sutcliffe, 2001). Collective reflexivity allows organizational members to identify deviations from their goals and thus reduces delays in organizational responses to changes in the link between activities and goals. The following two hypotheses test the relationship between collective reflexivity and delay, as well as collective reflexivity and a clock-based conception of time.

*Hypothesis 6:* *Collective reflexivity is negatively related to delay in organizational activities.*

*Hypothesis 7:* *A clock-based conception of time is positively related to collective reflexivity.*

The three practices suggested here—proactive information sharing, use of real-time information, and collective reflexivity—are facilitated by a continuous conception of time and inhibited by an event-based conception of time. Hypotheses three, five, and seven, suggest that the three communication practices are fostered through a clock-based conception of time. The same argument can be turned on its head: an event-based

inhibits these communicative practices that could be developed to identify and disseminate information about trends in the environment. This leads to the following hypothesis:

*Hypothesis 8:* *An event-based conception of time is negatively related to proactive information sharing, use of real-time information, and collective reflexivity.*

As figure 1 describes, the framework advanced in this dissertation asserts that communication practices mediate the relationship between a continuous conception of time and adaptation outcomes such as reduced delays in responses to environmental changes. Conceptions of time refer to how organizational members understand time (Ancona, Okhuysen, & Perlow, 2001). As such, conceptions of time are not communication or any type of organizational action. In order for conceptions of time to reduce delay in organizational actions these conceptions of time have to be embedded in organizational routines or practices. In other words, communicative practices mediate the effect of conceptions of time on adaptation outcomes such as timing of responses to environmental changes. A clock-based conception of time reduces delays in organizational actions by nurturing proactive information sharing, use of real-time information, and collective reflexivity. In contrast, an event-based conception of time leads to delays in adaptation because it inhibits these three communication practices. Thus, the three communication practices mediate the relationship between conceptions of time and organizational adaptation:

*Hypothesis 9:* *Proactive information sharing, use of real-time information, and collective reflexivity mediate the relationship between conceptions of time and delay in organizational actions.*

The main thesis in this dissertation is that conceptions of time play a greater role in organizational adaptation than temporal focus. As mentioned in the development of the theoretical framework, conceptions of time refer to different ways to describe time (Ancona et al., 2001) while present and future foci deal with the value given to the present and the future (e.g. Ballard & Seibold, 2003; Bluedorn, 2002; D'Alesio et al., 2003). Specifically, the main argument presented in this dissertation is that conceiving of time as clock-based, and hence continuous, is more relevant for adaptation than having a strong future focus.

*Proposition 3:* *Conceptions of time have a greater relationship to organizational adaptation than present and future foci*

Adaptation can be conceptualized as timely responses to environmental changes. Timely responses are critical because delays in responses to environmental issues can hurt organizational performance (Lee, 2007). Given the dynamic pace of most industries (D'Aveni, 1994), the time it takes organizations to perform any activity becomes crucial to their performance (Cushman, 2000). Accordingly, delays in organizational activities are likely to negatively influence the competitive position of an organization (Park & Zhou, 2005). In order for a clock-based conception of time to be beneficial to adaptation, as proposition 12 suggests, it necessarily requires reducing delay in organizational actions. Thus, the following hypothesis is advanced:

*Hypothesis 10:* *Delay in organizational actions is inversely related to a continuous conception of time.*

*Hypothesis 11:* *Delay in organizational activities is more strongly related to a continuous conception of time than it is to an event-based conception of time.*

The main argument set forth in this dissertation is that adaptation is more strongly related to conceptions of time than to present or future temporal foci. This implies that certain adaptation characteristics such as delay in organizational actions are more strongly affected by a continuous conception of time than by a present or future focus. As previously mentioned, how we value and orient to time depends on how we understand it. Accordingly, we should expect a greater effect of conceptions of time on delay in organizational activities than the effect of present and future foci. This leads to the following hypothesis:

*Hypothesis 12:* *Delay in organizational actions is negatively related to present and future foci.*

*Hypothesis 13:* *Delay in organizational actions is more strongly related to conceptions of time than it is to present or future focus.*

Clock-based conceptions of time are hypothesized to be more relevant to reducing delay in organizational activities than event-based conceptions of time or present and future temporal foci. However, the argument that clock-based conceptions of time are more relevant does not imply that we should ignore the potential effects of present and future foci. Specifically, because the actions of future-focused individuals tend to be based on anticipated consequences of the future (Zimbardo et al., 1997), these individuals

are likely to respond faster to changes in the environment than present-oriented organizational members, who tend to focus on enjoying the present or think the future is beyond their control (Zimbardo & Boyd, 1999). Future-focused organizational members thus are action-oriented and react faster to changes while present-focused organizational members develop new practices that are available to face those changes (March, 1991). Accordingly, the following hypothesis captures the different relevance of present focus against future focus in terms of reducing delays in organizational action:

*Hypothesis 14: Delay in organizational actions is more strongly related to a future focus than it is to a present focus.*

The next section discusses the three adaptive communication practices—proactive information sharing, use of real-time information, and learning through reflexivity—in terms of McGrath and Kelly's (1986) three issues in organizations—uncertainty, resource allocation, and conflicting interests—in order to describe the relevance of these practices for organizational functioning and adaptation.

**Uncertainty and Adaptive Communication Practices**

Brown and Eisenhardt (1997) studied eight product development teams and found that successful teams, those who introduced their products on time, engaged in what they labeled *time-paced evolution* in order to link the present and the future. The main characteristic of time-paced evolution is that "change is keyed to the passage of time, not the occurrence of particular events" (Brown & Eisenhardt, 1997, p. 25). Through a clock time conception, these successful teams were able to engage in continuous change rather than "the *episodic* phenomenon described by the punctuated equilibrium model" (Brown

& Eisenhardt, 1997, p. 1, *my italics*). By considering change as continuous and linking internal innovation to a clock-based timeline, these successful teams were able to reduce their uncertainty about potential organizational actions to face the unpredictability of future events and hence balance future and present needs (Brown & Eisenhardt, 1997).

*Proposition 4:* *Organizational practices developed from a continuous (clock-time) conception of time will tend to reduce uncertainty about the patterns of organizational action.*

Engaging in the three adaptive practices advanced in this dissertation implies using time as a critical organizational resource. In many organizations, time is socially constructed as a scarce resource (Ancona et al., 2001). Accordingly, how organizational members allocate their available man-hours is related to the degree to which they engage in proactive information sharing, the use of real-time information, and reflexivity (McGrath & Kelly, 1986). The next section will examine the relationships between time allocations and the three adaptive communication practices advanced in this dissertation.

**Resource Allocation and Adaptive Communication Practices**

The critical resource necessary for communication practices is time itself. Nonetheless, teams facing time pressure due to approaching deadlines stop information exchange and idea generation in an effort to concentrate on implementation (Waller, Zelmer-Bruhn, & Giambatista, 2002) which effectively inhibits the three adaptive communicative practices. Therefore, this section describes the relationship between time pressure and the three adaptive communication practices.

***Time pressure and proactive information sharing***

An issue in proactive information sharing is how the information retrieved by an organizational member is distributed within the organization. Proactive information requires that organizational members share information that is unrelated to their own activities with others in the organization (Huber, 2004). Engaging in proactive information sharing necessarily requires taking time away from organizational members' day-to-day, routines activities (Goodman & Darr, 1998). Time pressure leads to an adherence to routines, a halt on information exchange and a focus on immediate actions (Janis, 1983). Accordingly, proactive information sharing will be reduced by time pressure. Organizational members under time pressure may even avoid engaging in information sharing that has been requested by their colleagues (Perlow, 1997). On the other hand, organizational members working interdependently (Thompson, 1967) need to have at least a minimal level of time pressure in order to be motivated to proactively share information with one another. This leads to the following propositions:

*Proposition 5a:* *At low levels of time pressure, the relationship between time pressure and proactive information sharing will be positive.*

*Proposition 5b:* *At high levels of time pressure, the relationship between time pressure and proactive information sharing will be negative.*

***Time pressure and the use of real-time information***

Conceivably, time pressure could increase the use of real-time information since organizational members likely perceive they cannot afford to wait for formal reports. However, extant research suggests that organizational members are more likely to instead rely on the alternative to real-time information—past information and established

routines (Janis, 1983). Janis' (1983) seminal work on groupthink in organizational groups shows that time pressure leads groups to ineffective decisions, in part, because they rely on outdated information. For example, Janis illustrates how decision makers in the disastrous Bay of Pigs invasion relied on the incorrect and outdated assumption that Cuba had an obsolete air force. Further, research on threat rigidity (e.g. Ocasio, 1995; Staw, Sandelands & Dutton, 1981), in which organizations need to respond immediately to unexpected crises, also demonstrates that organizational members tend to fall back established routines that have worked in the past and discount new information. The relation between excessive time pressure in the face of unexpected events and the escalation of commitment (e.g. Staw & Ross, 1987) also provides support for the assertion that time pressure leads organizational members to rely on old routines and information. It is important to note that if there was no minimal level of time pressure organizational members would not need to use real-time information (Huber, 2004). Accordingly, these findings lead to the following proposition:

*Proposition 6a:* *At low levels of time pressure, the relationship between time pressure and organizational members' use of real-time information will be positive.*

*Proposition 6b:* *At high levels of time pressure, the relationship between time pressure and organizational members' use of real-time information will be negative.*

***Time pressure and collective reflexivity***

Reflexivity, the awareness of one's position and assumptions about reality, is included in most organizational learning perspectives (Barge & Oliver, 2003). This

reflexivity has a cost because organizational members must pause and disengage from the actions they are performing in order to be reflexive. For that reason, the resource most important for reflexivity is available time. This assertion seems paradoxical: in order to adapt to their changing environments, organizations require practices that incorporate continuous disengagement from everyday routines. Yet this is illustrated in the everyday routines of the software engineers and managers in Perlow's (1997) study. In Perlow's study, everyday routines were characterized by constant interruptions from those facing deadlines which led to a vicious cycle where overall performance of the department suffered. A "whatever it takes" mentality within the software development organization led members to constantly interrupt others if those interruptions helped each member reach his or her own individual goals (Perlow, 1997). For example, Sarah was a software engineer who understood that taking time to reflect and figure out problems by herself would be better in the long-term, but was instead constantly interrupting others to get her own work done (Perlow, 1997). Sarah also avoided meetings where software engineers could arrive at a shared understanding of problems because she felt she had no time to get involved; Sarah's focus was on getting her projects done at any cost (Perlow, 1997). Sarah was comfortable asking other members for help, even though she would never reciprocate. Although in the long run this lack of reciprocity will likely lead to a decrease in Sarah's performance, her attitude of getting her own job done regardless of everything else was the behavior recognized and rewarded by the group's managers (Perlow, 1997). Thus, since collective reflexivity does not lead to short-term tangible results or rewards by the organization, collective reflexivity—necessary for long-term performance—is inhibited by time pressure. This leads to the following proposition:

*Proposition 7:* *Time pressure will tend to inhibit organizational members' engagement in collective reflexivity.*

Proactive information sharing, use of real-time information, and reflexivity all require the allocation of time. Accordingly, time pressure leads organizational members to perceive time as scarce and will reduce their engagement in the three adaptive communication practices. Similar to the "fast learners" March's (1991) exploration simulation, the benefits of reflexivity typically accrue to organizational members who did not incur the costs of enacting it (Perlow, 1997). In Perlow's case study, some software engineers like Sarah were able to get their jobs done thanks to the reflection and learning of other software engineers who used a significant part of their time not only solving their own problems but also helping others (Perlow, 1997). Although in the long-term helping others was good for the organization, engineers' involvement in helping others engage in reflexivity and learning took more time away from their own work and was not rewarded by managers (Perlow, 1997). In contrast, engineers like Sarah, who did not allocate time to develop learning through reflexivity, hurt others and the organization in the long-run (Perlow, 1997) but were well regarded by management. The importance of collective reflexivity is critical for knowledge workers like the engineers depicted in Perlow's (1997) study, expected to engage in continuous reflection and learning (Garrick & Clegg, 2000; 2001) as part of their jobs. This lead to the following proposition:

*Proposition 8:* *Collective reflexivity increases the long-term performance of knowledge workers.*

The process of collective reflexivity involves exchange among organizational members. As such, it necessarily incorporates the recognition of multiple voices and

contested views of organizational reality (Barge, 2004; Barge & Oliver, 2003; Holmes et al., 2005). Collective learning through this process of reflexivity requires the interaction of diverse views of reality (Hewes, 1996): Group communication "allows group members to clarify, refute, support, extend, modify, and build upon each others' ideas…" (Salazar, Hirokawa, Propp, Julian, & Leatham, 1994, p. 536). Note that Salazar and colleagues include 'refute,' 'clarify,' and 'modify' in their view of group communication to convey that conflict is embedded in group communication processes (Renz & Greg, 2000). Team members cannot build on each others' ideas without some degree of conflict between opinions because team members cannot build on something with which they agree wholeheartedly. Hewes (1996) even suggests group discussions in which group members are not building on each others' arguments, and hence not learning from their interaction, lack coherence and should not be considered communication. Because team practices like collective reflexivity are complex and typically involve conflict, they can be costly in terms of the required time allocated. Not surprisingly, group tasks require more available time than organizational tasks carried out by individual members (Renz & Greg, 2000), and under time pressure such costly practices are likely to be jettisoned for more expedient practices. This leads to the following proposition:

*Proposition 9:* *The inhibiting effect of time pressure is greater in a collective process of reflexivity than in an individual-level process of reflexivity.*

Because the resources allocated to proactive information sharing and reflexivity represent effort and time investments by organizational members, these members need to

have an incentive to allocate their time into these communicative processes. Accordingly, the interests of organizational members are considered next.

**Conflicting Interests and Adaptive Communication Practices**

Conflicting interests bring the present-future duality full circle because organizational members' interests shape and are shaped by their present and future foci. Organizational members with different foci will experience misunderstandings and conflicts that decrease performance (Waller, Conte, Gibson, & Carpenter, 2001). Waller and colleagues combine two temporal individual traits: time urgency and temporal focus in order to describe four different types of teams and offer several propositions regarding how team composition affects how members plan, pay attention to, and meet deadlines, as well as how team composition affects performance.[3] Two team types—future-oriented organizational members with high time urgency and present-oriented members with low time urgency—described by Waller and colleagues have direct implications for members' engagement in the three adaptive practices described here—proactive information sharing, use of real-time information, and collective reflexivity. Waller and colleagues' arguments suggest that the effects of time urgency on the use of adaptive communication practices are identical to the effects of contextual time pressure (Okhuysen & Waller, 2002; Waller et al., 2001; Waller et al., 2002) described earlier. Specifically, the only conceptual difference between time pressure and time urgency is that the former is a temporary perception or state (Okhuysen & Waller, 2002; Waller et al., 2002) while the latter is an individual trait (Waller et al., 2001). Thus, high levels of time urgency will inhibit proactive information sharing, use of real-time information, and collective

reflexivity. However, as with time pressure, organizational members need to have at least a minimal level of time urgency in order to be motivated to continually sense their environments (Huber, 2004) and to use information in real-time (Eisenhardt, 1989). This suggests inverted-U relationships between time urgency and proactive information sharing, using real-time information, and collective reflexivity:

*Proposition 10: Organizational members' engagement in proactive information sharing has a negative relationship with time urgency.*

*Proposition 11: Organizational members' use of real-time information has an inverted U-shaped relationship with time urgency.*

*Proposition 12: Organizational members' collective reflexivity has an inverted U-shaped relationship with time urgency.*

## SUMMARY

This dissertation suggests a critical role of clock-time conceptions in organizational adaptation by contrasting the digital/discrete quality of event-time with the analog/continuous quality of clock-based conceptions of time. Research on organizational adaptation (Brown & Eisenhardt, 1997; Eisenhardt, 1989; Tushman & Anderson, 1986) and strategic actions (Hambrick, Cho, & Chen, 1996; Porter, 1980) highlights the importance of the speed of organizational adaptive processes. Drawing on Huber (2004), the theoretical framework developed in this dissertation proposes that speed is less about the pace of an adaptation process than it is about the *timing* of that process. An event-based conception of time requires organizational members to identify events and make sense of their activities over time through these discrete phenomena,

hence creating a delayed or incomplete response. In contrast, a continuous view of time allows organizational members to learn from near-events and to timely identify trends in their environments. Organizations that start adapting sooner than others leverage the continuity afforded by a clock-based conception of time. Further, the framework asserts that organizational members can cope with the present-future duality by linking the present and the future through adaptive communication practices. Unlike reactive practices based on an event-based conception of time, adaptive communication practices—proactive information sharing, use of real-time information, and collective reflexivity—nurtured through a clock-based conception of time reduce delays in organizational responses to environmental changes.

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[1] Following Bluedorn (2002), throughout this dissertation, the orientation toward the present of the future will be labeled *temporal focus* because it reflects the emphasis on the present and future. The use of the term temporal focus is inclusive, encompassing the terms 'time perspective' (e.g. D'Alessio, Guarino, De Pascalis, & Zimbardo, 2003) and "temporal orientations" (e.g. McGrath & Tschan, 2004) used in social psychology and the term 'temporal perspectives' used by communication scholars (e.g. Ballard & Seibold, 2003).

[2] The tragedy of the commons refers to a situation in which all members benefit from a public, self-replenishable resource (Sheldon & McGregor, 2000). The tragedy of the commons is discussed in this dissertation by considering time as a resource that needs to be used in order to generate knowledge and information. This is the original conceptualization of the tragedy of the commons as applied to temporal focus by Bluedorn (2002). His later conceptualization of stewardship of the temporal commons (Bluedorn & Waller, 2006) relates to the issue of corporations defining time for their publics, and goes beyond the scope of this dissertation.

[3] Since Ballard and Seibold (2004a) find that urgency is positively related to both a present focus and a future four, the four types of temporal team configurations suggested by Waller and colleagues are not orthogonal and need to be further reconsidered.

