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# Information and Communication Technologies in Practice

**Trondheim, May 2004**

Doctoral thesis for the degree of doktor philosophiae

Norwegian University of Science and Technology  
Faculty of Social Sciences and Technology Management  
Department of Industrial Economics and Technology  
Management

 NTNU

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A Study of Advanced Users in the Workplace in Norway  
and the United States

**Doctoral Thesis for the degree of PhD**

Trondheim, May 2004

Norwegian University of Science and Technology  
Department of Industrial Economics and Technology  
Management

**To**

**Nora, Vegard, and Wencke**

**And to my Mom, who never got to see me finish**

**2004:70**

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we have been 720 km apart, because we work at different universities, for most of these four years it has felt like we've been next-door neighbors. My email log shows 2,178 messages from him between March 2000 and March 2004—either responding to a question or just keeping me on my toes. Given the topic of this dissertation, all this emailing has influenced my work in multiple ways, especially as a sensitizing device, enabling me to relate personal experience to the views expressed by my informants. Alf Steinar and his wife Christine have opened up their house for work, lodging, and outstanding meals during my visits to Trondheim. For that I am very thankful.

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## Abstract

This dissertation examines Information and Communication Technology (ICT) use in workplace environments in Norway and the United States. Despite the appropriateness and timeliness of the World Wide Web and Internet as topics of study today, little is known about how people actually use a full range of ICTs in naturalistic settings. This investigation primarily addresses the following research question: *How do workers use ICTs to meet business objectives when a full array of ICTs is available to them?* The data, targeting high-end ICT users, was collected over a two-year period, from Fall 2000 through Fall 2002. During this time, 72 semi-structured, in-depth individual interviews—36 in the U.S. and 36 in Norway—were collected. A Grounded Theory approach was chosen for its ability to generate descriptive and explanatory accounts of contemporary organizational ICT-use behavior by advanced users. Our analysis resulted in four papers:

### Paper One

The Reflexivity Between ICTs and Business Culture: Using Hofstede's Theory to Compare Norway and the United States.

- The data of advanced ICT users were coded, analyzed, and placed into Hofstede's (1980) four-dimensional framework of national-culture differences (power distance, uncertainty avoidance, individualism, and masculinity). We proposed that ICT-use comparisons between the two countries support Hofstede's findings. We found only partial support for these propositions. As expected, Norway and the U.S. are similar on two dimensions (power distance and uncertainty avoidance), but contrary to expectations, they are also similar on the two dimensions where we expected differences (individualism and masculinity).

## Paper Two

### Social Actors' Enactment of Media Use and Organizational Environments

- This paper uses the concept of scripts to couple Weick's (1979) notion of enactment and Langer's (2000) theory of mindfulness/mindlessness with empirical data on the use of ICTs in organizations. The findings: (1) show that the notion of clear-cut boundaries between an organization and its "environment" is problematic, and illustrate how organizational members indeed enact—or co-create—the environments of their organizations; (2) validate that mindfulness is required for media richness theory to be predictive; and (3) illustrate how organizational members construct the richness of one medium through the use of other media.

## Paper Three

### A Reflexive Model of ICT Practices in Norway and the United States

- Using Grounded Theory as a research method, and Adaptive Structuration Theory (AST) as our conceptual basis, this paper proposes an empirical model of ICT use. The model consists of four core categories: satisficing, channels, communication structure, and environmental agents. The model lays out the factors that influence individuals' use when they choose various ICTs. Findings suggest that: (1) the parts of the model are interdependent and mutually causal in that individuals consider and even reconsider the use of multiple communication channels within and between tasks, (2) there are contradictions in how ICTs are perceived with respect to credibility, and (3) people will perceive the utility of ICTs differently depending on the nature of the task and the meta-message that using these sources may convey to others.

## Paper Four

### The Study of Sequence: A Narrative Analysis of ICT Practices

- This paper examines how—and why—ICT use-sequences vary. Building on an earlier context-based model of ICT use (Paper Three), we analyzed interviews with experienced users to learn the reasons for their sequences. The paper extends these individual strategies and the ICT model presented in Paper Three by displaying 24 different sequences possible from the four categories of the model. The effect of examining these different possible sequences is their equi-finality. That is, all iterations of sequence lead to ideal and equally successful outcomes.