# Chapter 2: Methodology

## HYPOTHESES

The theoretical framework developed in this dissertation represents a broad research agenda that goes beyond the empirical scope of this dissertation. The empirical research for this dissertation focused on testing the key hypotheses of the model: conceptions of time are more predictive of organizational adaptation than are present and future foci. Below is a summary of the hypotheses that were tested:

*Hypothesis 1a:* *Organizational members with a high present focus engage in more exploration than members with a high future focus.*

*Hypothesis 1b:* *Organizational members with a high future focus engage in less exploration (and more exploitation of their current capabilities) than members with a high present focus.*

*Hypothesis 2:* *Proactive information sharing is negatively related to delay in organizational actions.*

*Hypothesis 3:* *A clock-based conception of time is positively related to proactive information sharing.*

*Hypothesis 4:* *The use of real-time information is negatively related to delay in organizational actions.*

*Hypothesis 5:* *A clock-based conception of time is more positively related to the use of real-time information.*

*Hypothesis 6:* *Collective reflexivity is negatively related to delay in organizational actions.*

*Hypothesis 7:* *A clock-based conception of time is positively related to collective reflexivity.*

*Hypothesis 8:* *An event-based conception of time is negatively related to proactive information sharing, use of real-time information, and collective reflexivity.*

*Hypothesis 9:* *Proactive information sharing, use of real-time information, and collective reflexivity mediate the relationship between conceptions of time and delay in organizational actions.*

*Hypothesis 10:* *Delay in organizational actions is inversely related to a continuous conception of time.*

*Hypothesis 11:* *Delay in organizational activities is more strongly related to a continuous conception of time than it is to an event-based conception of time.*

*Hypothesis 12:* *Delay in organizational actions is negatively related to present and future foci.*

*Hypothesis 13:* *Delay in organizational actions is more strongly related to conceptions of time than it is to present or future focus.*

*Hypothesis 14:* *Delay in organizational actions is more strongly related to a future focus than it is to a present focus.*

Having established the hypotheses that test the main thesis of this dissertation—that conceptions of time more predictive of adaptation as present and future temporal foci—the next step is to describe the appropriate sample and construct measures that were be tested in the hypotheses. The constructs required for this empirical research were a) clock-based and event-based conceptions of time, b) present and future temporal foci, c) exploration, d) delay in organizational responses, e) proactive information sharing, f) use of real-time data, and g) collective reflexivity. The following section describes the scales adapted from prior research to measure these constructs.

## QUESTIONNAIRE DESIGN

Several of the scales included in this research were specifically developed to measure the proposed constructs based on prior theoretical or qualitative research. The scales developed in this dissertation were proactive information sharing, use of real-time information, and conceptions of time. Scales for the other constructs—exploration, present and future temporal foci, collective reflexivity, and delay—were drawn from prior quantitative research. Additionally, the questionnaire included an open-ended question that collected qualitative information to inform and contribute to the interpretation of the quantitative results. The scales were refined through a pilot study, in which both the scales and the hypotheses were tested. This chapter describes the analysis and results of the pilot study and the analysis and background of the main study. Accordingly, the results chapter focuses on the results from the main study.

## Measures

Scales for conceptions of time, proactive information sharing, and use of real-time information were developed for this study based on the literature in organizational temporality (e.g. Ancona et al., 2001), organizational innovation (e.g. Brown & Eisenhardt, 1997) and organizational adaptation (Gómez, 2004; Huber, 2004). The measures for present and future temporal foci, exploration, reflexivity, and delay in adaptation were drawn from existing scales capturing temporal foci and perceived delay (Ballard & Seibold, 2004a), experimentation (Lee, Edmondson, Thomke, & Worline, 2004) and reflexivity (Tjosvold, Tang, & West, 2004). The following paragraphs further describe each of the scales included in this dissertation.

### *Event-based conceptions of time*

Ancona and colleagues (2001) describe event-based time as a conception of time based on an event "as a reference point for things that happen before and after" (p. 515). Bluedorn (2002) regards an event-based conception of time as one where "Time is in the events, the events do not occur in time" (p. 31, his italics). The event-based conception of time consists of five items and was developed based on prior theoretical research on event-based conceptions of time (e.g. Ancona et al., 2001; Bluedorn, 2002; McGrath & Rotchford, 1983), (see Appendix). A sample item is "In this organization we make sense of time through organizationally relevant events." The initial reliabilities of this scale were $\alpha = .32$ in the pilot study and $\alpha = .05$ in the main study. Since the scale was specifically developed for this dissertation, exploratory factor analysis (EFA) was performed in both studies to refine this measure.

***Clock-based conceptions of time***

Ancona and colleagues (2001) describe clock time as a linear continuum. Four items were specifically developed to capture continuous versus discrete conceptions of time (see Appendix). An example item is "Time flows smoothly like a river." The initial reliabilities of this scale were $\alpha = .32$ in the pilot study and $\alpha = .28$ in the main study. Since the scale was specifically developed for this dissertation, exploratory factor analysis (EFA) was performed in both studies to refine the measures.

***Present focus***

The present focus six-item subscale was drawn from Ballard and Seibold's (2004b) work on the dimensions of organizational temporality. In their instrument, the items in the present focus scale start with the following statement:

> "Please think about the way you and your coworkers refer to time in the course of carrying out your daily tasks at work. Read the statements below and then rate each of the words or phrases that follow based upon how well they describe the way you and others in your immediate work group or work unit generally talk about time. Please circle the number to the right of each word or phrase that best represents your answer."

In order to avoid framing present focus in terms of an event-based conception of time, the phrase "tasks at" was replaced with the following statement: "In my organization, we usually discuss our daily work in terms of…" A sample item adapted from Ballard and Seibold is: "In my organization, we usually discuss our work in terms of the here-and-

now." The reliabilities of this scale were $\alpha = .87$ in the pilot study and $\alpha = .88$ in the main study. The scale is illustrated in the appendix.

***Future focus***

The future focus five-item subscale was drawn from Ballard and Seibold's (2004b) subscale of future temporal focus. In their instrument, the items in the future focus scale start with the following statement:

> "Please think about the way you and your coworkers refer to time in the course of carrying out your daily tasks at work. Read the statements below and then rate each of the words or phrases that follow based upon how well they describe the way you and others in your immediate work group or work unit generally talk about time. Please circle the number to the right of each word or phrase that best represents your answer."

In order to avoid framing future focus in terms of an event-based conception of time, the phrase "tasks at" was replaced with the following statement: "In my organization, we usually discuss our daily work in terms of…" Additionally, an item was reworded from "Anticipated events" to "Anticipated trends" to further avoid the event-based framing. A sample item adapted from Ballard and Seibold is: "In my organization, we usually discuss our work in terms of the future developments." The reliabilities of this scale were $\alpha = .93$ in the pilot study and $\alpha = .93$ in the second study. The adapted scale is presented in the appendix.

***Exploration***

Exploration was measured through an eight-item scale adapted from Lee and colleagues' (2004) measures of experimentation, chosen over scales developed specifically to measure exploration and exploitation (e.g. Sidhu, Volberda, & Commandeur, 2003, 2004; Wong, 2004) because these latter scales do not get at the temporal issue that make exploration and exploitation relevant to the future duality—i.e. March's (1991) assertion that the benefits of exploration are uncertain and distant in time. This present-future duality issue is better captured by Lee and colleague's experimentation scale. A sample item from their scale is "Current routines work and will remain unchanged (R)." The initial reliabilities of this scale were $\alpha = .32$ in the pilot study and $\alpha = .68$ in the main study. Since the scale was specifically developed for this dissertation, exploratory factor analysis (EFA) was performed in both studies to refine the scale.

***Response delay***

Delay was measured through Ballard and Seibold's (2004b) three-item temporal punctuality subscale. Ballard and Seibold define punctuality as the "exacting nature of the timing" (p. 143). The items borrowed from Ballard and Seibold for this study relate to a feeling of being late or delayed, which can be applied to macro timing issues (adapting to environmental change). A sample item from Ballard and Seibold is "running late." The initial reliabilities of this scale were $\alpha = .73$ in the pilot study and $\alpha = .74$ in the second study. In order to refine the scale, exploratory factor analysis (EFA) was performed in both studies to refine the scale.

***Proactive information sharing***

As described previously, proactive information sharing depends on the type of information. Equivocal information is more costly to share through computer mediated communication (CMC) because it needs to be codified. In contrast, information already codified, such as that found in reports, statistics, and other documents can be easily shared through CMC. Accordingly, information sharing was divided into sharing explicit information and sharing implicit (ambiguous) information (Bock, Zmud, Kim, & Lee, 2005). The scale to measure proactive sharing of explicit information was developed for this study drawing items from both Bock and colleagues (2005) and Kolekofski and Heminger's (2003) research on information sharing. The scale for proactive sharing of implicit information was adapted from Kramer, Callister and Turban's (1995) measure of unrequested information giving. The reliabilities for the 8-item proactive information sharing scale were $\alpha = .92$ in the pilot study and $\alpha = .92$ in the main study. The reliabilities for the 4-item proactive sharing of explicit information scale were $\alpha = .90$ in the pilot study and $\alpha = .92$ in the main study. Finally, the reliabilities for the 4-item proactive sharing of tacit information scale were $\alpha = .84$ in the pilot study and $\alpha = .90$ in the main study. Both scales are presented in the appendix.

***Use of real-time information***

Real-time information is defined by Eisenhardt (1989) in terms of what it is not: real-time information is not forecasted information, but information that is reported as it is occurring. Accordingly, real-time information can be understood as constant, up-to-the-minute information, immediate, and unformatted. The five-item scale developed to

measure this real-time information reflects these characteristics and is included in the appendix. A sample item of this scale is "The organization uses up-to the minute information." The initial reliabilities of this scale were $\alpha = .51$ in the pilot study and $\alpha = .50$ in the main study. In order to refine the scale, exploratory factor analysis (EFA) was performed in both studies.

***Collective reflexivity***

Reflexivity was measured drawing from Tjosvold and colleagues' (2004) nine-item reflexivity scale. Tjosvold and colleagues adapted this scale from prior research by West and colleagues (Carter & West, 1998; West, Patterson, & Dawson, 1999) to measure employees' reflection of their goals and processes. A sample item of this scale (listed in the appendix) is "In this organization we often review our approach to getting the job done." As with all measures in the study, participants were asked to rate on a 6-point Likert scale (1=strongly disagree, 6=strongly agree) their level of agreement with the statements in each of the nine items. The reliabilities of this scale were $\alpha = .83$ in the pilot study and $\alpha = .87$ in the main study. The adapted scale is presented in the appendix.

***Demographic variables***

In addition to the measures capturing the theoretical constructs, I included three quantitative demographic measures in the questionnaire—tenure, age, and gender. Age has been found to relate negatively to a present focus and positively to a future focus among samples involving college students (Zimbardo & Boyd, 1999). However, samples of college students represent a limited range in terms of age. Gender has not been found to relate to future focus or present focus, but was related to a positive past focus in

Zimbardo and Boyd's (1999) study. Finally, tenure has not been included in empirical analyses regarding present and future foci, but has been considered as an inhibitor to open-mindedness and change (Finkelstein & Hambrick, 1996). Further, tenure has been found to have a positive relationship with conformity among executives (Finkelstein & Hambrick, 1990). Accordingly, these three demographic variables were included in the analyses.

Two sites were recruited for this research. The first site served as a pilot study to test the newly developed scales as well as the framework. The pilot study tested the hypotheses within a high technology startup organization in the Southwest United States. The site for the main study was a public organization in charge of planning and operating public transportation in a city in the Southwest United States. The following section describes the pilot study.

## PILOT STUDY: HIGH TECHNOLOGY INC. (HTI)[4]

This first site served as a pilot study for the newly developed scales. The recruitment for this organization was achieved through an outreach/mentorship program in which three undergraduate students participated in research activities under my supervision and the sponsorship of Dr. Ballard. One of the undergraduate students used his networks to contact one of the vice presidents (VP) of HTI. The agreement was that HTI would allow the research team to collect data and would in turn get both a systems training workshop developed by the research team and a final report regarding HTI's communication practices. The project was sponsored by the VP and approved by the company's president. The assessment would be conducted through a web-based survey

which would be first adapted to the organization based on information retrieved from three focus groups. The web-based survey would include organizational members from all areas of this geographically dispersed organization. Following detailed analysis of the survey a report was provided back to HTI in February 2007.

**Focus Groups**

This study started out with two focus groups that provided feedback in order to refine the questionnaire and adapt it to the organization. The focus groups were done through two teleconferences lasting around 30 minutes each with five members each from different areas of HTI. Instead of having a third focus group, the company was asked for written feedback from five organizational representatives following a Delphi method. After revising the questionnaire using the feedback from the focus groups and the Delphi method, data collection through the web-based questionnaire took place in the months of October through December 2006. Having a population with advanced technology infrastructure allowed the use of online questionnaires, dramatically reducing the cost of data collection (Dillman, 2000). Following Dillman (2000), three electronic reminders were sent to participants, each two weeks apart and beginning two weeks after the initial contact. In order to leverage sponsorship by the upper levels within HTI, the initial invitation to participate in the questionnaire and the follow-up reminders were sent either by the VP who served as a liaison between the research team and HTI, or by HTI's President and COO.

**Respondent's Demographic Characteristics**

Responses were obtained from 58 of the 230 organizational members, reflecting a response rate of 25%. Among the 58 employees, 26 reported to be in a sales division (69% of total respondents), 10 reported to work as engineers (17% of total respondents), 4 reported being in the corporate office (7% of total respondents), and the rest reported being on IT or consulting. The respondents varied in age from 22 to 53 years, with a mean of 38 years and a standard deviation of 8.19 years. Regarding tenure at the company, respondents ranged from 1 month to 18 years, with a mean of 2 years 11 1/2 months and a standard deviation of 3.74 years. Finally, 41 of the respondents were male (71%), 16 were women (27 %) and 1 did not respond (2%).

**Reliability of Measures and Factor Analyses**

Comments volunteered by HTI respondents in the open-ended question of the questionnaire indicated that the measures indeed captured a functional level of analysis.[5] Because several scales were created specifically for this dissertation, their reliability scores were first assessed and those scales with reliability scores below .80 were factor analyzed to determine if some items did not load on the factor representing the latent variable. Those measures with reliability scores above .80 are presented first. Then, those with lower reliability scores are discussed in terms of the resulting factor structures from their exploratory factor analyses.

The measures that have a high reliability scores in this sample were: future focus ($\alpha = .93$), proactive information sharing (including both explicit and tacit, $\alpha = .92$),

proactive sharing of explicit information ($\alpha$ = .90), present focus ($\alpha$ = .87), proactive sharing of tacit information ($\alpha$ = .84), and collective reflexivity ($\alpha$ = .83). Given their high reliability scores, these scales were not factor-analyzed.

Although the N = 58 sample size of study one is not ideal for EFA, it is above the recommended minimum of five data points per item (Child, 2006). The largest scale considered in the EFA presented below has seven items, thus the scales factor analyzed have at least eight data points per item. The scales that were factor-analyzed were delay ($\alpha$ = .73), use of real-time information ($\alpha$ = .51), exploration ($\alpha$ = .35), clock-based conceptions of time ($\alpha$ = .32), and event-based conceptions of time ($\alpha$ = .32). Because the items within each scale are conceptually related, a VARIMAX rotation was not adequate given its assumptions about orthogonal factors (Park, Dailey, & Lemus, 2002). Accordingly, the factor analyses used an oblique rotation with Kaiser Normalization, which allows factors to be correlated (Park et al., 2002). The criterion for number of factors selected in this exploratory pretest was based on keeping those factors with eigenvalues > 1. Although this criterion has a tendency to overestimate the number of factors (Park et al., 2002), constraining the structure to only one factor could potentially lead to a fusion of factors that is more damaging to theory building exploratory analyses than having irrelevant factors with low item loadings (Child, 2006). The factor analyses are presented in Table 1 with positive factors loadings above 0.5 underlined.

Table 1: Factor Structures for Delay, Real-time Information Use, Exploration, Clock-based Time, and Event-based Time

| | *Delay* | |
|---|---|---|
| *In our workgroup we talk about our actions and activities as...* | | |
| Behind schedule | 0.851 | |
| Running late | 0.916 | |
| Overdue | 0.879 | |
| On time (R) | 0.166 | |
| | *Real-time Information* | |
| *In my workgroup, we usually...* | Reduced Queue | Immediate Reporting |
| take a couple of days to interpret information | 0.805 | 0.177 |
| wait until the end of the day to compile reports | 0.785 | 0.104 |
| wait for information to be interpreted before using it | 0.618 | -0.325 |
| scan the system for the most | -0.203 | 0.736 |
| report information as soon as we receive it | 0.081 | 0.720 |
| act upon information as we receive it | 0.445 | 0.703 |
| | *Exploration* | |
| *In my workgroup…* | Supportive Climate | Dissatisfaction w/Status Quo |
| one does not get into trouble for trying out new ideas | 0.870 | -0.047 |
| we reward innovators, even if they fail. | 0.810 | -0.260 |
| it is not worth the trouble to question the current processes (R). | 0.584 | 0.242 |
| Current routines work and will remain unchanged (R). | 0.030 | 0.745 |
| traditional processes should be upheld because they work (R). | -0.533 | 0.634 |
| we avoid ideas with uncertain potential (R). | 0.280 | 0.633 |
| there is one best way to achieve desired outcomes (R). | -0.184 | 0.330 |
| | *Clock-based Time* | |
| Time is a collection of periods with specific duration. (R). | 0.852 | |
| Time can be separated into discrete chunks (R). | 0.850 | |
| Different periods of time are separate from each other (R). | 0.711 | |
| Time flows smoothly like a river. | -0.577 | |
| | *Event-based Time* | |
| We consider the passage of time regardless of organizational events. (R). | 0.747 | |
| Time is relevant, even if no events happen in the organization (R). | 0.743 | |
| Time can be separated from organizational events (R). | 0.723 | |
| Time has meaning only in terms of organizational events. | 0.531 | |
| We make sense of time through organizationally relevant events. | -0.475 | |

Extraction Method: Principal Component Analysis.
Rotation Method (for two factor matrices): Oblimin with Kaiser Normalization.