The contributions to theory and practice that can be drawn from these four papers follow three main themes: (1) how workers use multiple ICT, often in a sequential manner, when solving tasks, (2) how workers often *satisfice* when making choices about what ICTs to use, and (3) how a dynamic and reflexive relationship between users, organizations, and ICTs (social construction) shape how individuals use ICTs. These contributions fill several current theoretical gaps and add to our current practical understanding of ICT use behavior.

Communication in organizations has changed drastically as a result of the use of ICTs over the last dozen years. This study maps some particulars of these changes; as the core of my research program, I plan to continue studying these dynamics.



## List of papers

This dissertation consists of an introductory section and the following four individual papers:

Sørnes, J-O., Stephens, K. K., Sætre, A. S., & Browning, L. D. (2004). The Reflexivity Between ICTs and Business Culture: Using Hofstede's Theory to Compare Norway and the United States. *Informing Science*, 7(1), 1-30.<sup>1</sup>

Sætre, A. S., Sørnes, J-O., Browning, L. D., & Stephens, K. K. (2003). Social Actors Enactment of Media Use and Organizational Environments. *Informing Science and Information Technology Education Joint Conference, June 24-27, Pori, Finland*<sup>2</sup>

Stephens, K. K., Browning, L. D., Sørnes, J-O., & Sætre, A. S. (2002, July 16-20). A Reflexive Model of ICT Practices in Norway and the United States. *52<sup>nd</sup> Annual Conference of the International Communication Association, Seoul, Korea.*<sup>3</sup>

Browning, L. D., Sørnes, J-O., Stephens, K. K., & Sætre, A. S. (2003, May 23-27). The Study of Sequence: A Narrative Analysis of ICT Practices. *53<sup>rd</sup> Annual Conference of the International Communication Association, San Diego, CA.*<sup>4</sup>

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<sup>1</sup> An earlier version of this paper titled "Leveling Differences and Reinforcing Similarities: The Impact of Information and Communication Technologies on National Culture" was presented at the Informing Science and Information Technology Education Joint Conference, June 24-27, 2003, Pori, Finland. The paper was accepted as a *Best Paper* after a triple blind review.

<sup>2</sup> An earlier version of this paper: "Organizational Members' Enactment of Organizational Environments and Media use: A Study of ICT Practices in Norway and the United States" was presented at the Informing Science and Information Technology Education Joint Conference, June 24-27, 2003, Pori, Finland. The paper was accepted after a triple blind review.

<sup>3</sup> Paper accepted after double blind review.

<sup>4</sup> An earlier version of this paper was accepted after double blind review.

## List of Figures and Tables

Figure 1.	Sociological Paradigms for Organizational Analysis_____	18
Figure 2.	Media Richness Theory_____	44
Figure 3.	Social Influence Model_____	50
Figure 4.	Dual Capacity Model_____	53
Figure 5.	Adaptive Structuration Theory Model_____	58
Figure 6.	Practice-Lens_____	63
Figure 7.	Theoretical Contributions_____	254
Table 1.	Research Paradigms_____	3
Table 2.	Deterministic and Social Constructed/Emergent Theories____	37
Table 3.	Rational Choice vs. Social Interaction Theories_____	48
Table 4.	Criteria for Evaluating Interpretive Research_____	89

## Table of Contents

Acknowledgments	III
Abstract	V
List of Papers	VIII
List of Figures and Tables	IX
<b>Contents</b>	<b>X</b>
<b>1. Introduction and Overview</b>	<b>1</b>
1.2 Situating the Research	2
1.3 Introduction to Existing Research	4
1.4 Specifying the Research Problem	5
1.5 Problem Statement	8
1.6 A Note on Terminology	9
1.7 Team Research	11
1.8 Summary	12
1.9 Overview of Chapters	13
<b>2. Situating this Research within Current Perspectives</b>	<b>15</b>
2.1 Traditional and Emergent Perspectives: Positivism vs. Interpretivism	15
2.1.1 Functionalist Point of View	18
2.1.2 Interpretivist Point of View	18
2.2 Meta-Theoretical Perspectives	20
2.2.1 The Nature of Causality in Research on ICT use	21
2.3 Technological Paradigms	22
2.3.1 Emergent ICTs and Theorizing	23
2.4 Combining Perspectives	30
2.5 Summary	31
<b>3. Review of Literature</b>	<b>33</b>
3.1 The Purpose of Literature Review in Interpretive Research	33
3.2 What Determines ICT use?	35
3.3 Prominent Theories of Media use	36
3.4 Technological Deterministic Perspective (TD)	37
3.4.1 Social presence theory (SP)	38
3.4.2 The Reduced Social Cues Theory (RSC)	41
3.4.3 Media Richness Theory (MR)	43
3.4.4 Summary of Deterministic Theories	45
3.5 Social Constructionist and Emergent Perspective	46
3.5.1 The Social Influence Model (SIM)	49
3.5.2 Dual Capacity Model (DC)	52
3.5.3 Adaptive Structuration Theory (AST)	55
3.5.4 Practice Lens	61

3.5.5	Summary of Social Constructionist and Emergent Perspective_____	64
3.6	Summary of Literature Review_____	64
<b>4.</b>	<b>Research Methods</b> _____	68
4.1	Historical Backdrop and Evolution of Grounded Theory_____	68
4.2	Linking GT to Organizational Communication_____	69
4.3	Glaser vs. Strauss_____	73
4.4	Research Sampling, Participants, and Sites_____	76
4.5	Criteria for Judging the Quality of this Research_____	86
4.5.1	The Problem with <i>Validity</i> and <i>Reliability</i> in Interpretivistic Research_____	87
4.5.2	Assessing Soundness in Qualitative Research_____	88
4.5.3	The Current Approach_____	91
<b>5.</b>	<b>Introduction to Individual Papers</b> _____	94
5.1	Individual Papers_____	95
Paper One	_____	96
Paper Two	_____	146
Paper Three	_____	182
Paper Four	_____	221
<b>6.</b>	<b>Key Contributions and Future Directions</b> _____	253
6.1	Theoretical Contribution_____	253
6.1.1	Sequential ICT use – Use of Multiple ICTs_____	255
6.1.2	Satisficing_____	259
6.1.3	Social Construction of ICT use_____	264
6.2	Contributions to Practice_____	266
6.3	Future Research_____	273
6.4	Concluding Remarks_____	274
6.5	Postscript_____	275
	<b>References</b> _____	276
<b>Appendix A:</b>	Declaration from Co-Authors_____	294
<b>Appendix B:</b>	Interview Guide_____	295
<b>Appendix C:</b>	Interviewees and Industries_____	296
<b>Appendix D:</b>	Interview Transcripts_____	298
<b>Appendix E:</b>	Codes and Categories_____	301
<b>Appendix F:</b>	59 Categories_____	303

## 1 Introduction and Overview

The diffusion and pervasiveness of information and communication technologies (ICTs) during the last quarter-century have been well documented. Today, ICTs are ubiquitous, as most business practices are related to them and they penetrate private homes, organizations, nations, and the world economy. As organizations progressively expand—locally, nationally, and into global markets—it is crucial for them to know how ICTs facilitate communication and other business objectives (Jarvenpaa & Leidner, 1999; Orlikowski, 2002). In the workplace, individuals must discern between a multiplicity of new ICTs, such as email, voicemail, WorldWideWeb (WWW), cellphones, and videoconferencing, when communicating with coworkers and customers in their daily tasks. As ICTs enable new ways of communicating and processing information, they have changed the way workers communicate, collect, store, use, and distribute information for business purposes (Conrad & Poole, 2002; Mansell & Silverstone, 1997; Miller, 2003). The sheer speed and ease of use of modern ICTs only amplify the challenge of choosing the right ones for a given task (Eisenhardt & Brown, 1999).

While organizations have used ICTs for decades now in unique and innovative ways to improve their position in a market, the most pervasive feature of these technologies is the way they have reduced constraints on organizational processes (Morgan, 1997; Utterbach, 1994). Today, ICTs, and in particular the WWW, permeate most processes in organizations. For example, both intra- and interorganizational communication concerns—e.g., decision-making, organizational entry and assimilation, organizational learning, organizational change and renewal, structuring and organizing—as well as individual-level concerns are influenced by ICTs (Morgan, 1997). As noted by Morgan, “Computers automate complex information flows, and with the development of the Internet, corporate ‘intranets,’ and other webs of electronic communication, we are finding that organizations are becoming synonymous with decisions,

policies, and data flows that shape our day-to-day practice” (1997, p. 78). In short, the effects of ICTs on organizations and their employees are major since they have transformed work practices and organizational contexts (Morgan, 1997; Taylor, Groleau, Heaton, & Van Every, 2001).