The factor analysis of the *delay* scale indicated that one item—"In our workgroup we talk about our actions and activities as on time" (R)—did not load substantially on the latent factor. Dropping this item from the delay scale improved its reliability to $\alpha = .86$. While the delay scale indicated one dimension, the EFA of the *real-time information* scale suggested two factors with three items each. The first factor included the following three items: "In my workgroup, we usually...take a couple of days to interpret information" (R), "…wait until the end of the day to compile reports" (R), and "…wait for information to be interpreted before using it" (R). These three items had a reliability of $\alpha = .62$. The three items loading in the second factor were "In my workgroup, we usually...scan the system for the most recent information," "…report information as soon as we receive it," and "…act upon information as we receive it." These three items had a reliability of $\alpha = .55$. Both reliabilities are higher than the original reliability of the six items, indicating that the two dimensions represented a fusion of factors (Child, 2006) when they are aggregated. Accordingly, both scales were considered as distinct dimensions, the first dimension labeled "Reduced queue" and the second dimension labeled "immediate reporting/acting."

The *exploration* scale revealed two different dimensions. The following three items loaded into dimension 1: "In my workgroup… one does not get into trouble for trying out new ideas," "…we reward innovators, even if they fail," and "…it is not worth the trouble to question the current processes (R)." These three items seemed to focus on a climate conducive towards experimentation within the functional unit and their reliability was $\alpha = .68$. Three items loaded into the second factor: "In my workgroup…

current routines work and will remain unchanged" (R), "…traditional processes should be upheld because they work" (R), "…we avoid ideas with uncertain potential" (R), and "…there is one best way to achieve desired outcomes"(R). These three items seemed to reflect avoiding contempt or dissatisfaction with the present state of things. However, the reliability for these three items was low ($\alpha = .48$). Given the low reliability of the second dimension, only the first dimension was included in the analysis.

The factor analysis of the *clock-based conception of time* scale showed that one item—"time flows smoothly like a river"—did not load on to the latent factor and dropping this item improved the scale reliability to $\alpha = .77$, which is an acceptable reliability level. The initial EFA of the *event-based conception of time* indicated a two-factor solution with two items each. Given the limitations of two-items scales and the low reliability scores for each factor ($\alpha = .10$ for the first factor and $\alpha = .48$ for the second factor) this scale was constricted to one factor because using the eigenvalue > 1 led to factor diffusion and made the factors difficult to interpret (Child, 2006). Accordingly, the event-based time scale was factor-analyzed a second time constraining the resulting factor structure to a one-factor solution. The one-factor solution indicated four items with loadings above 0.5 and a reliability score of $\alpha = .60$. The four items were "Time has meaning only in terms of organizational events," "We consider the passage of time regardless of organizational events" (R), "Time is relevant, even if no events happen in the organization" (R), and "Time can be separated from organizational events" (R).

**Analysis**

After assessing the reliabilities and using EFA to refine those scales with low reliabilities, the scale means were computed. These scale means were then used in testing the hypotheses. Given the high correlation of proactive information sharing (both explicit and tacit) with both measures, as well as the high correlation among explicit and tacit, an EFA was run to determine if they could be represented as one dimension. Results indicated that the items measuring both sharing of explicit and sharing of tacit information loaded onto one factor. Accordingly, hypotheses tests included only the proactive information sharing scale.

Hypothesis one tested whether organizational members with a high present focus engage in more exploration than members with a high future focus. Because the measures of present and future foci represented scales rather than categories, the analysis was done through multiple linear regression with exploration as the dependent variable and present and future foci as the independent variables. In order to further test the relationship between present and future foci and exploration, a regression including all the scale means was run, hence controlling for potential unobserved variables.

Hypotheses two, four, and six tested the relationship between the three communication practices and delay in organizational actions. Specifically hypothesis two tested the relationship between proactive information sharing and delay. Hypothesis four tested whether the use of real-time information was negatively related to delay. Finally, hypothesis six tested the proposed negative relationship between collective reflexivity and delay. These three hypotheses were tested by regressing delay in

organizational actions as the dependent variable and including the three communication variables as independent variables.[6]

Hypotheses three, five, and seven tested whether a clock-based (continuous) conception of time was related to the three communication practices—proactive information sharing, use of real-time information, and collective reflexivity, respectively. Hypothesis eight tested whether an event-based conception of time was negatively related to the three communication practices. These four hypotheses were tested through a canonical correlation analysis including all four (real-time information was divided into two dimensions) communication practices as criterion (dependent) variables and event-based and clock-based conceptions of time, and present and future foci, as covariates (independent) variables.[7] The theoretical framework suggests that delay and exploration are not predictors of the communication practices but outcomes of these practices. Accordingly, delay and exploration were not included in the model because it was conceptually inconsistent to treat them as predictors of the communication practices.

Canonical correlation analysis (CCA) has several advantages. First, using multivariate methods such as CCA reduces the probability of committing 'experimentwise' Type 1 errors—finding relationships that are not there—by performing several regressions or other univariate tests (Humphries-Wadsworth, 1998; Sherry & Henson, 2005). Using two separate regressions, one for each of the two exploration dimensions would have inflated the probability of Type 1 error. Instead, both dimensions were tested through CCA.

A second advantage of CCA is that, except for structural equation modeling, CCA represents the highest level of the general linear model and most other parametric tests

(e.g. ANOVA, MANOVA, multiple regression, and t-tests) can be subsumed as special cases of CCA (Humphries-Wadsworth, 1998; Sherry & Henson, 2005). Most importantly, as with all parametric tests, CCA includes parameters of effect size and significance.

A third advantage of CCA is that multivariate analyses best capture the complex cause-effects relationships of human behavior (Humphries-Wadsworth, 1998; Sherry & Henson, 2005). In testing hypothesis one, both dimensions of exploration were conceptually related and it would have been inaccurate to assume they were orthogonal. Testing the relationship of communication practices, present and future foci and conceptions of time with these two dimensions simultaneously captured the complex relationships of these constructs.

Similar to factor analysis, each canonical function, or variate—a weighted combination of predictor and dependent variables—captures a proportion of the total variance. Accordingly, it is recommended (Sherry & Henson, 2005) to focus the analysis and discussion only on those variates that capture a significant portion of the variance.

Hypothesis nine tested whether the three communication practices mediated the relationship between conceptions of time and delay in organizational actions. Accordingly, following Baron and Kenny (1986), conceptions of time were used as predictors of delay in two regressions models: the first regression model did not include (did not control for) the communication practices. The second regression included—controlled for—the communication practices. If the relationship between conceptions of time and delay was reduced when controlling for the communication practices, then these

practices mediated the relationships between conceptions of time and delay (Baron & Kenny, 1986).

Hypothesis ten tested the negative relationship between a clock-based conception of time and delay in organizational actions and whether that relationship was stronger than the relationship between delay and an event-based conception of time. Similarly, hypothesis eleven tested whether the effects of conceptions of time on delay were stronger than the effects of present and future foci. Finally, hypothesis twelve tested the proposed negative relationship between delay in organizational actions and a future focus and whether this relationship was stronger than the relationship between delay and present focus. These three hypotheses were tested through a regression model that included delay as the dependent variable and conceptions of time and present and future foci as predictors.

**Results**

The correlations among scale means, with the reliabilities included in the diagonal matrix, are presented in table 2. These correlations show that event-based and clock-based conceptions of time were significantly and positively correlated in this sample. Further, both conceptions of time were negatively correlated to present and future foci, as well as to information sharing and collective reflexivity. Additionally, an event-based conception of time was also negatively related to immediate acting upon or reporting information. Consistent with prior research by Ballard & Seibold (2004a, 2004b) present and focus foci were positively related. Further, they were also both positively related to information sharing and collective reflexivity. In addition, future focus was also related

to immediate acting upon/reporting information. Surprisingly, delay was not related to any other measure. Except for a reduced queue in information processing, the communication practices were all positively related among themselves and related to exploration.

Table 2: Pearson Correlations among Conceptions of Time, Present and Future Foci, Communication Practices, Exploration, and Delay

| | Event | Clock time | Present | Future | Delay |
|---|---|---|---|---|---|
| Event | (.48) | | | | |
| Clock time | .341* | (.77) | | | |
| Present | -.573* | -.334* | (.87) | | |
| Future | -.557* | -.480* | .607* | (.93) | |
| Delay | .048 | -.119 | .168 | -.052 | (.86) |
| Information Sharing | -.561* | -.329* | .441* | .708* | -.035 |
| Reflexive | -.440* | -.305* | .513* | .733* | -.186 |
| No queue | -.038 | .345* | -.049 | -.189 | -.204 |
| Immediate | -.284* | -.049 | .241 | .583* | -.163 |
| Explore | -.091 | -.132 | .047 | .263* | -.283* |
| | Information Sharing | Reflexivity | Infqueue | Immediate | Exploration Climate |
| Information Sharing | (.84) | | | | |
| Reflexivity | .741* | (.83) | | | |
| No queue | -.181 | -.098 | (.62) | | |
| Immediate | .618* | .602* | .055 | (.55) | |
| Explore | .403* | .382* | -.030 | .413* | (.48) |

* Correlation is significant at the 0.05 level (2-tailed).

As illustrated in table 3, hypothesis one was not supported. A present temporal focus was not significantly related to a climate supportive to exploration. In contrast, a future temporal focus was a significant predictor of a climate conducive to exploration. Thus, although there were differences between the effects of present and future foci on exploration, the results were in the opposite direction. Although a present focus seems to indicate future consequences are not emphasized (Zimbardo & Boyd, 1999), a future

orientation, in which consequences are considered, was related to a climate of exploration in which organizational members do not fear the repercussions of experimentation.

Table 3: Regression Coefficients of Present and Future Foci as Predictors of a Climate of Exploration

| | Unstd. Coefficients | Standardized Coefficients | p |
|---|---|---|---|
| Present Focus | -.145 | -.159 | .337 |
| Future Focus | .254 | .340 | .044 |

Dependent Variable: Climate Conducive to Exploration

Hypotheses two, four, and six tested the relationship between the three communication practices and delay in organizational actions. Specifically hypothesis two tested the relationship between proactive information sharing and delay. Hypothesis four tested whether the use of real-time information was negatively related to delay. Finally hypothesis six tested the proposed negative relationship between collective reflexivity and delay. Table 4 presents the results of the regression model with delay in organizational actions as the dependent variable and the four communication variables as independent variables. Hypothesis two is not supported: proactive information sharing was not related to delay in organizational actions. Similarly, hypothesis four is not supported, neither waiting to report information due to a queue or procedure (e.g. waiting until the end of the day) nor immediate acting upon/reporting information were related to delay. Nevertheless, hypothesis six was supported: collective reflexivity was negatively related to delay in organizational actions ($\beta$=-0.456, $p$=0.044). In addition, a present focus was positively and significantly related to perceived delay in organizational actions ($\beta$=0.440, $p$=0.019).

Table 4: Regression Coefficients of Present and Future Foci, Conceptions of Time, and Communication Practices as Predictors of Delay in Organizational Activities

| | Unstd. Coefficients | Standardized Coefficients | p |
|---|---|---|---|
| Present Focus | .601 | .440 | .019 |
| Future Focus | -.129 | -.115 | .644 |
| Event-based time | .291 | .194 | .298 |
| Clock-based time | -.093 | -.085 | .598 |
| Information Sharing | .306 | .248 | .289 |
| Reflexivity | -.683 | -.456 | .044 |
| No queue | -.207 | -.170 | .256 |
| Immediate Reporting | -.020 | -.013 | .946 |

a Dependent Variable: Delay in organizational activities

Hypotheses three, five, and seven tested whether a clock-based (continuous) conception of time was related to the three communication practices—proactive information sharing, use of real-time information, and collective reflexivity, respectively. Table 5 presents the canonical solution that tests these three hypotheses. The analysis yielded four canonical functions (variates) with squared canonical correlations ($R_C^2$) of .618, .179, .145 and .060 respectively for each successive function. Collectively, the full model across the four functions was statistically significant, Wilks's $\lambda = .252$ criterion, $F(16, 147.28) = 5.247$, $p < .001$. Because Wilks's $\lambda$ represents the variance unexplained by the model, $1 - \lambda$ yields the full model effect size and is an $R^2$ metric. Thus, for the set of four canonical functions, the $R^2$ type effect size was .748, which indicates that the full model explained a substantial portion, about 75%, of the variance shared between the variable sets. The submodel with functions two through four was also statistically significant, with Wilks's $\lambda = .660$ criterion, $F(9, 119.40) = 2.476$, $p = .013$. The model including functions three and four was also statistically significant, with Wilks's $\lambda = .803$

criterion, $F(4, 100.00) = 2.890$, $p=.026$. Finally, function four, tested in isolation, was not statistically significant: Wilks's $\lambda = .940$, $F(1, 51) = 3.265.$, $p=.077$. Accordingly, the discussion focuses on the first three canonical functions.

After identifying that the model itself was significant, the next step was to identify the specific significant relationships (Thompson, 1997). Table 5 presents the structure coefficients, the squared structure coefficients, and the communalities (h2) across the three statistically significant functions. The first thing noticeable from table 5 is that proactive information sharing (-.913), collective reflexivity (-.925), and immediate reporting/acting upon information (-.759) all load negatively and considerably onto the first canonical variate. Accordingly, variate one represents inhibiting communication practices. Regarding canonical variate two, only a reduced information queue, a dimension of real-time information, had considerable loading onto variate two (.755). Finally, immediate acting upon/reporting information was the only communication practice that loaded onto canonical variate three (-.623).

Regarding the predictor variable set in variate 1—event-based time loaded considerably onto this canonical variate (.641). This implies a negative relationship between event-based time and proactive information sharing, collective reflexivity, and immediate acting upon/reporting information. Additional analyses showed that event-based time was a significant predictor of proactive information sharing ($\beta=-.280$, $p = 0.028$), but not of reflexivity or immediate acting upon/reporting information. Thus, hypothesis eight was partially supported. A clock-based conception of time did not have a considerable loading onto canonical variate one. Accordingly, hypotheses three, five, and seven were not supported: a clock-based conception of time was not significantly

related to proactive information sharing, collective reflexivity, or use of real-time information.

Present and future foci also loaded considerably, albeit negatively, onto the first canonical variate. This implies that they were positively related to proactive information sharing, collective reflexivity, and immediate acting upon/reporting information. Additional univariate analyses revealed that a present focus was not significantly related to any of the three communication practices. In contrast, these analyses revealed that a future focus was a significant predictor of proactive information sharing ($\beta$=.608, $p<0.001$), collective reflexivity ($\beta$=.678, $p<0.001$), and immediate acting upon/reporting information ($\beta$=.788, $p<0.001$). Accordingly, a future focus, and not the hypothesized clock-based conception of time, was the strongest significant predictor of adaptive communication practices.

Hypothesis three, relating clock-based time to proactive information sharing was not supported. Hypotheses five was partially supported: a clock-based conception of time was related to both a reduced information queue and to immediate acting upon/reporting information. Hypothesis six was not supported: a clock-based conception of time was not significantly related to collective reflexivity. Hypothesis eight was also not supported: an event-based conception of time was not significantly related to any of the communication practices.

Table 5: Canonical Solution for Temporal Foci and Conceptions of Time Predicting Communication Practices for Functions 1, 2 and 3.

| | Function 1 | | Function 2 | | Function 3 | | |
|---|---|---|---|---|---|---|---|
| | $r_s$ | $r_s^2$ (%) | $r_s$ | $r_s^2$ (%) | $r_s$ | $r_s^2$ (%) | $h^2$ |
| Proactive Information Sharing | -0.913 | 83.36% | 0.239 | 5.71% | 0.192 | 3.69% | 92.76% |
| Collective Reflexivity | -0.925 | 85.56% | -0.096 | 0.92% | 0.047 | 0.22% | 86.71% |
| No information queue | 0.168 | 2.82% | 0.755 | 57.00% | -0.470 | 22.09% | 81.91% |
| Immediate reporting/acting | -0.759 | 57.61% | -0.017 | 0.03% | -0.623 | 38.81% | 96.45% |
| $R_C^2$ | | 61.80% | | 17.90% | | 14.50% | |
| Event-based time | 0.641 | 41.09% | -0.642 | 41.22% | -0.412 | 16.97% | 99.28% |
| Clock-based time | 0.375 | 14.06% | 0.391 | 15.29% | -0.800 | 64.00% | 93.35% |
| Present focus | -0.621 | 38.56% | 0.107 | 1.14% | 0.395 | 15.60% | 55.31% |
| Future focus | -0.989 | 97.81% | -0.145 | 2.10% | 0.038 | 0.14% | 100.00% |

Note: Structure coefficients ($r_s$) greater than |.45| are underlined. Communality coefficients greater than |.45| are underlined.

The regression model testing hypotheses nine through fourteen is illustrated in table 4. Hypothesis ten tested the relationship between a clock based conception of time and delay. Hypothesis eleven tested whether a clock-based conception of time was a stronger negative predictor of delay in organizational actions than an event-based conception of time. These hypotheses were not supported. Neither clock- or event-based conceptions of time were significantly related to delay. Hypothesis twelve and thirteen tested whether the effects of conceptions of time on delay as compared to the effect of present and future foci. These hypotheses were not supported—conceptions of time were not significantly related to delay in organizational activities. Hypothesis fourteen tested whether the negative relationship between a present focus and delay was stronger than the relationship between delay and future focus. Hypothesis fourteen was not

supported—a present focus was significantly related to delay in organizational activities while a future focus was not significantly related. However, present focus had a *positive*, not the hypothesized negative relationship. Finally, hypothesis nine tested whether communication practices mediated the relationship between conceptions of time and delay in organizational activities. This hypothesis was not supported—when the communication practices were removed from the regression equation, conceptions of time remained not significantly related to delay in organizational activities.