Sometimes, organizations come to a crossroad, one where certain external factors, like the WWW, create considerable influence on current practices. Such a “bifurcation point” represents an instant when a system’s equilibrium is disrupted; when this happens, participants end their commitment to existing processes and begin something new (Morgan, 1997). In terms of ICTs, the most dramatic example of such a choice point—bifurcation—was when ICTs, in particular the Internet, became a mainstay of how we communicate in and between organizations. As this happened, our communication patterns were altered (Flanagin & Metzger, 2001; Morgan, 1997).

## **1.2 Situating the Research**

In their review of future challenges for organizational communication research, Taylor, Flanagin, Cheney, and Seibold (2000) address key moments and central concerns, and identify the role of ICTs as a crucial organizational communication focus area. The authors urge fellow researchers to consider ICTs as an integral part of the greater organizational communication phenomenon, and to consider what implications this has in various organizational contexts. Therefore, studies of ICTs should consider the role of organizational context, rather than singling out ICTs as a separate area of study.<sup>5</sup> I follow their plea by targeting high-end ICT users in naturalistic settings (i.e., organizations) as the primary focus. Furthermore, driven primarily by the news media, IT vendors, and writers of professional management literature (Schultze & Orlikowski, 2001), much of the public discussion about ICTs has focused on technical issues, especially the

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<sup>5</sup> Similarly, Mumby and Stohl (1996) identified the “organization-environment relationship,” and especially the role of ICTs, in bridging this increasingly permeable and indistinct relationship, as a key issue for contemporary studies in organizational communication studies.

workings of the Internet and WWW. Yet, while the technology itself is fascinating, we should not forget that these emerging ICTs are being used by people in various organizational settings around the world. Hence, it is critical to study the social and psychological implications of ICTs, as people are both affecting and being affected by them (DeSanctis & Fulk, 1999; Dutton, 1999; Henderson & Venkatraman, 1994; Zuboff, 1988).

To understand the factors that may determine how individuals communicate and use different ICTs, researchers must develop and extend theories for contemporary media use. Hence, alongside developments in organizations and ICTs, research must develop theories that help describe, explain, and predict the use of ICT in such a context (Timmerman, 2002). However, as recognized by researchers in the field, this is by no means an easy task (Taylor et al., 2000). By examining the amount of research on ICT use in organizations, we can see a complex picture emerge. One explanation for this complexity, in addition to rapid and continuous advancements in ICTs, is the amount of communication carried out in the workplace, best illustrated by managers who reportedly spend as much as 85% of their workday communicating (Timmerman, 2002).

Paradoxically, while a utopian view is sometimes fronted, asserting that new ICTs will replace more traditional means of communication, research often shows conflicting findings. In recent reviews, scholars have found that ICTs are often preferred at the expense of FtF (e.g., Jarvenpaa & Leidner, 1999; Nardi, Whittaker, & Bradner, 2000; and Nardi & Whittaker, 2001). Still, an impressive body of research finds that FtF is the preferred mode of communication (e.g., Clark, 1996; Doherty-Sneddon et al., 1997; Olson & Olson, 2001; Timmerman, 2000). However, research also shows that when new ICTs are introduced, they tend to augment, rather than replace, other means of communication (Sarbaugh-Thompson & Feldman, 1998; Woolgar, 2000). This is just one of many examples of ICT use where researchers keep fronting divergent findings. While Chapter Three offers a more detailed review of research in the field, the next section will serve as a brief introduction.

### **1.3 Introduction to Existing Research**

A substantial body of research has been produced on ICT use in organizations (see Hollingshead & Contractor, 2002, for a review). Research has focused on:

- Media choice—how people make choices about the different media they use in their communication with others (e.g., Daft & Lengel, 1984; Trevino, Daft, & Lengel, 1990; El-Shinnawy & Markus, 1997).
- Media effects—how technologies can impact group interaction processes and group outcomes (e.g., Hilz & Turoff, 1978; Sproull & Kiesler, 1991; McGrath & Hollingshead, 1993).
- The interaction between ICTs and group/individual interaction (e.g., Poole & DeSanctis, 1990; Orlikowski, 2000; Orlikowski & Robey, 1991; Zack & Mckenney, 1995).