**Insights from Pilot Study**

Of the twelve hypotheses tested in study one, only hypothesis five is supported: a clock-based conception of time was related to immediate reporting and use of real-time information. The lack of results is due in part to the combination of small sample size and the development of new measures that need to be further refined. One specific issue that needs to be addressed is that conceptions of time and present and future foci are positively inter-related. Nevertheless, even with these inter-relations, the findings discriminate among present and future foci and conceptions of time. Specifically, the findings suggest that a future focus has a greater influence on communication practices than either conceptions of time or a present focus.

A surprising finding was that present and future foci were not related to exploration. Hypothesis one was based on research that defines the focus on exploration based on temporal distance—exploration implies benefits that are distant in time. This lack of findings is potentially due to the small sample and low reliabilities for some scales in the pilot study. These limitations limited the power of the hypotheses tests.

Building on the insights from the pilot study, study two recruited a larger sample and modified the wording of a couple of items to improve their validity. The next section describes the methodology for study two.

## STUDY TWO: SOUTHWEST TRANSPORTATION AUTHORITY (STA)[8]

The site for this study was the transportation authority organization for a city located in the Southwest US. STA has approximately 1200 employees and is a relevant site for this study because its members need to balance 25-year transportation and city plans which they need to coordinate with other city, state, and federal organizations at the same time that they need to react to immediate unanticipated issues in their everyday activities, such as ice storms, for example.

I initially contacted STA by phone and e-mail and exchanged messages with the department of marketing and community relations. STA was very open to the research and I was oriented to the VP of operations, who became the sponsor of the project. While I intended to focus on administrative staff, the VP of operations considered that everybody in STA should participate. Because bus drivers and other operations crew did not have their own workstation with internet access to participate in the questionnaire, STA's information technology staff became involved in implementing public workstations where the operations crew could access the questionnaire. By working with them in implementing a solution we were able to make sure all operations crew could participate while maintaining the individual responses confidential and avoiding duplicate answers derived from using public workstations. As in the case of HTI, we followed Dillman's (2000) recommendation regarding survey reminders. These

reminders were internally communicated by the VP of operations and STA's president. The next sections describe the characteristics of respondents at the site, the refinement of measures and factor analyses, as well as the models to test the twelve hypotheses.

**Respondent's Demographic Characteristics**

Responses were obtained from 186 of the 1200 organizational members, reflecting a response rate of 15%, which is in part due to the technological infrastructure limitations of the operations employees. Among the 186 employees, 67 reported they work in an administrative area (37% of the sample and 28% percent of the 240 administrative employees), 72 (39% of the sample and 8% of the 950 operation employees) reported to be involved in an operations area (including bus drivers, maintenance crews, supervisors, managers, and receptionists) and the other 44 (24% of the sample) did not answer this question.[9] In order to test for differences across respondents from different functional units, I ran a MANOVA using functional unit (Administration versus Operations) as the fixed factor and conceptions of time, temporal foci, communication practices, delay, exploration, and communication adequacy as dependent variables. The results from the MANOVA did not show significant differences between administrative and operations personnel across the dimensions. Regarding tenure at the company, respondents ranged from 1 month to 26 years, with a mean of 8.48 years and a standard deviation of 7.28 years. Finally, 82 of the respondents were male (45%), 68 were women (37%) and 33 did not respond (18%). As in the case of functional unit, I ran a MANOVA model to test for differences between men and women across all the variables and found no significant differences.

**Reliability of Measures and Factor Analyses**

Leveraging the feedback from the pilot study regarding the low reliability of the event-based conception of time, two items were modified after an extensive talk with STA's representatives in order to make them more understandable. One item was changed from "We make sense of time through organizationally relevant events" to "We understand time through organizationally relevant events." The second item modified was "Time has meaning only in terms of organizational events," which was changed to "We define time through organizationally relevant events." STA representatives also noted that the questionnaire began with temporal issues—the most abstract concepts—and negotiated that the order of the questionnaire be changed to begin with the communication practices and end with the temporal concepts. This change was made because the STA contacts reviewing the questionnaire suggested that respondents were more comfortable reporting communication practices than temporal concepts. Accordingly, the most abstract temporal concepts were moved to the end of the questionnaire. STA contacts also specified that they wanted to get feedback relating to communication across different functional units. Accordingly, a question was included in which respondents were asked to identify up to five other functional units they communicated with and to rate the adequacy of their communication with each of these areas.

As in the case of the pilot study, the internal consistency reliabilities of scores on each scale were first assessed and those scales with reliability below .80 were factor analyzed to determine if some items did not have a loading above 0.5 on the factor

representing the latent variable and whether the scale could be refined according to conceptual considerations. Those measures with reliabilities above .80 are presented first. Then, those with lower reliabilities are discussed and the results of the factor analyses presented.

The measures that had a high reliability in this sample were: future focus ($\alpha$ = .93), proactive information sharing (including both explicit and tacit, $\alpha$ = .92), proactive sharing of explicit information ($\alpha$ = .92), proactive sharing of tacit information ($\alpha$ = .90), present focus ($\alpha$ = .88), and collective reflexivity ($\alpha$ = .87). Given the strong reliability of scores on these scales, these scales were not factor-analyzed.

The scales that had a reliability below $\alpha$ = .80 were delay ($\alpha$ = .74), exploration ($\alpha$ = .68), use of real-time information ($\alpha$ = .50), clock-based conceptions of time ($\alpha$ = .28), and event-based conceptions of time ($\alpha$ = .05). Accordingly, these scales were refined through exploratory factor analysis (EFA). Because the items in the scales were expected to be related, oblique rotation was used in the cases where two factors were obtained. The results of the factor analyses are presented in table 6, those factors with loadings above .5 are underlined.

Table 6: Factor Structures for Delay, Real-time Information Use, Exploration, Clock-based Time, and Event-based Time

| | | | | |
|---|---|---|---|---|
| | Delay | | | |
| we talk about our actions and activities as... | | | | |
| Behind schedule | 0.938 | | | |
| Running late | 0.968 | | | |
| Overdue | 0.921 | | | |
| On time (R) | -0.110 | | | |
| | Real-time Information | | | |
| In my workgroup, we usually... | Immediate | No Queue | | |
| report information as soon as we receive it | 0.857 | 0.018 | | |
| act upon information as we receive it | 0.812 | 0.001 | | |
| scan the system for the most | 0.750 | -0.141 | | |
| take a couple of days to interpret information | 0.097 | 0.827 | | |
| wait until the end of the day to compile reports | 0.018 | 0.806 | | |
| wait for information to be interpreted before using it | -0.367 | 0.700 | | |
| | Exploration | | | |
| In my workgroup… | Dissatisfaction w/current state | Climate of Exploration | | |
| current routines work and will remain unchanged (R). | 0.837 | 0.108 | | |
| there is one best way to achieve desired outcomes (R). | 0.825 | -0.001 | | |
| traditional processes should be upheld because they work (R). | 0.780 | -0.212 | | |
| one does not get into trouble for trying out new ideas | -0.050 | 0.795 | | |
| we reward innovators, even if they fail. | -0.208 | 0.772 | | |
| it is not worth the trouble to question the current processes (R). | 0.480 | 0.612 | | |
| we avoid ideas with uncertain potential (R). | 0.593 | 0.606 | | |
| | Clock-based time | | | |
| Time can be separated into discrete chunks (R). | 0.860 | | | |
| Time is a collection of periods with specific duration. (R). | 0.814 | | | |
| Different periods of time are separate from each other (R). | 0.784 | | | |
| Time flows smoothly like a river. | -0.578 | | | |
| | Event-based time | | | |
| Time is relevant, even if no events happen in the organization (R). | 0.785 | | | |
| We consider the passage of time regardless of organizational events. (R). | 0.638 | | | |
| Time can be separated from organizational events (R). | 0.461 | | | |
| We define time through organizationally relevant events | -0.761 | | | |
| We understand time in terms of organizational events | -0.786 | | | |

Extraction Method: Principal Component Analysis.
Rotation Method (for two factor matrices): Oblimin Rotation with Kaiser Normalization.

Consistent with the pilot study, the factor analysis of the *delay* scale indicated that one item—"In our workgroup we talk about our actions and activities as on time" (R)—

did not load substantially on the latent factor. Upon examination, this item differed conceptually from the other items in the scale because not being "on time" is not necessarily being delayed. As Ballard and Seibold (2004a) note, punctuality and delay are two different dimensions of precision and "on time" seems to reflect punctuality rather than delay. Dropping this item from the delay scale improved its reliability to $\alpha$ = .94.

Also consistent with the pilot study, the *exploration* scale revealed two different dimensions. Three items loaded into the first factor: "In my workgroup… current routines work and will remain unchanged" (R), "…traditional processes should be upheld because they work" (R), and "…there is one best way to achieve desired outcomes"(R). These three items indicate dissatisfaction with the present state of things. The reliability for these three items was $\alpha$ = .80. The following four items loaded into dimension 2: "In my workgroup… one does not get into trouble for trying out new ideas," "…we reward innovators, even if they fail," "…it is not worth the trouble to question the current processes (R)," and "…we avoid ideas with uncertain potential (R)." These four items tend to indicate a functional unit climate conducive to experimentation and their reliability was $\alpha$ = .68.

The EFA of the *real-time information* scale suggested the same two factors found in the pilot study, with three items each. The first factor included the following three items: "In my workgroup, we usually..." "…report information as soon as we receive it," "…act upon information as we receive it," and "…scan the system for the most recent information." These three items had a reliability of $\alpha$ = .75. The three items loading in

the second dimension were "In my workgroup, we usually...take a couple of days to interpret information" (R), "…wait until the end of the day to compile reports" (R), and "…wait for information to be interpreted before using it" (R). These three items had a reliability of $\alpha = .68$. Both reliabilities were higher than the original reliability of the six items, indicating that the two dimensions should not be aggregated because this would lead to fusion, and reduce interpretability and the reliability of the scores (Child, 2006). Accordingly, both measures were computed as distinct scales, the first dimension labeled "immediate acting upon/reporting information" and the second dimension labeled "information queue."

The factor analysis of the *clock-based conception of time* scale showed that one item—"time flows smoothly like a river"—did not load substantially (above 0.5) on to the latent factor and dropping this item improved the scale reliability to $\alpha = .79$, which is an acceptable reliability level. Following the results from the pilot study, the EFA of the *event-based conception of time* was constrained to a one-factor solution. The one-factor solution included three items with loadings above .45.[10] The reliability scores for a scale with these three factors was $\alpha = .64$. The three items that loaded into the factor were "We consider the passage of time regardless of organizational events" (R), "Time is relevant, even if no events happen in the organization" (R), and "Time can be separated from organizational events" (R).

**Analysis**

Hypothesis one tested whether organizational members with a high present focus engaged in more exploration than members with a high future focus. Unlike the pilot study, in the main study the model had two dependent variables—two dimensions of exploration—a climate conducive to exploration and dissatisfaction with status quo. This hypothesis was thus tested using canonical correlation controlling for the effects of the three communication practices, as well as the conceptions of time. Canonical correlation allows testing a weighted combination of predictor variables with a weighted combination of dependent variables (Kachigan, 1991).

In testing hypothesis one, both dimensions of exploration were conceptually related and it would have been inaccurate to assume they were orthogonal. Testing the relationship of communication practices, present and future foci and conceptions of time with these two dimensions simultaneously through CCA captured the complex relationships of these constructs. As stated in the analysis section of the pilot study, Sherry and Henson (2005) recommend focusing the analysis and discussion only on those variates that capture a significant portion of the variance. Because some measures are correlated, they also recommend focusing on structure coefficients rather than on beta weights.

Hypotheses two, four, and six focused on the relationship between the three communication practices and delay in organizational actions. Specifically hypothesis two tested the relationship between proactive information sharing and delay. Hypothesis four tested whether the use of real-time information was negatively related to delay. Hypothesis six tested the proposed negative relationship between collective reflexivity and delay. These three hypotheses were tested through multiple regression using delay in

organizational actions as the dependent variable and the three communication variables as independent variables, while controlling for conceptions of time, present and future foci, age, and tenure.

Hypotheses three, five, and six tested whether a clock-based (continuous) conception of time was related to the three communication practices—proactive information sharing, use of real-time information, and collective reflexivity, respectively. Hypothesis eight tested whether an event-based conception of time was negatively related to the three communication practices. These four hypotheses were also tested through a canonical correlation analysis including all five communication practices dimensions (recall that proactive information sharing had two dimensions—explicit and tacit information—and that use of real-time information also had two dimensions—immediate acting upon/reporting, and a reduced information queue) as dependent variables and the conceptions of time (event-based and clock-based) and present and future foci as independent variables.[11]

Hypotheses nine through twelve, focusing on delay and its relationship with conceptions of time and present and future foci, were analyzed through regression models in a similar way to their analysis in the pilot study. Hypothesis nine tested whether the three communication practices mediated the relationship between conceptions of time and delay in organizational actions. Following Baron and Kenny (1986), and using the regression model run for testing hypotheses three, five, and seven, a regression was run with delay as the dependent variable with communication practices removed from the predictor set. The contrast between the models in terms of a reduction in effect size or loss of significance in the relationships between conceptions of time and delay due to the

inclusion of the communication practices into the model tested the mediation effect indicated in hypothesis nine (Baron & Kenny, 1986).

Hypothesis ten tested the negative relationship between a clock-based conception of time and delay in organizational actions and whether that relationship was stronger than the relationship between delay and an event-based conception of time. Similarly, hypothesis eleven tested whether the effects of conceptions of time on delay were stronger than the effects of present and future foci. Hypothesis twelve tested the proposed negative relationship between delay in organizational actions and a present focus and whether the relationship was stronger than the relationship between delay and future focus. Hypotheses ten, eleven, and twelve were tested through the two regressions models used for testing hypothesis three, five, seven, and nine. The first model included only conceptions of time and present and future foci as predictors of delay in organizational activities in order to test hypotheses ten through twelve. The next chapter discusses the results of the analyses for this study.

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[4] Real organization names have been disguised to protect the anonymity of the participating organizations.

[5] However, these comments also highlighted the fact that most information sharing and information use problems within HTI were not within functional units but mostly across functional units.

[6] Given the limited sample size in the pilot study, the regression did not control for conceptions of time, temporal foci, and demographic variables.

[7] Given the limited sample size in this first study the multiple regression did not include additional predictors that need to be controlled for, such as the interactions between conceptions of time and temporal foci, and the demographic variables—age, tenure, and gender.

[8] Real organization names have been disguised to protect the anonymity of the participating organizations.

[9] Some respondents used the open-ended response to comment that providing information about their functional unit would reduce their anonymity.

[10] Although a loading of .45 is relatively low, it was included in the factor in order to keep three items in the event-based time scale.

[11] Because about a third of the respondents did not answer the demographic questions and only half of the respondents answered the communication adequacy question, these variables were not included in the analysis due to their impact in the sample size.
The outcome variables delay and exploration were not included in the model because they are conceptually proposed as outcomes of the communication practices and it was thus considered conceptually inconsistent to treat them as predictors of communication practices.

# Chapter 3: Results

The correlations among scale means, with the reliabilities included in the diagonal matrix, are presented in table 7. As reported in this table, the two conceptions of time were highly correlated with each other. Present and future foci were also highly correlated with each other, which is consistent with Ballard and Seibold's (2004a) results. An interesting preliminary finding from this correlation table is that conceptions of time and present and future foci were negatively correlated with each other. Consistent with this finding, conceptions of time were negatively correlated to all but one of the communication practices (reduced information queue) and also negatively related to a climate supportive to exploration. In contrast, present and future foci were positively related to all but one of the communication practices (reduced information queue) and also positively related to a climate conducive to exploration. As was the case for the pilot study, except for reduced information queue, all the communication practices dimensions were highly and positively related to each other. These communication practices dimensions were also significantly and positively related to a climate conducive to exploration. Regarding the other exploration dimension—dissatisfaction with status quo—it was only significantly related to the two dimensions of real-time information use. Further, its relationship with immediate acting upon/reporting information was negative while its relationship with a reduced information queue was positive. Finally, the outcome variable delay was not significantly related to any of the other variables in the study.

Table 7: Pearson Correlations among Conceptions of Time, Temporal Foci, Communication Practices, Exploration, and Delay

| | Event | Clock-based | Present | Future | Delay | Explicit |
|---|---|---|---|---|---|---|
| Event-based | (.64) | | | | | |
| Clock-based | .612* | (.79) | | | | |
| Present | -.452* | -.370* | (.88) | | | |
| Future | -.482* | -.390* | .686* | (.93) | | |
| Delay | .135 | .139 | -.101 | -.157 | (.94) | |
| Explicit | -.203* | -.301* | .416* | .513* | -.191 | (.92) |
| Tacit | -.254* | -.281* | .510* | .562* | -.129 | .645* |
| Reflexivity | -.307* | -.309* | .553* | .713* | -.164 | .680* |
| No queue | .036 | .048 | -.043 | -.052 | -.053 | -.127 |
| Immediate | -.319* | -.298* | .486* | .466* | -.291* | .554* |
| Expl climate | -.250* | -.231* | .364* | .552* | -.200* | .499* |
| Dissatisfaction w/ Status Quo | .080 | .127 | -.081 | -.027 | -.058 | -.070 |

| | Tacit | Reflexivity | Reduced Queue | Immediate | Expl Climate | Dissatisf |
|---|---|---|---|---|---|---|
| Tacit | (.90) | | | | | |
| Reflexivity | .776* | (.87) | | | | |
| No queue | -.020 | -.118 | (.68) | | | |
| Immediate | .524* | .618* | -.072 | (.75) | | |
| Exploration Climate | .652* | .629* | .100 | .401* | (.68) | |
| Dissatisfaction w/ Status Quo | .037 | -.082 | .227* | -.242* | 162 | (.80) |

* Correlation is significant at the 0.01 level (2-tailed).

Table eight presents the summary results of the hypotheses. This table includes the results of the hypotheses as well as additional findings that will inform future research on the complex relationships between clock-based and event-based conceptions of time, present and future foci, and communication practices. After presenting table eight, each of the results from each of the hypotheses is presented in detail.