Specifically, adaptive structuration theory (AST) and the “practice-lens” approach for studying “technologies-in-practice” (Orlikowski, 2000) have examined how the structures that are imposed by technology recursively shape—and are in turn shaped by—human interaction. These in turn establish norms of ICT use (Orlikowski, 2000; Poole & DeSanctis, 1990). Based on existing literature (see Chapter Three for a further detail), it is possible to identify at least two meta-theoretical research perspectives that seek to explain how individuals use ICTs when communicating (see Chapter Two for more detail). These are: (1) a technological deterministic perspective, and (2) a social constructionist and emergent perspective (Hollingshead & Contractor, 2002; Markus & Robey, 1988; Spears et al., 2002). While the social constructionist and emergent perspective are prevalent in current research, studies are still influenced by the early deterministic and rational-choice theories of media use (Hollingshead & Contractor, 2002). Yet, to date, empirical findings in this area show more diversity than commonality, thus rendering the task for today’s researchers



challenging (Robey & Boudreau, 1999). Not surprisingly, alternative explanations continue to be put forth.

#### **1.4 Specifying the Research Problem**

My own approach to the topic can be summarized in four “problem areas” based on a review of the literature (see Chapter Three – Literature Review), and pleas by researchers for future directions. These are: use of multiple ICTs, empirical base, a full range of ICTs, and cultural sensitivity.

##### 1. Use of multiple ICTs

Over a decade ago, Sitkin, Sutcliffe, and Barrios-Choplin (1992) identified several fruitful avenues to follow for future research on ICT use. They documented that existing theories fail to recognize the influence of multiple ICTs for a given communication effort. Based on their own work, together with reviews of the literature, they proposed that: (1) it is unnecessarily restrictive to think that only one ICT is used for a given task, (2) the use of multiple ICTs might be preferred for redundancy assurance, (3) using multiple ICTs may signal the importance of the message, (4) combining ICTs may mitigate undesirable bias, (5) using multiple ICT may facilitate learning through repetition and reinforcing message clarity, and (6) the use of diverse ICTs may be well suited for an increasingly diverse workforce. While some research has followed their plea (e.g., Haythorntwaithe & Wellmann, 1998), much research subscribes to such oversimplification (the failure to recognize the influence of multiple ICTs) even today (Flanagin & Metzger, 2001; Walter & Parks, 2002). In a recent study, Walther and Parks (2002) theorize that “communication efficiency may rest on sequences or combinations of media rather than on isolated choices about a single medium” (p. 534). I answer this call by targeting users who have access to and use multiple

ICTs for a given communication effort or business problem. (See problem area three, below, for further conceptualization.)

2. Empirical base

Another shortcoming in current research is that most empirical work in this area relies heavily on experiments in controlled settings, usually involving college students where single ICTs, such as email and voicemail, are compared. Seldom are organizational members in naturalistic settings, such as the workplace, used as the empirical base. (For exceptions, see Flanagin & Metzger, 2001; Orlikowski, 1993; Robey & Boudreau, 1999; Savolainen, 1999) Isolating ICT use from actual practice, as much previous research has done, hampers our ability to see how people use ICTs in realistic situations. I use a naturalistic setting as the empirical base, which enables me to capture ongoing and situated work practices, told by the actors themselves, of workers constantly facing technological and organizational changes in their environment—often having to get their job done independent of time and space constraints.