Table 8: Summary of Findings

| Hypothesis | Supported / Not supported | Additional Findings |
|---|---|---|
| 1a: Organizational members with a high present focus engage in more exploration than members with a high future focus. | Not supported | Future focus, not present focus, is positively related to exploration.<br>Proactive sharing of both explicit and tacit information, collective reflexivity, and immediate reporting/acting upon information (real-time information) were also related to exploration. |
| 2: Proactive information sharing is negatively related to delay in organizational activities. | Not supported | |
| 3: A clock-based conception of time is positively related to proactive information sharing. | Not supported | A clock-based conception of time is *negatively* related to proactive information sharing.<br>Future focus is the largest predictor of proactive information sharing. |
| 4: The use of real-time information is negatively related to delay in organizational activities. | Not supported | |
| 5: A clock-based conception of time is positively related to the use of real-time information. | Not supported | Present and future foci are significant predictors of immediate acting upon/ reporting information (a dimension of real-time information use). |
| 6: Collective reflexivity is negatively related to delay in organizational activities. | Not supported | |
| 7: A clock-based conception of time is positively related to collective reflexivity. | Not supported | Future focus is the largest predictor of proactive collective reflexivity. |

| Hypothesis | Supported / Not supported | Additional Findings |
|---|---|---|
| 8: An event-based conception of time is negatively related to proactive information sharing, use of real-time information, and collective reflexivity. | Not supported | |
| 9: Proactive information sharing, use of real-time information, and collective reflexivity mediate the relationship between conceptions of time and delay organizational activities. | Not supported | |
| 10: Delay in organizational actions is inversely related to a continuous conception of time. | Not supported | |
| 11: Delay in organizational activities is more strongly related to a continuous conception of time than it is to an event-based conception of time. | | |
| 12: Delay in organizational actions is negatively related to present and future foci. | Not supported | |
| 13: Delay in organizational actions is more strongly related to conceptions of time than it is to present or future focus. | | |
| 14: Delay in organizational actions is more strongly related to a future focus than it is to a present focus. | Not supported | |
| Not Hypothesized: Communication Adequacy | | Communication adequacy was positively related to a future focus and to proactive information sharing. |

## HYPOTHESIS ONE: RELATIONSHIP BETWEEN PRESENT AND FUTURE FOCI AND EXPLORATION

Hypothesis one tested whether present focus was positively related to exploration and had a greater effect on exploration than a future focus. This hypothesis was not supported in the CCA. The results of the CCA are reported in table 9. The CCA used the present and future foci, conceptions of time, and the three communication practices as predictors of the two exploration variables—climate conducive to exploration and dissatisfaction with status quo. The analysis yielded two functions with squared canonical correlations ($R_C^2$) of .499, and .134 respectively for each successive function. Collectively, the full model across the two functions was statistically significant, Wilks's $\lambda = .434$ criterion, $F(20, 314.00) = 8.135$, $p < .001$. Because Wilks's $\lambda$ represents the variance unexplained by the model, $1 - \lambda$ yields the full model effect size and is an $R^2$ metric. Thus, for the set of two canonical functions, the $R^2$ type effect size was .566, which indicates that the full model explained a substantial portion, about 57%, of the variance shared between the variable sets. The full model included two functions or variates. Function 2, tested in isolation, was also statistically significant, $F(9, 158) = 2.726.$, $p = .006$.

After identifying that the model itself was significant, the next step was to identify the specific significant relationships (Thompson, 1997). Table 9 presents the structure coefficients, the squared structure coefficients, and the communalities (h2) across the two functions. The first thing noticeable from table 9 is how each of the exploration dimensions contributed distinctly to the canonical variates: a climate conducive to exploration had a considerably high structure coefficient in variate 1 (.993) and a very

small loading into variate 2 (.115). In contrast, dissatisfaction with the status quo had a small loading on variate 1 (.068) and a considerably high loading on variate 2. Accordingly, variate 1 was considered as representing a climate conducive to exploration and variate 2 as representing dissatisfaction with the status quo. The first canonical variate accounted for 49.90% while the second variate accounted for 13.40% of the total variance.

Regarding the predictor variable set in variate 1—climate conducive to exploration—both present and future foci were primary contributors to the climate conducive to exploration variate. However, the effect size of future focus ($r_s^2$ = 63.84%) was twice the size as large as the effect size of present focus ($r_s^2$= 31.70%), which is contrary to hypothesis 1. Further, additional univariate analyses found that the relationship between present focus and a climate conducive exploration was not significant. Thus, hypothesis 1 was not supported.

Except for a reduced information queue, all the communication practices—proactive sharing of explicit information, proactive sharing of tacit information, collective reflexivity, and immediate acting upon/reporting information—were primary contributors to the climate conducive to exploration variate. Additionally, both real-time information dimensions—reduced information queue and immediate acting upon/reporting information were primary contributors to the second variate (dissatisfaction with status quo). However, they had opposite effects: whereas a reduction in immediate acting upon/reporting information increased dissatisfaction with the status quo, a reduction in the information queue decreased dissatisfaction with the status quo.

Communication practices and future foci were both significantly related to a climate conducive to exploration. Accordingly, additional analyses were performed to test for mediation effects of communication practices on the relationship between present and future temporal foci and a climate conducive to exploration. First, a regression model was performed with climate conducive to exploration as the dependent variable and event- and clock-based conceptions of time, and present and future foci as predictor variables. A future focus was the only significant predictor of a climate conducive to exploration ($\beta$=0.548, $p$<0.001).

The second step consisted of introducing proactive sharing of explicit information, proactive sharing of tacit information, collective reflexivity, and immediate acting upon/reporting information into the model. When these communication practices were included in the model, the effect size of the relationship between future focus and a climate conducive to exploration was reduced 50% ($\beta$=0.2701, $p$=0.006). Additional step-wise regression analyses showed that the individual introduction of each communication practice into the model reduced the effect size of a future focus on a climate conducive to exploration. Further, as it is reported below for the test of hypotheses three, five, seven, and eight, a future focus was a significant predictor of all the adaptive communication practices. Accordingly, proactive sharing of explicit information, proactive sharing of tacit information, collective reflexivity, and immediate acting upon/reporting information partly mediated the relationship between a future focus and a climate conducive to exploration according to Baron and Kenny's (1986) test of mediation.

Table 9: Canonical Solution for Present and Future Foci, Conceptions of Time and Communication Practices Predicting Climate Conducive to Exploration and Dissatisfaction with Status Quo for Canonical Functions 1 and 2.

| | Function 1 | | Function 2 | | |
|---|---|---|---|---|---|
| *Variable* | $r_s$ | $r_s^2$ (%) | $r_s$ | $r_s^2$ (%) | $h^2$ |
| Climate supportive of exploration | 0.993 | 98.60% | 0.115 | 1.32% | 99.93% |
| Dissatisfaction with current state | 0.068 | 0.46% | 0.998 | 99.60% | 100.06% |
| $R_C^2$ | | 49.90% | | 13.40% | |
| Event-based time | -0.385 | 14.82% | 0.227 | 5.15% | 19.98% |
| Clock-based time | -0.360 | 12.96% | 0.282 | 7.95% | 20.91% |
| Present focus | 0.563 | 31.70% | -0.318 | 10.11% | 41.81% |
| Future focus | 0.799 | 63.84% | -0.188 | 3.53% | 67.37% |
| Proactive Sharing of Explicit Info | 0.665 | 44.22% | -0.182 | 3.31% | 47.53% |
| Proactive Sharing of Tacit Info | 0.886 | 78.50% | 0.001 | 0.00% | 78.50% |
| Collective Reflexivity | 0.998 | 99.60% | -0.301 | 9.06% | 108.66% |
| Reduced information queue | 0.130 | 1.69% | 0.567 | 32.15% | 33.84% |
| Immediate information use | 0.559 | 31.25% | -0.584 | 34.11% | 65.35% |
| Delay | -0.223 | 4.97% | -0.326 | 10.63% | 15.60% |

Note: Structure coefficients ($r_s$) greater than |.45| are underlined. Communality coefficients greater than |.45| are underlined.

## HYPOTHESES THREE, FIVE, SEVEN, AND EIGHT: RELATIONSHIP BETWEEN CONCEPTIONS OF TIME, PRESENT AND FUTURE FOCI AND COMMUNICATION PRACTICES

Hypotheses three, five and seven tested the proposed positive relationships between a clock-based conception of time and the three communication practices—proactive information sharing, collective reflexivity, and use of real-time information. Hypothesis eight tested the proposed negative relationship between an event-based conception of time and the three communication practices. None of these hypotheses were supported in the CCA analysis. This CCA analysis used the present and future foci, as well as the event-based and clock-based conceptions of time, as predictors of the five

communication practices dimensions—proactive sharing of explicit information, proactive sharing of tacit information, collective reflexivity, reduced information queue, and immediate acting upon/reporting information. The analysis yielded four functions with squared canonical correlations ($R^2_C$) of .543, .081, .029, and .001 for each successive function. Collectively, the full model across the four functions was statistically significant, Wilks's $\lambda = .407$ criterion, $F(20, 334.93) = 8.323$, $p < .001$. Accordingly, the $R^2$ full model effect size, $1 - \lambda$, was .593. This indicates that the full model explained a substantial portion, about 59%, of the variance shared between the variable sets. The full model includes functions 1 to 4. However, the model with functions 2 to 4 was not statistically significant: Wilks's $\lambda = .891$, $F(12, 428.90) = 1.593.$, $p = .090$. Given the small effect sizes of functions 2, 3 and 4, and their lack of statistical significance, only canonical function 1 will be reported.

Table 10 presents the structure coefficients and the squared structure coefficients for canonical function 1. Because there is only one function, it is interpreted as the synthetic composite representing all the communication practices as a whole. The only dimension that did not load considerably onto the variate is a reduced information queue (-.071). Proactive sharing of explicit information (.722), proactive sharing of tacit information (.813), collective reflexivity (.989), and immediate acting upon/reporting information (.711) were all primary contributors to the composite communication practices variate.

Regarding the predictor variable set, all four predictors are primary contributors: event-based time had structural coefficient ($r_s$) of -.490, clock-based time had $r_s = -.501$, present focus had a $r_s = .799$, and future focus had a $r_s = .979$. Conceptions of time were

not contributors but inhibitors of the communication practices, given their negative contribution. Because hypotheses three, five, and seven test the individual effects on each of the separate communication practices, the results of univariate analyses for each communication practice as a dependent variable are also reported. Because all predictors included were primary contributors according to their structural coefficients, the next step was to assess their significance using a modified significance level of α=.05/(# univariate models run) to reduce 'experimentwise' type 1 errors. Given that four models are run (reduced information queue is excluded because it does not contribute to the communication practices variate) a significance level of α=.015 (α=.05/4) is considered.

Table 10: Canonical Solution for Present and Future Foci and Conceptions of Time Predicting Communication Practices for Canonical Function 1.

| | | Function 1 | |
|---|---|---|---|
| | | $r_s$ | $r_s^2$ (%) |
| Proactive Sharing of Explicit Info | | 0.722 | 52.13% |
| Proactive Sharing of Tacit Info | | 0.813 | 66.10% |
| Collective Reflexivity | | 0.989 | 97.81% |
| Reduced information queue | | -0.071 | 0.50% |
| Immediate information use | | 0.711 | 50.55% |
| | $R_C^2$ | | 54.30% |
| Event-based time | | -0.490 | 24.01% |
| Clock-based time | | -0.501 | 25.10% |
| Present focus | | 0.799 | 63.84% |
| Future focus | | 0.979 | 95.84% |

Note: Structure coefficients ($r_s$) greater than |.45| are underlined. Communality coefficients greater than |.45| are underlined.

Table 11 reports the results of univariate models using each of the communication practices contributing to the composite canonical variate as dependent variables and conceptions of time and present and future foci as predictors. Hypothesis three tested the proposed positive relationship between proactive information sharing and a clock-based conception of time. Hypothesis three was not supported, although a clock-based

conception of time was significantly related to proactive sharing of explicit information, the relationship was negative. Hypothesis four tested the positive relationship between a clock-based conception of time and collective reflexivity while hypothesis six tested the positive relationship between a clock-based conception of time and use of real-time information. Hypothesis eight tested whether an event-based conception of time was negatively related to the three communication practices. Hypotheses four, six, and eight were not supported: a clock-based conception of time was not significantly related to collective reflexivity or immediate acting upon/reporting information and was significantly but *negatively* related to proactive sharing of explicit information ($\beta$=-0.205, $p$=0.015). An event-based conception of time was not significantly related to any of the communication practices.[12] In contrast, present and future foci were related to the communication practices. Specifically, a present focus was significantly related to proactive sharing of implicit information ($\beta$=0.268, $p$=0.002) and to immediate acting upon/reporting information ($\beta$=0.297, $p$=0.001). A future focus was a significant predictor of all four communication dimensions in the regression models, relating significantly to proactive sharing of explicit information ($\beta$=0.443, $p$<0.001), proactive sharing of tacit information ($\beta$=0.390, $p$<0.001), collective reflexivity ($\beta$=0.632, $p$<0.001), and immediate acting upon/reporting information ($\beta$=0.264, $p$=0.006). These results also indicate that a future focus was the highest predictor in three of the four regression models: proactive sharing of both explicit and tacit information, and collective reflexivity.

Table 11: Regression Coefficients of Present and Future Foci and Conceptions of Time as Predictors of Communication Practices.

| | Explicit IS | Tacit IS | Collective Reflexivity | Immediate acting/report |
|---|---|---|---|---|
| (Constant) | | | | |
| Event-based | .186 | .085 | .082 | -.037 |
| Clock-based | -.205* | -.092 | -.087 | -.020 |
| Present Focus | .121 | .268* | .133 | .297* |
| Future Focus | .433* | .390* | .632* | .264* |

* Significant at the .015 level

**HYPOTHESES TWO, FOUR, SIX, AND NINE THROUGH FOURTEEN: RELATIONSHIPS BETWEEN CONCEPTIONS OF TIME, PRESENT AND FUTURE FOCI, COMMUNICATION PRACTICES, AND DELAY IN ORGANIZATIONAL ACTIVITIES.**

Hypotheses two, four, and six tested the relationship between the three communication practices and delay in organizational actions. Hypothesis nine tested whether the three communication practices mediated the relationship between conceptions of time and delay in organizational actions. Hypothesis ten tested the negative relationship between a clock-based conception of time and delays in organizational actions. Hypothesis eleven tested whether that relationship was stronger than the relationship between delay and an event-based conception of time. Hypothesis twelve tested the potential relationship between delay and present and future foci. Hypothesis thirteen tested whether the effects of conceptions of time on delay were stronger than the effects of present and future foci. Finally, hypothesis fourteen tested the whether delay in organizational actions had a stronger relationship to a future focus than to a present focus. Table 12 presents the results of the regression with delay in organizational actions as the dependent variable and conceptions of time, present and future foci, and the three communication variables as independent variables. As

illustrated in table 12, there was no relationship between any of the predictors—communication practices, conceptions of time, and present and future foci—and delay. Thus, hypotheses two, four, six, and nine through fourteen were not supported.

Table 12: Regression Coefficients of Present and Future Foci, Conceptions of Time, and Communication Practices as Predictors of Delay in Organizational Activities.

| | W/out Communication Practices | Full Model |
|---|---|---|
| Event-based | .037 | .021 |
| Clock-based | .057 | .015 |
| Present | .028 | .075 |
| Future | -.136 | -.144 |
| Explicit | | -.039 |
| Tacit | | .001 |
| Reflexivity | | .064 |
| No queue | | -.119 |
| Immediate | | -.207 |

a Dependent Variable: Delay in organizational activities; * Significant at the .025 level

## POST-HOC ANALYSES – COMMUNICATION ADEQUACY, AGE AND TENURE

Additional analyses were run to assess the relationship of age and tenure with conceptions of time, temporal foci, and communication practices. These post-hoc analyses also tested the relationship of communication adequacy with conceptions of time, present and future temporal foci, and communication practices. Because fewer respondents answered the communication adequacy and demographic questions, these analyses have a smaller sample size. In the analyses of age and tenure, the sample size is N = 117. In the case of communication adequacy, the sample size is N = 90. The relationships of age and tenure with all the dimensions were tested through canonical correlation analysis. Communication adequacy was tested through a regression model.

The CCA analysis presented in table 13 included age and tenure as predictors of the five communication practices dimensions—proactive sharing of explicit information, proactive sharing of tacit information, collective reflexivity, reduced information queue, and immediate acting upon/reporting information—present and future foci, as well as the event-based and clock-based conceptions of time. The analysis yielded two functions with squared canonical correlations ($R^2_C$) of .208, and .114 respectively. Collectively, the full model across the two functions was statistically significant, Wilks's $\lambda = .702$ criterion, $F(24, 206) = 1.664$, $p = .032$. Accordingly, the $R^2$ full model effect size, $1 - \lambda$, was .298, explaining about 30%, of the variance shared between the variable sets. The model testing function 2 was not statistically significant: Wilks's $\lambda = .886$, $F(11, 104) = 1.214$, $p = .287$. Given the small effect size of function 2 and its lack of statistical significance only canonical function 1 is discussed.

Table 13 presents the structure coefficients and the squared structure coefficients for canonical function 1. The only dependent dimensions that load considerably, yet negatively, onto the canonical variate were proactive sharing of explicit information (-.564), and proactive sharing of tacit information (-.466). Accordingly, these two dimensions of proactive information sharing were primary, negative contributors to the canonical variate. Regarding the predictor variable set, only tenure had a structural coefficient above the .45 criterion: ($r_s = .827$). Having identified relationships between both dimensions of proactive information sharing with tenure, the next step was to further explore those relationships through univariate analyses. Because two regression models were run (one for each proactive sharing dimension), a significance level of $\alpha$=.025 was considered.

Table 13: Canonical Solution for Age and Tenure Predicting Present and Future Foci, Conceptions of Time, and Communication Practices for Canonical Function 1.

| | Function 1 | |
|---|---|---|
| | $r_s$ | $r_s^2$ (%) |
| Proactive Sharing of Explicit Info | -.564 | 31.81% |
| Proactive Sharing of Tacit Info | -.466 | 21.72% |
| Collective Reflexivity | -.251 | 6.30% |
| Reduced information queue | -.151 | 2.28% |
| Immediate information use | .120 | 1.44% |
| Event-based time | -.231 | 5.34% |
| Clock-based time | -.036 | 0.13% |
| Present focus | .072 | 0.52% |
| Future focus | -.007 | 0.00% |
| Climate conducive to exploration | -.439 | 19.27% |
| Dissatisfaction with the status quo | -.379 | 14.36% |
| Delay | -.217 | 4.71% |
| $R_C^2$ | | 29.80 % |
| Tenure | .827 | 68.39% |
| Age | -.083 | 0.69% |

Note: Structure coefficients ($r_s$) greater than |.45| are underlined. Communality coefficients greater than |.45| are underlined.

Table 14 reports the results of univariate regression models using proactive sharing of explicit information and proactive sharing of tacit information as dependent variables and tenure as the predictor. At the  =.025 level of significance, tenure was the only significant, negative, predictor of proactive sharing of explicit information (β=-0.283, $p$=0.007). However, its relationship with proactive sharing of tacit information was only marginally significant (β=-0.237, $p$=.026). In other words, these results suggested that the longer respondents had been at the organization, the less likely they were to engage in proactive sharing of explicit information.

Table 14: Regression Coefficients of Tenure as Predictor of Explicit and Tacit Information Sharing.

| | Explicit IS | Tacit IS |
|---|---|---|
| Tenure | -.283* | -.237 |

* Significant at the .025 level

Table 15 presents the results of the regression models using conceptions of time, present and future temporal foci, and communication practices as predictors of communication adequacy. Two regression models were run, one included age and tenure in the predictor set, the other model did not include these two demographic variables. There were multicollinearity issues when the two dimensions of proactive information sharing were included in the regression model. Accordingly, the aggregate scale of proactive information sharing was used in the regression models. Results indicated that a future focus ($\beta$=0.317, $p$=.038) and proactive information sharing ($\beta$=0.376, $p$=.044) were significant predictors of communication adequacy when tenure and age were not controlled in the model. However, when tenure and age were introduced into the model, a future focus lost its significant relationship with communication adequacy ($\beta$=0.226, $p$=.199). Although its effect size increased, the significance of proactive information sharing was also reduced ($\beta$=0.384, $p$=.055). Age and tenure seemed to at least partly mediate the relationships between communication adequacy and future focus and proactive information sharing, respectively. However, they were not significant predictors of communication adequacy.

Table 15: Regression Coefficients of Conceptions of Time, Temporal Foci, Communication Practices, Exploration Climate, and Delay as Predictors of Perceived Communication Adequacy.

| | Without Tenure and Age | Including Tenure and Age |
|---|---|---|
| Event-based time | -.018 | .004 |
| Clock-based time | -.123 | -.139 |
| Present focus | .143 | .152 |
| Future focus | .317* | .226 |
| Proactive Information Sharing | .376* | .384* |
| Collective Reflexivity | -.197 | -.275 |
| Immediate information use | -.062 | -.010 |
| Climate conducive to exploration | -.103 | .016 |
| Dissatisfaction with the status quo | -.119 | -.115 |
| Delay | -.058 | -.040 |
| Tenure | | .172 |
| Age | | .044 |

* Significant at the .05 level.

## DISCUSSION AND LIMITATIONS OF MAIN STUDY

This study represented a methodological improvement over study one. The scales were refined and their reliabilities improved. Further, the sample size of 186 respondents increased the power of this study. While this should be a positive sign, it also implies that lack of supporting results cannot be explained by a lack of power in the study.

Consistent with the proposed conceptualization of exploration as being distant in time (March, 1991), the lack of support for hypothesis one suggests that a future focus nurtures a climate of exploration in which the short term costs are de-emphasized and treated as learning experiences for the future, and repercussions for engaging in

experimentation are minimized. Further, contrary to the hypothesized relationships (hypotheses three, five, and seven), the results from study two highlight a future focus as more relevant to communication practices than a clock-based conception of time. A future focus was the highest predictor of all but one of the measures of communication practices, and was significantly and positively related to all the communication measures. In contrast, a clock-based conception of time was not related to these practices. Further, the relationship between a future focus and a climate conducive to exploration was partly mediated by proactive information sharing and collective reflexivity.

The framework advanced in this paper proposed that an event-based conception of time inhibits adequate communication practices. However, hypotheses eight, testing the negative relationships between communication practices and an event-based conception of time was not supported. An event-based conception of time was not significantly related to proactive sharing of explicit information, collective reflexivity or the dimensions of real-time information. Even though an event-based conception of time did not have significant relationships with the three communication practices, it is important to note that its relationships with the two dimensions of proactive information sharing were marginally significant but *positive*. The fact that they were positive is critical even though they were not significant at the $\alpha$=.015 level because the model proposes that the relationships will be negative. A potential explanation for this result is that, although events are by definition discrete, conceptualizing time in terms of events helps organizational members have a richer picture of their environments and thus have a better grasp of inter-relationships that require proactive information sharing and immediate acting upon/reporting information. To test the possibility that event-based

time provides organizational members with a rich picture, an additional analysis was performed using interdepartmental communication adequacy as a dependent variable and conceptions of time and present and future foci as independent variables. This analysis did not show a relationship between event-based conceptions of time and inter-departmental communication adequacy.

An interesting non-finding throughout the hypotheses is the lack of relationships between delay and most of the measures. Most notably, delay in organizational actions was not related to either present or future foci or to conceptions of time. Similarly, delay was not related to most of the dimensions of communication practices or to the demographic variables. The only significant relationship found for delay was the reduced queue/no waiting dimension of real-time information use. Since this relationship was negative it implies that a large queue in information processing was related to delay in organizational actions and a reduced queue/no waiting before acting upon or reporting information is negatively related to delay. Thus, aside from the information processing queues becoming cues for perceptions of delay, conceptualizing time in certain ways, focusing on the present or the future, or engaging in communicative practices does not reduce perceptions of delays in organizational action.

Most of the proposed hypotheses were not supported across the pilot study and the main study. Nevertheless, the findings provide a starting point to understand how organizational members balance the present-future duality in terms of communication practices and innovation. The findings indicate that a future focus is more relevant to communication practices and exploration than present focus and conceptions of time.

The next chapter discusses the findings in terms of the theoretical framework and suggests avenues for further research.

[12] A separate analysis showed that a clock-based conception of time was not significantly related to a reduced information queue.

# Chapter 4: Discussion

## KEY FINDINGS

The issue of how organizational functional units communicatively manage the tension between the present and the future is a new research avenue in organizational communication. This dissertation has uncovered several key issues that will be considered in the following paragraphs: a) the central role of future focus in nurturing both adaptive communication practices and exploration; b) the relevance of inter-group communication and how it is nurtured through a future focus and proactive information sharing; c) the need to consider external audiences in the communicative issues of the present-future duality; and d) the need to integrate both activities (Ballard & Seibold, 2004a) and resources/investments (Levinthal & March, 1993, March, 1991), into the discussion of a present-future duality by fostering the concept of *sustainability*—meeting our immediate needs without compromising our capacity to meet our future needs (Baker & Ward, 2002; Bullis, 2004; Livesey, 2002). Sustainability necessarily reflects the tragedy of the commons, a critical issue that has not been sufficiently addressed in organizational communication.

### Future Focus, Exploration, and Communication Practices

The framework developed and partially tested in this dissertation links present and future foci to McGrath & Kelly's (1986) three temporal issues in collective action—uncertainty, resource allocation, and conflicting interests. Specifically, the framework

proposes that how organizational members resolve these problems is influenced by their present or future temporal focus. Further, the framework proposes that resolving these problems leads either to exploiting and refining current processes and routines—exploitation—or to engaging in activities whose benefits are uncertain and distant in time—exploration (March, 1991). The findings in both the pilot study and the main study are consistent with March's assertion: a future focus, emphasizing outcomes distant in time, is indeed related to exploration. The framework suggested that the present and future foci had direct relationships with exploration. Nevertheless, the findings further indicate that the relationship between future focus and exploration is partially mediated by adaptive communication practices. The next section describes the relationship between future focus and communication practices. Then, the mediating effects of communication practices in the relationship between future focus and exploration is presented.

***Future focus relates to communication practices***

Communication practices as a whole had a stronger relationship with future focus than with either present focus or conceptions of time. The following paragraphs describe the characteristics that make a future focus relevant to adaptive communication practices in organizations. By examining how temporal foci have been conceptualized, the discussion focuses on the distinction between orienting to time (construals) and understanding time (conceptions), and concludes that a future focus reflects organizational members' orientations—their behavioral preferences—when facing the allocation of social, temporal, and physical resources.

Present and future construals of time "refer to the way workgroup members interpret or orient to time" (Ballard & Seibold, 2004a, p. 141). According to Ballard and Seibold, these present and future construals reflect "whether group members' thoughts are *oriented* toward the present or future" (p. 144, *my italics*). Organizational members not only define time, but choose to orient their thoughts, and potentially their interactions, toward a focus on the present or the future. To provide additional conceptual support for the view of present and future foci as preferences in Ballard and Seibold's (2004a) construals, the following paragraph revisits the definitions of time perspective (Zimbardo & Boyd, 1999), and temporal focus (Bluedorn, 2002), which are used to develop the concept of temporal focus used in this dissertation.

Zimbardo and Boyd (1999) define time perspective as a "nonconscious process whereby the continual flows of personal and social experiences are *assigned* to temporal categories, or time frames, that help to give order, coherence, and meaning to those events" (p. 1271, *my italics*). Assigning activities to temporal categories implies preferences and thus behavioral intentions which go beyond understanding and defining time, which is the realm of conceptions of time. This is also consistent with Bluedorn's (2002) definition of temporal focus. For Bluedorn, temporal focus is "the degree of *emphasis* on the past, present, and future" (p. 140, *my italics*). Accordingly, Ballard and Seibold's (2004a) definition of temporal perspective, Zimbardo and colleagues' time perspective and Bluedorn's (2002) temporal focus all indicate a preference or orientation toward the present and the future.

Understanding present and future temporal foci as construals explains why foci are more directly relevant to communication practices than conceptions of time. In

contrast to construals which reflect organizational members' orientations, most people have a hard time defining time—explaining their conceptions of time. Whereas present and future foci—construals of time—relate to organizational members' motivations, conceptions of time are an abstraction.

Consistent with the relationship between future focus and exploration and future focus and communication practices, the findings also suggest relationships between exploration and proactive information sharing, collective reflexivity, and immediate reporting. These relationships will be discussed next.

***Communication practices partly mediate the relationship between future focus and exploration***

As the findings illustrate, adaptive communication practices—proactive information sharing, collective reflexivity, and use of real-time information—play a role in organizational members' exploration efforts. Proactive information sharing is related to exploration because exploration necessarily requires sharing information, opinions and ideas. Without functional unit members sharing ideas with others, experimentation is not shared and does not lead to organizational learning (Nonaka, 1994). Similarly, experimentation requires a break from current routines and processes in order to question them and develop alternatives—collective reflexivity. Developing new routines and ideas will not happen if functional unit members do not pause and collectively reflect on the relationship between their goals and their activities. This sharing of information and reflecting on goals necessarily promote acting upon information or reporting information at a faster pace—use of real-time information.

Communication practices and future focus were both related to exploration. Further, a future focus was related to communication practices, which partly mediated the relationship between a future focus and exploration. Accordingly, a future focus nurtures exploration directly and also by fostering these adaptive communication practices—proactive information sharing, collective reflexivity, and the use of real-time information.

A key finding not initially considered in the framework is the perception of inter-group communication as a critical issue in organizations. Inter-group communication adequacy was related to future focus and proactive information sharing. Accordingly, inter-group communication adequacy will be discussed next.

**Inter-Group Communication is Critical for Organizational Members**

Inter-group communication is critical in organizations because the different groups or functions within an organization are interdependent (Thompson, 1967). This dissertation set forth a framework regarding conceptions of time, present and future foci and communication practices at the functional unit level. Nevertheless, participating organizations pointed to the critical relevance of inter-group communication. Because data access was negotiated as a pro bono consulting project in both organizations, organizational contacts were asked what they would like to know more about their communication. The single issue most relevant for organizational members across both organizations was inter-departmental/inter-group communication. Research on the relationship between temporality and communication in organizations (e.g. Ballard & Seibold, 2003, 2004a, 2006) has focused on temporality within functional units. The next step relates to understanding how temporality and communication within groups are

related to communication across groups (e.g. Ballard & Seibold, 2006). Findings presented here suggest that adequacy of communication across departments is related both to a future focus and to proactive information sharing. This is consistent with Ballard and Seibold's (2006) findings regarding the relationship with inter-departmental satisfaction and a future focus.

A future focus is related to adequacy of communication across groups because, as March (1991) notes, exploration is related to functional diversity. Distal and proximal activities relate not only to time, but also to how close those activities are to the every day functions of a functional unit. When organizational members talk about their day to day activities they refer to activities performed mostly within the functional unit. In contrast, when organizational members talk about long-term plans, they are likely to take into consideration the activities and needs from other departments. However, most organizations focus their attention on issues that are close to their everyday activities in both time and space (March, 1991). For example, production and sales departments often focus on their own short-term goals and fight over deadlines and resources without understanding how their functions tie together. In contrast, having a future focus implies having a greater understanding the relationships between actions and all of their consequences across all the inter-related organizational functions. Thus, a future focus is likely to lead organizational members to grasp the big picture and hence to make efforts to improve their communication with other departments or groups within the organization.

Although a future focus is related to adequate communication across functions because it relates to grasping the big picture, grasping the big picture itself could lead to a

future focus. Grasping the big picture—having a systemic perspective of the organizational actions and consequences—potentially leads to both more adequate communication and an increased focus in the future (Arrow, Poole, Henry, Wheelan, & Moreland, 2004; Gharajedaghi, 1999; Meadows, 2001). Accordingly, training in systems thinking, a perspective that considers how actions in one part of the organization are related to consequences both within and outside the organization, can become a temporal intervention designed to increase a future focus. Systems thinking initiatives can thus be used to develop a stronger focus on long-term organizational actions across organizational members. This long-term focus in turn will lead to an increased willingness to proactively share information with others, collectively reflect on work processes, and use real-time information within the organization.

**Stakeholder Communication is Critical to the Present-Future Duality**

This dissertation focused on intra-organizational and group communication issues regarding organizational members' choices about the present-future duality. A necessary next step is to consider a stakeholder perspective on the present-future duality. Organizations need to respond to its diverse groups of constituents. Including these constituents in the present-future duality is a necessary next step.

The introductory chapter of this dissertation provided examples of the communicative nature of the present-future duality and the importance of considering stakeholders. Specifically, the difference between Tylenol and Exxon's management of crises reflected the present-future duality in terms of their stakeholders. Specifically, how these organizations managed their crises in terms of the duality is directly related to

communication with their stakeholders. This is consistent with Ryder's (2000) assertion that reputation that took decades to build needs to be managed because it can be destroyed with a single action. Similarly, Livesey (2002) analyzes Shell's social reporting to readdress its relationship with stakeholders and represent the organization in a favorable light. Research on present and future foci and its consequences needs to move towards how temporal choices about present organizational actions and future organizational and societal outcomes are reported to the stakeholders.

The focus groups in STA provided some insight into the relevance of stakeholders. For example, they talked about how board members are elected and make strategic decisions based on their constituents even though they do not grasp all the operational constraints of STA. Further, STA depends on its relationship with other state and city organizations for both legitimacy and funding, and thus needs to communicate its present plans and future actions to these external stakeholders. Because including stakeholder communication is critical in order to understand organizational adaptation (Lewis & Seibold, 1998), a necessary next step in my own research is to perform content analysis of several public documents that STA has directed toward these stakeholders.

Another issue that also needs to be addressed in order to have a rich picture of the present-future duality is the relationship between how organizational members orient to the present and the future and how they enact those discussions into resource allocation. A fruitful approach to this future research is the concept of *sustainability*, which be discussed in the following section.

**Sustainability is the Present-Future Duality**

A theme underlying this dissertation is that the present-future duality is not related only to organizational member's orientations, but also to organizational resources and to the present and future outcomes of allocating those resources into diverse organizational activities. Accordingly, understanding and researching the relationship between present and future foci and communicative activities within organizations necessarily needs to be complemented with discussions about resource allocations. Further, research on present and future foci also requires capturing organizational members' discussions about outcomes. The orientation toward the present or the future necessarily reflects the values placed on immediate against more distant outcomes.

The introductory chapter in this dissertation provided several examples of the tension between the present and the future. For example, I illustrated how transportation authorities need to balance the immediate social and economic costs of constructing new roads against the benefits those roads will bring in the long term. The illustrations also considered the societal issues of taxes, the public deficit and future Medicare benefits, highlighting the fact that current tax breaks imply a greater deficit in the future and/or reduced social benefits. In addition, I illustrated the basic tension most organizations face between investing in research and development against investing in pushing their current products and services through advertising or cost reductions (by becoming more cost-efficient in current processes). The next step is incorporating the insights illustrated in those examples into measures of present and future foci that include resources and outcomes.

The concept of sustainability provides a clear approach to frame the present-future duality in terms of resource allocation and consequences. Sustainability refers to the capacity to satisfy present needs while safeguarding the capacity to satisfy future needs (Baker & Ward, 2002; Bullis, 2004; Livesey, 2002; Ryder, 2000). According to this definition, *sustainability **is** the present-future duality*—it reflects attending to the present without sacrificing the future. Sustainability can serve as the theoretical framework for further advancing a present-future duality in organizational and group communication because it encompasses not only activities but also resource allocation decisions (Baker & Ward, 2002; Bullis, 2004). Accordingly, it brings back McGrath and Kelly's (1986) three temporal issues in collective action—uncertainty, scarcity of resources, and conflicting interests—back into the discussion of the present-future duality. In other words, the present-future duality can be reframed as sustainability, and the role of communication practices and present and future foci thus expanded to include resource allocation issues. Figure 2 presents a revised model of communication practices and organizational sustainability in which resource allocation becomes an outcome of temporal foci and communication practices and which expands in order to consider relationship building—stakeholder communication—as a key factor of organizational sustainability.

## SUMMARY OF KEY FINDINGS

The findings indicate that a future focus plays a central role in fostering adaptive communication practices—proactive information sharing, collective reflexivity, and use of real-time information. Specifically, a future focus is positively related to all three

communication practices and exploration. In contrast, conceptions of time played a minor role in fostering the three communication practices.

Communication practices are related to exploration and partly mediate the relationship between future focus and exploration. Proactive information sharing and future focus are also related to adequacy of communication across departments. This finding supports the argument that time and space are related in organizational contexts (March, 1991) because actions in other departments will also be distant in terms of the time they will affect a specific department. Having discussed the key findings and their implications, the next section focuses on the limitations in this dissertation.

## LIMITATIONS AND FUTURE RESEARCH

Although study two presented refined scales as compared to study one, there are still some limitations in this study. The limitations in this dissertation are a) Low reliabilities of the event-based and clock-based conceptions of time; b) a potentially low construct validity of the delay scale; c) a lack of an intra-group dynamics measure that capture how the costs and benefits of the present-future tension are distributed within groups; and, to a lesser extent, d) the high correlations between present and future foci. These limitations will be addressed below.

### Capturing Taken-for-Granted Conceptions of Time

Conceptions of time proved to be the most difficult measures to develop for this study. Despite the extent of research on conceptions of time (e.g. Ancona et al., 2001; Bluedorn, 2002; Clark, 1985; McGrath & Tschan, 2004), there are no quantitative

measures of event- and clock-based conceptions of time. One explanation for the lack of measures is the level of abstraction of conceptions of time. Conceptions of time "represent the answer to the question 'What is time?'" (Ancona et al., 2001, p. 514). The concept of 'time' is part of a culture's taken for granted assumptions that are not questioned or evaluated by members of a cultural group (Schein, 1992). Accordingly, most people have a hard time describing time.[13] Consistent with the idea that conceptions of time are abstractions, some respondents at both sites participating in the studies reported having difficulty linking the items capturing conceptions of time to their everyday activities. This is a limitation of the measures and it reflects the abstract nature of conceptions of time. The scripted and taken for granted nature of conceptions of time explains in part why the respondents did not link conceptions of time to their everyday experience of communication practices.

The abstract nature of conceptions of time also affects how researchers design their measures (Arrow et al., 2004; Zaheer, Albert, & Zaheer, 1999). Specifically, drawing from research on revolutionary change (e.g. Anderson & Tushman, 1990; Tushman & O'Reilly, 1996; Tushman & Romanelli, 1985), in this dissertation event-based time was conceptualized as discontinuities. Accordingly, it was proposed that an event-based conception of time necessarily implies that discontinuous events have to happen in order to be grasped and *reacted to* by organizational members. By focusing on discontinuities, the theoretical framework advanced downplayed non-discontinuous and micro-level events in favor of a macro—industry level—view of events. In contrast, other scholars have taken a micro view of time that would lead to conceptualizing event-based time as continuous and clock-time as discrete.

An example of event-based time as continuous is McGrath and Tschan's (2004) definition of events. These authors define event as "an observed state or action of some concrete system or a component of such as system" (p. 170) and define observation as "a record of an event" (p. 170). Their micro-level definition of an event as any observed state or action implies that continuous vigilance is nurtured through a micro-event-based conception of time rather than a clock-based conception of time. The emphasis on any observed state or action implies that an event-based conception of time could thus be continuous, depending of the frequency and temporal patterning (regularity in its cycles) of events (McGrath & Tschan, 2004; Vanlear, 1996). Thus, how participants understand events, either as discrete epochs or series of micro-level observed states and actions, affects whether an event-based conception of time nurtures adaptive communication practices based on continuous vigilance. Further empirical research needs to capture how participants define event-based time rather than imposing the researcher's assumptions in order to better understand participants' conceptions of time.

Whereas reporting their taken-for-granted assumptions about time was difficult for respondents, distinguishing between ongoing activities being delayed and activities starting late also proved difficult for participants. The specific limitation is that the delay measure did not capture the delay in *starting* an activity, and instead captured delays in ongoing activities. This limitation will be discussed next, along with the description of alternative measures of delay in setting in motion activities.

**Measuring Delays in Triggers Rather than in Ongoing Activities**

A null finding in the two studies is that the adaptive communication practices developed in the framework are not related to delay. The argument for the relevance of these communication practices is that they help the organization act and react faster to changes in the environment. However, except for a reduced queue in information processing—a dimension of real-time information use—delay was not significantly to conceptions of time, present and future foci, or communication practices. This section describes potential theoretical reasons for the lack of relationships.

Delay was not found to relate to either conceptions of time or present and future foci. In the case of conceptions of time, the explanation is related to the same issue as the lack of strong relationships between conceptions of time and communication practices: conceptions of time relate to definitions and taken-for-granted assumptions that are difficult to relate to daily activities. However, this argument would not affect the relationship between delay and communication practices or delay and present and future orientations, yet those relationships were not found. The following paragraphs suggest that the lack of relationship can be related to a measure that confounds delay in ongoing activities with delay in triggering organizational responses.

Delays in sensing the need to act might not be captured in the delay scale used in the studies and this might explain the lack of findings regarding the relationship between communication practices and delay in organizational actions. A common conceptualization of delay in organizational responses to their environments has to do with environmental scanning and the timing of organizational action (Cushman, 2000;

Hambrick, Cho, & Chen, 1996; Huber, 2004). The framework developed and partially tested in this dissertation suggests that proactive information sharing, collective reflexivity, and use of real-time information reduce delays in sensing environmental signals and thus organizational action. The scale used for delay, however, cues respondents on the status of ongoing organizational activities, not on the timing of the recognition to act sensing.

Further research on delay of organizational responses to environmental events necessarily needs to focus on the timing of sensing. Research focusing on the speed of organizational responses within the strategic management field (e.g. Hambrick et al., 1995) has relied on observed responses and measured the actual time it took top management teams to respond to a competitor's move. Such approach overcomes the problems of self-report measures but necessarily requires comparing across several organizations or departments.

An alternative to actual measurement of response time is the use of self-report measures used to capture constructs related to delays in triggering organizational members' responses. One potential measure is the environmental scanning scale used in research on learning organizations (e.g. Bhatnagar & Sharma, 2005). Another potential measure, that could be combined or integrated with the environmental scanning scale, is the decisional procrastination scale used in social psychology research (e.g. Milgram & Tenner, 2000). Including measures that capture the delay in initializing organizational responses will provide a richer picture of the relationship between temporal issues and organizational adaptation than relying on measures of delay based in ongoing organizational activities. These two scales are briefly described below.

Although environmental scanning is related to the degree to which organizations get information from their environments, some measures of environmental scanning explicitly relate to delay. For example, Bhatnagar and Sharma (2005) measure environmental scanning as it relates to how fast organizations know about new developments within their environments. One of their sample items is: "Most national and global trends are quickly picked up and the important information reaches the concerned personnel." (p. 1731). As this item illustrates, scanning captures the timing of information received from the environment and is thus directly related to delay in starting organizational action.

Another potential measure for capturing delay in triggering organizational actions is Milgram and Tenner's (2000) measure of *decisional procrastination*. Milgram and Tenner found that decisional procrastination is related to the level of anxiety, the relevance of the outcomes, and the time it takes to decide. Procrastination can be defined as "to postpone or delay performing a task or making decisions" (van Eerde, 2000, p. 374) and, as van Eerde notes, there is virtually no research about procrastination in organizational contexts. Further, procrastination can be related to a) temporal issues in organizations, such as uncertainty and time pressure, b) dissatisfaction with current state—the trigger of exploration—and c) social interaction outcomes—the communicative aspect of procrastination (van Eerde, 2000). Accordingly, reframing delay through measures of procrastination can help organizational researchers further make empirical distinctions between ongoing activities that are delayed and organizational responses whose initiation have been postponed or delayed.

Further testing the framework developed in this dissertation requires capturing the timing when organizational actions begin. By considering measures that capture delays in initiating organizational actions—such as environmental scanning and procrastination—the relationship between communication practices, present and future foci and delay in triggering an organizational action can be further explored. Similar to the issue of which organizational members engage in exploration, which organizational members trigger organizational responses also implies personal benefits and costs to those members. However, another potential limitation in the dissertation is the lack of measures capturing costs and benefits within functional unit dynamics. This limitation is addressed below.

**Capturing Costs and Benefits of Intra-Group Dynamics**

A limitation in the empirical study in this dissertation is the lack of individual outcomes such as promotions or other measures of success that provide outcome differences between those organizational members with a future focus and those with a present focus. March's (1991) simulation model suggests that the costs and benefits of engaging in new processes and ideas that could be valuable in the future are unevenly distributed across organizational actors. The theoretical framework advanced in this dissertation proposes that present-oriented individuals will incur the cost of exploration while future oriented individuals will reap the benefits. The reasoning behind this argument is that present-oriented individuals usually focus on activities that provide them with immediate gratification without thinking about future consequences (Zimbardo & Boyd, 1999). The type of activities these present-oriented individuals would engage in

would probably be intrinsically rewarding and challenging and provide flow—living in the moment (Zimbardo & Boyd, 1999). In contrast, future-oriented individuals engage in activities that are consistent with their future goals, and would avoid uncertain activities.

When the uncertain and challenging activities that present-oriented individuals engage in become certain and fruitful, these activities lose the characteristics that made them intrinsically rewarding. Accordingly, present-oriented individuals move on to some other activities. At that moment, however, those ideas become attractive to future-oriented individuals, who disseminate them and reap the rewards of the innovations. This process is consistent with the change management ideas suggesting that change requires a champion, but that this champion is not necessarily the individual who came up with the idea in the first place (Howell & Higgins, 1990). However, the research design does not allow for testing whether future-oriented individuals reap higher benefits than present-oriented individuals. Further, because present and future foci were captured at the group level, we do not have data to test how different present and future foci affect group interactions. Future research focusing on content analysis of group discussions will provide further understanding of the distribution of benefits and costs across group and organizational members when facing the present-future duality.

Finally, a specific issue that needs to be addressed is that present and future foci were positively inter-related. Nevertheless, even with these inter-relations, the findings discriminate among the temporal foci and conceptions of time. Specifically, the findings suggest that a future focus has a greater influence on communication practices than either conceptions of time or a present focus. These limitations will be addressed below.

**Distinguishing the Future from the Present through Enactments**

Both the results in this dissertation and the previous research done based on Ballard and Seibold's (2004a) measures of present and future foci (Ballard & Seibold, 2006, 2004a, 2004b; Gómez, 2004) show that present focus and future focus are inter-related. Nevertheless, other scholars suggest that organizational members have a tendency to have a present focus and emphasize immediate outcomes over those more distant in time (Levinthal & March, 1993; March, 1991). Levinthal and March's *temporal myopia* is consistent with other measures of temporal foci such as Zimbardo and colleagues' (e.g. D'Alessio et al., 2003; Zimbardo & Boyd, 1999, Zimbardo et al., 1997) and inconsistent with present and future having a high positive correlation. Accordingly, it is fruitful to understand why the present and the future are positively related in Ballard and Seibold's measures, but negatively related in other measures of temporal foci (e.g. D'Alessio et al., 2003; Zimbardo & Boyd, 1999, Zimbardo et al., 1997). The following section discusses these differences, asserting that the fundamental difference between these measures lies in the distinction between talk and actions.

The measures of present and future foci drawn from Ballard and Seibold's (2004a) scale for this study captured a functional unit level of analysis in both the pilot study and the main study. That was indeed the level of analysis intended both by Ballard and Seibold (2004a) and in this dissertation. Ballard and Seibold's measure thus captures the social construction of time in functional units by focusing on how these units orient to present and future events in their conversations. However, these functional unit-level present and future foci do not necessarily reflect decisions.

One potential explanation for the positive relation between these two temporal foci is that "talk" does not necessarily reflect actions. Although Ballard and Seibold's (2004) measures of present and future foci are intended to capture "whether group members' thoughts are oriented toward the present or future" (p. 144), they capture how group members *refer* to activities in terms of the present and the future. A potential limitation of this group-level measure is that functional units construe the present and the future regardless of their resource allocation choices. Further, referring to both "the here-and-now"—one item related to a present focus—and "long-term plans"—an item capturing a future focus—is necessary in order to engage in choosing either one. In other words, the decision between allocating resources to present activities or investing in future opportunities necessarily requires the group to have a conversation about both. This potentially explains the empirical correlation found among present focus and future focus in the studies using Ballard and Seibold's measures. Both present and future activities are referred to within groups, thus enacting the present-future duality: talking about immediate activities and benefits necessarily requires the discussion of future consequences. Groups construe both the present and future when talking about their activities because each one is the anti-thesis of the other.

The next step is to develop action-based measures that capture the actual temporal enactments of present and future. For example, a measure of organizational members' goals and resource allocation choices will address McGrath and Kelly's (1986) temporal issues involved in collective action. Specifically, a measure based on enactments would allow us to move beyond how organizational members orient to time in general and focus on choices that address their uncertainty about future outcomes, and the scarcity of

resources. McGrath and Kelly seem to provide a hierarchy in addressing both temporal issues. They consider that scarcity of resources affects the setting of priorities and is thus related to strategic planning. In contrast, they consider uncertainty about future events as related to operational planning where scheduling would reduce uncertainty about organizational actions and processes.

The framework developed here, based on *temporal myopia* (Levinthal & March, 1993; March, 1991), suggests that uncertainty and scarcity of resources are inter-related at the strategic planning level and that both influence the priorities set by organizational members regarding allocation of activities and resources across time. Further, the framework links present and future foci to temporal myopia and choices about goals and allocation of resources. Thus a measure of enactments of temporal foci based on organizational members' discussion of distal and proximal goals (March, 1999, 1988) could complement Ballard and Seibold's (2004b) construals of the present and the future based on how organizational members orient to activities. An example item of such a measure would be "In my organization, we usually talk about immediate benefits as expendable to ensure our long-term goals."

The research of temporal foci at the individual level is a potential resource to draw on in order to develop a measure of temporal foci as enactments at the group and organizational levels. For example, Zimbardo and colleague's (e.g. D'Alessio et al., 2003; Zimbardo & Boyd, 1999) STPI measures capture present and future in terms of consequences. An item of their future focus scale is "I keep working at difficult, uninteresting tasks if they will help me get ahead." This item shows how individuals make a choice about sacrificing their immediate present needs in order to get ahead in the

future. Strathman and colleagues (Strathman, Gleicher, Boninger, & Edwards, 1994) also emphasize the importance of outcomes of temporal foci in their *consideration of future consequences* (CFC) scale. The CFC has been found to relate to health decisions such as diabetes screening (Orbell & Hagger, 2006) and sleep habits and GPA scores (Peters, Joireman, & Ridgway, 2005) as well as to organizational citizenship behavior in organizations (Joireman, Daniels, George-Falvy, & Kamdar, 2006). Further, it has also been related to societal level issues such as proenvironmental behavior (Joireman, Lasane, et al., 2001). Two example items from the CFC scale is "I consider how things might be in the future and try to influence those things with my day to day behavior" and "I only act to satisfy immediate concerns, figuring the future will take care of itself." By drawing on these scales and adapting them to the collective nature of group and organizational communication, communication scholars can develop an enactment measure of present and future to complement Ballard and Seibold's (2004a) construals.

A potential counter argument to developing a collective measure of present and future as enactments based on Zimbardo and colleagues' (e.g. Zimbardo & Boyd, 1999) STI and Strathman and colleagues' (1994) CFC is that those measures usually reflect individuals' self-interest. In contrast, a collective-level measure of present and future enactments needs to consider issues of commitment and identification to group and organizational goals. It is thus important to note that the present and future foci scales developed at the individual level do not necessarily emphasize self-interested behavior. For example, Joireman and colleagues relate their CFC to organizational citizenship behavior (2006) and to proenvironmental behavior (2001). Further research can draw on these measures in order to capture a collective level of present and future enactments that

both includes the consideration of consequences and captures the inter-subjective nature of collective reality that is the focus of organizational and group communication.

## CONCLUDING COMMENTS

As any other scholarly work, the discussion in this dissertation reflects the implicit assumptions of the researcher. The main assumption I hold that guides and constrains this dissertation is that there is a trade-off between the present and the future. To be better prepared for the future, individuals, groups, and organizations have to forego immediate gratification or other form of benefits. The distinct effects of future focus as contrasted to present focus on exploration, communication practices, and communication adequacy all are consistent with the assumption that organizational members with a high future focus recognize the need to sacrifice immediate benefits in the present and invest time and other resources in order to gain benefits in the future. An extreme example of this trade-off between present and future goes beyond the boundaries of specific organizations and into Savickas' (1991) characterization of how most people contrast work and love:

> As Cabot (1914) noted, "Work is doing what you do not now enjoy for the sake of a future which you clearly see and desire." In contrast, love is timeless. Whereas work aims toward a goal, love exists for the sake of love itself…Because work moves toward a goal, it should be efficient, planned, and scheduled. After all, work is busyness or business. Love, spontaneous and patient, loses track of time. (p. 316).

As this quote illustrates, the assumption that the present and future represent a trade-off goes beyond organizational contexts. The aim of this dissertation was to explore how organizational members manage this present-future trade-off through their communicative practices. The findings suggest an optimistic scenario: a higher future focus—higher willingness to sacrifice the present (Zimbardo & Boyd, 1999)—is less costly over time to organizational members, as illustrated by the higher communication adequacy among departments. This is consistent with Ballard and Seibold's (2006) findings relating a future focus with job satisfaction. Acknowledging the need to forego immediate gratification will lead organizational members to collectively gain greater benefits over time. Further research on present and future foci in group and organizational communication is warranted given the strong relationship between a future focus, exploration, adaptive communication practices, and communication adequacy.

[13] As an example of the abstract nature of time, the author recalls a graduate seminar in systems thinking where the class read through and prepared a discussion of several readings on systems thinking and its effects over time. A couple of minutes into the discussion the professor asked "What is time"? Since the class did not have a clear answer, the professor dismissed the class at that point with the mandate to go and find out what time is.

## Figures

*Figure 1.* Communication Practices and the Present-Future Duality in Organizational Adaptation

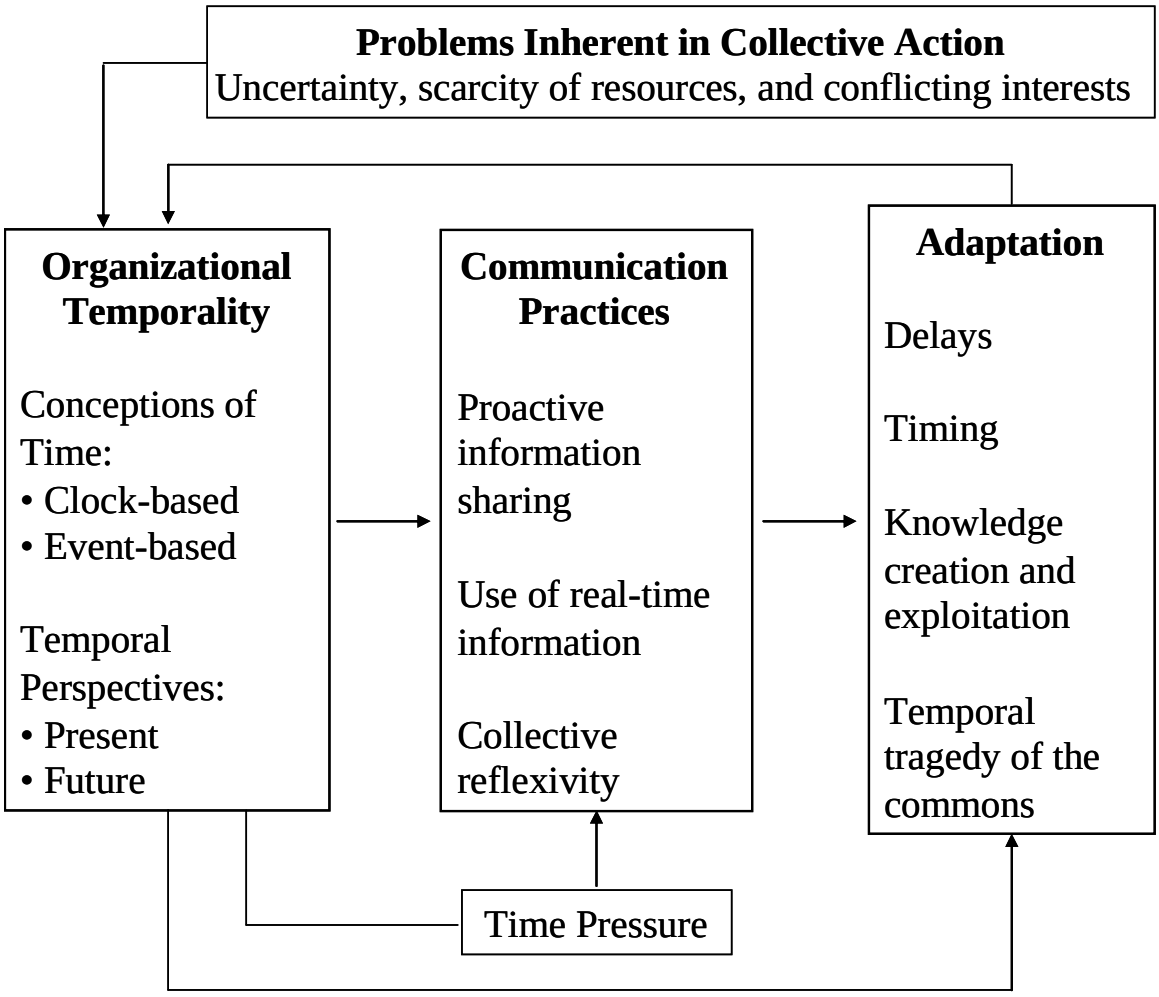
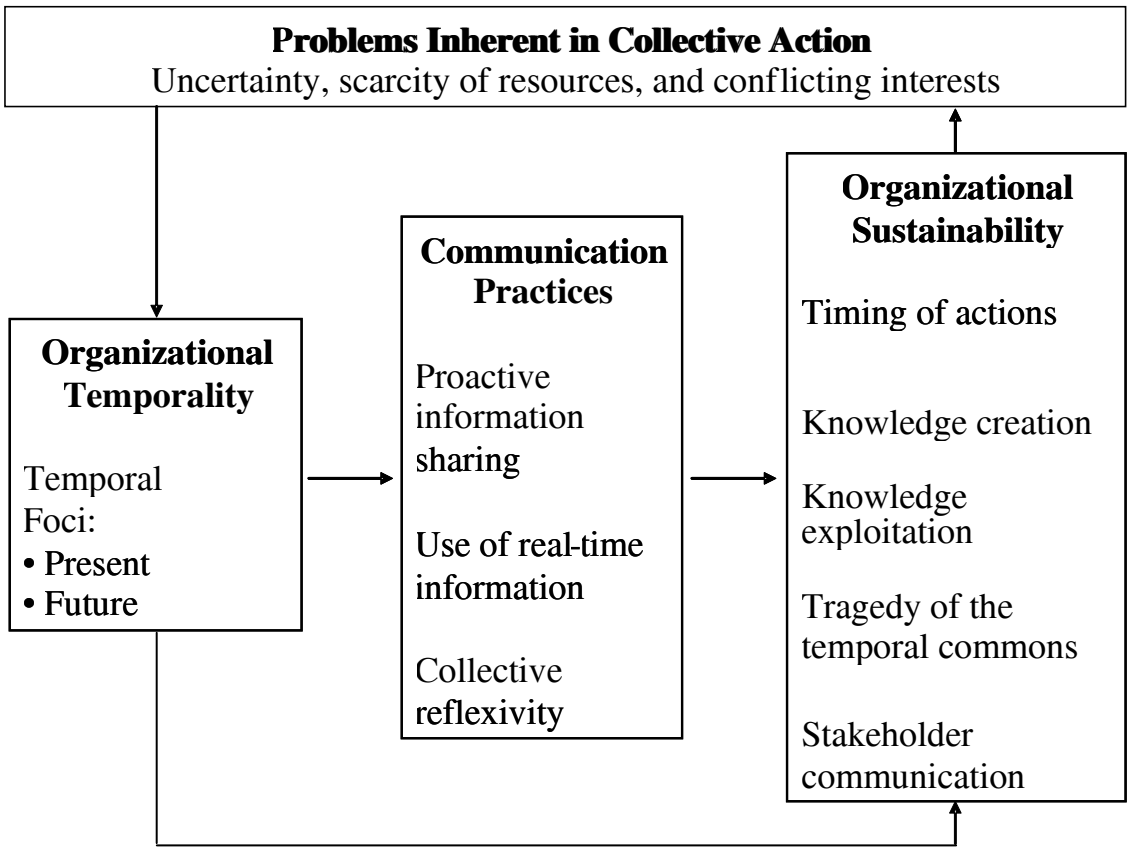


*Figure 2.* Communication Practices and Organizational Sustainability



# Appendix A: Questionnaire

The item numbers continue from scale to scale in order to provide an idea of the length of the whole questionnaire.

*Event-based Conceptions of Time*. The five items were developed based on prior theoretical research on event-based conceptions of time (e.g. Ancona et al., 2001; Bluedorn, 2002; McGrath & Rotchford, 1983).

1. We make sense of time through organizationally relevant events.
2. Time has meaning only in terms of organizational events.
3. We consider the passage of time regardless of organizational events.
4. Time can be separated from organizational events (R).
5. Time is relevant, even if no events happen in the organization (R).

*Continuous/discrete Conceptions of Time.* Items six through nine relate to the clock-based/continuous versus discrete conceptions of time.

6. Different periods of time are separate from each other (R).
7. Time flows smoothly like a river.
8. Time can be separated into discrete chunks (R).
9. Time is a collection of periods with specific duration. (R).

*Present focus.* Adapted items from Ballard and Seibold (2004)

"Please think about the way you and your coworkers refer to time in the course of carrying out your daily tasks at work. Read the statements below and then rate each of the words or phrases that follow based upon how well they describe the way you and others in your *organization* or work unit generally talk about time. Please circle the number to the right of each word or phrase that best represents your answer."

"In my organization, we usually discuss our work in terms of:"

10. What is pressing

11. Unfolding developments

12. The immediate consequences

13. The here-and-now

14. Presently developing issues

15. What is urgent today

*Future focus*. Adapted items from Ballard and Seibold (2004)

"Please think about the way you and your coworkers refer to time in the course of carrying out your daily tasks at work. Read the statements below and then rate each of the words or phrases that follow based upon how well they describe the way you and others in your *organization* or work unit generally talk about time. Please circle the number to the right of each word or phrase that best represents your answer."

"In my organization, we usually discuss our work in terms of:"

16. Future developments

17. Long-term plans

18. Projected dates

19. Long-term expectations

*Exploration*. Seven items adapted from Lee, Edmondson, Thomke, and Worline's (2004) measures of experimentation:

"In this organization…"

20. Current routines work and will remain unchanged (R).

21. It is not worth the trouble to question the current processes (R).

22. Traditional processes should be upheld because they work (R).

23. It is okay to try new ideas without negative repercussions.

24. We reward innovators, even if they fail.

25. We avoid ideas with uncertain potential (R).

26. There is one best way to achieve desired outcomes (R).

*Response Delay*. Ballard and Seibold (2004) three-item precision scale.

"Please think about the way you and your coworkers refer to time in the course of carrying out your daily tasks at work. Read the statements below and then rate each of the words or phrases that follow based upon how well they describe the way you and others in your *organization* or work unit generally talk about time. Please circle the number to the right of each word or phrase that best represents your answer."

27. Behind schedule

28. Running late

29. Overdue

30. On time

*Dynamic Explicit Information Sharing.* Developed based on Bock et al. (2005) and adapting items from Kolekofski and Heminger (2003).

31. The norm in the organization is to share any documents or reports that could be useful to others

32. If we find documents or reports that are relevant to others in the organization, we usually notify them and share the information.

33. We often send reports, statistics, or texts to others in the organization who are unaware of this information.

34. We tend to make information available to others who might not know they need it throughout the organization.

*Dynamic Tacit Information Sharing.* Kramer, Callister and Turban's (1995) measure of unrequested information (they reported a reliability of .95 on eight items, the same four items applied to coworkers and then to supervisors).

35. We usually suggest ideas for getting cooperation around here.

36. We normally volunteer suggestions for improving the way things are done.

37. We do not need to be asked to give our ideas for decisions that need to be made.

38. It is ok to provide opinions and explain ideas without being asked.

*Real-time Information.* The scale developed to measure this real-time information reflects the characteristics suggested by Eisenhardt (1989).

This organization we…

39. use real-time information.

40. rely on a constant flow of information.

41. wait for information to be interpreted (R).

42. emphasize formal analysis and interpretation of unexpected information (R).

43. rely mainly on information from formal reports (R).

*Collective Reflexivity*. Tjosvold, Tang, and West's (2004) nine-item reflexivity scale.

44. We often review our objectives.

45. We regularly discuss whether we are working effectively together.

46. We often discuss the methods we use to get the job done.

47. We modify our objectives in the light of changing circumstances.

48. We often discuss how well we communicate.

49. Organizational members are committed to ongoing improvement.

50. Organizational members are open to improved ways of working.

51. We focus on our own work (R).

52. We focus on doing our job well (R).

# Appendix B: Human Subjects Approval Form

**OFFICE OF RESEARCH SUPPORT & COMPLIANCE**

THE UNIVERSITY OF TEXAS AT AUSTIN

*P.O. Box 7426, Austin, Texas 78713 (512) 471-8871 - FAX (512 471-8873)*
*North Office Building A, Suite 5.200 (Mail code A3200)*

FWA# 2030

Date: **08/30/06**

PI(s): **Luis F Gomez** Department & Mail Code: **DEPT OF COMMUNICATION STUI A1105**

Dear: **Luis F Gomez**

IRB APPROVAL – IRB Protocol # **2006-05-0071**

Title: **Pay now or pay later: The present and future dialectic in organizational communication**

In accordance with Federal Regulations for review of research protocols, the Institutional Review Board has reviewed the exempt status assessment of the above referenced protocol and found that it meets exempt approval under the category designated below for the following period: **08/30/2006** - **08/29/2007**

Any research involving surveys, interviews, or observation of children is not eligible for exempt review, unless it consists only of observational research where the investigator(s) do not participate in the activities being observed. Research that is FDA regulated cannot be granted an exemption except for category 6. (Research is FDA-regulated when it involves the use of a drug or medical device, other than the use of an approved drug or medical device in the course of medical practice, or when the results are to be submitted to or held for inspection by the FDA.) Unless otherwise required by Department or Agency heads, exempt research must fall within one of the following categories:

___1. Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as:
(i) research on regular and special education instructional strategies, or
(ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.
(iii). The research is not FDA-regulated

__x__2. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:
(i.) Information obtained is recorded in such a manner that human subjects can be identified, directly or through

identifiers linked to the subjects: and
(ii.) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subject's financial standing, employability, or reputation; or
(iii.) The research involves surveys, interviews, or observation of children (where the investigator does not participate in the activities being observed);
(iv.) The research is not FDA-regulated

___3. Research involving the use of educational tests, survey or interview procedures, or observing public behavior that is not exempt under number 2 above, if the subjects are public officials or candidates for public office or a federal statute requires that the confidentiality of personally identifiable information will be maintained throughout the research and thereafter. The research is not FDA-regulated

___4. Research involving the collection or study of existing data, documents, records, pathological or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, either directly or through identifiers linked to the subjects. To qualify for exemption, the data, documents, records or specimens must be in existence before the project begins. The research is not FDA-regulated

___5. Research and demonstration projects which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate; or otherwise examine:

i. Public benefit or service programs;
ii. Procedures for obtaining benefits or services under those programs;
iii. Possible changes in-or alternatives to those programs or procedures; or
iv. Possible changes in methods or levels of payment for benefits or services under those programs.
v. The program under study must deliver a public benefit (e.g., financial or medical benefits as provided under the Social Security Act or service (e.g., social, supportive, or nutrition services as provided under the Older Americans Act).
vi. The research or demonstration project must be conducted pursuant to specific federal statutory authority;
vii. There must be no statutory requirement that an IRB review the project;
viii. The project must not involve significant physical invasions or intrusions upon the privacy of participants;
ix. The funding agency must authorize or concur with this exemption.
x. The research is not FDA-regulated

___6. Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

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____Please use the attached approved consent forms

__**x**__Waiver of Documentation of Consent

____Waiver of Informed Consent

**RESPONSIBILITIES OF PRINCIPAL INVESTIGATOR FOR ONGOING PROTOCOLS:**

(1) Report immediately to the IRB any unanticipated problems.
(2) Proposed changes in approved research during the period for which IRB approval cannot be initiated without IRB review and approval, except when necessary to eliminate apparent immediate hazards to participant. Changes in approved research initiated without IRB review and approval to eliminate apparent immediate hazards to the participant must be promptly reported to the IRB, and reviewed under the unanticipated problems policy to determine whether the change was consistent with ensuring the participants continued welfare.
(3) Report any significant findings that become known in the course of the research that might affect the willingness of subjects to continue to take part.
(4) Insure that only persons formally approved by the DRC enroll subjects.
(5) If relevant to your study, please use only a currently approved consent form (remember approval periods are for 12 months or less).
(6) Protect the privacy and confidentiality of all persons and personally identifiable data, and train your staff and collaborators on policies and procedures for ensuring the privacy and confidentiality of participants and information.
(7) Submit for review and approval by the IRB all modifications to the protocol or consent form(s) prior to the implementation of the change.
(8) Please note that this office will send out a reminder prior to the end of your approval period (typically at the end of the 12 months). At this time we will ask you to give us an update on whether the study is still in progress and/or has had any changes that need to be reviewed for approval.
(9) Notify the IRB and the DRC when the study has been completed and complete the Final Report Form.
(10) Please help us help you by including the above protocol number on all future correspondence relating to this protocol.

Thank you for your help in this matter.

Sincerely,

Lisa Leiden Ph.D., IRB Chair,
Director of the Office of Research, Support, & Compliance

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# Vita

Luis Felipe Gómez was born on México City, México, on October 31, 1969. He entered the Monterrey Technology Institute Campus San Luis, in San Luis Potosí, México where he earned his BA in Business Administration in 1992. The following two years he worked as a financial analyst in San Luis Potosí. During this period, Felipe experienced the inconsistencies and paradoxes of organizational life and decided to learn more about why organizations act in irrational ways. He pursued an MBA, which he earned from Katholieke Universiteit, in Leuven, Belgium, in 1995. After graduating from his MBA, Luis Felipe spent a couple of years trying to start his own import/export business in Central and Southeast Texas. Not having satisfied his quest for understanding organizational contexts, Luis Felipe joined the Ph.D. Program in Management at the Monterrey Technology Institute in Monterrey, México, in 1997. He came to The University of Texas at Austin as a transfer student in 1998 and formally applied to the Ph.D. Management Program. During the application process, he spent a year working as a reengineering consultant for a steel manufacturing company in San Luis Potosí. The project consisted of the implementation of an enterprise resource system (ERP) requiring the adaptation of work design and communication structures. He was accepted to the Ph.D. Program in Management at The University of Texas at Austin in 2000 and transferred to the Communications Studies Program in 2002, given his interests in understanding how organizational members enact organizational contexts. His interests in how organizational members negotiate organizational evolution and adaptation led Luis Felipe to study the temporal choices organizational members make, giving birth to this dissertation.

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