3. A full range of ICTs

A third shortcoming in current research, noted by Flanagin and Metzger (2001), is the proliferation of the Internet and the WWW in particular in the current work practices. The Internet and WWW have provided incentives and opportunities to explore how organizational members use the full range of ICTs—that is, the Internet and WWW in conjunction with more traditional media such as the telephone, fax and FtF. In fact, many of these traditional ICTs are now available on the WWW, such as telephony, email, and videoconference, making the contemporary media environment even more complex. As Flanagin and Metzger argue, “Although a great deal of empirical research has been done on the selection and use of ‘new’ technologies, these studies preceded or did not

include the Internet” (p. 155). Whenever new ICTs are discussed, we often assume that they are quickly outdated as current innovations. While this is true for some technologies (e.g., telex; also pagers in Norway<sup>6</sup>), new ICTs rarely replace older technologies; for example, videoconference has not made face-to-face meeting obsolete, and the fax has not replaced snail-mail (Miller, 2003). Therefore, as new ICTs are introduced, they tend to be embraced and shaped by social factors and existing technologies in that given context. Consequently, new ICTs tend to be integrated as a supplement to current technologies rather than replacing them (Woolgar, 2000). I answer this call by targeting users who have access to and use a full range of ICTs for a given communication effort or business problem.

#### 4. Cultural sensitivity

Despite the proliferation of ICTs throughout the Western world, a majority of existing theorizing and empirical work stems from U.S.-based researchers and empirical contexts. However, there have been few attempts to develop, extend, or test theories outside the U.S. Hence, existing theories of ICT use are criticized for lacking “cultural sensitivity” (Stohl, 2001). While cultural differences are studied in other fields (Hofstede, 1980), we currently know less about how ICTs are used in different national cultures, and also when communicating cross-culturally. Some comparative studies of ICT use has been done between cultures that are very dissimilar (e.g., the U.S. and Japan), and this literature often suggests that communicators use ICTs in different ways (Straub, 1994; Rice, D’Ambra & More, 1998). For example, a cross-cultural study of U.S. and Japanese email and fax diffusion found that culture can be a key variable in predicting how individuals will use these two ICTs for

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<sup>6</sup> The SMS (Short Messaging System) capability of cellphones in Norway has made pagers obsolete. As a result, all pager services were shut down in Norway as of September 1<sup>st</sup> 2003. At the time that some of our interviews were conducted, only a year and a half ago, this technology was still used by some of our interviewees.

information exchanges (Straub, 1994). Straub found that Japanese knowledge workers rated email at a lower value than other channels. He also tested perceptions of media richness and social presence between Japan and the US and found that email is perceived as less information-rich in Japan and the fax is perceived as more information-rich. These findings suggest that national culture is an important variable when studying media use. As ICTs are embedded in the organization's cultural system, it establishes how technological artifacts are interpreted and constructed (Bijker, Hughes, & Pinch, 1987). Furthermore, as ICTs are constructed at the organizational and individual level, they will mean different things to different people across contexts and in different organizations. Even in firms belonging to the same industry, the same ICT may render very different usage patterns (Whittaker & Sidner, 1997). Hence, because of differences in their cultural systems, what looks to be a successful ICT in one organization may fail in another (Bijker et al., 1987; Nonaka & Takeuchi, 1995). By targeting users from Norway and the United States we will be able to address some of these issues due to the comparative nature of our data.

## **1.5 Problem Statement**

Based on the above four “problem areas,” the following overarching research question is proposed:

*How do workers use ICTs to meet business objectives when a full array of ICTs is available to them?*

By *workers* I mean men and women from Norway and the United States who can be considered high-end users of ICTs. By *business objectives* I mean communication, problem-solving, decision-making, and learning activities. By

*full array* of ICTs I mean the WWW and the more traditional technologies like the telephone, fax, voicemail, and videoconference.

## **1.6 A Note on Terminology**

Due to the rapid development of new ICTs and applications across academia, the terms used to conceptualize ICT are sometimes misleading, limiting, and inconsistently applied. For example, “computer-mediated communication” (CMC), which logically ought to refer solely to communication mediated by a computer, is often used even when comparing CMC with the telephone and face-to-face (FtF) communication. Another common term is “information technology” (IT), but that is limiting, too, as human communicative features have traditionally not been associated with the acronym. DeSanctis and Poole (1994) introduced the term “advanced information technology” (AIT), meaning as tools, techniques, and knowledge that enable multiparty participation in organizational and inter-organizational activities through sophisticated collection, processing, management, retrieval, transmission, and display of data and knowledge. While the term is descriptive, it has primarily been used in connection with research on group decision support systems (GDSS). More recently, “information and communication technology” (ICT) has been used to cover the fusion of computing and telecommunications that has taken place over the past quarter-century, culminating in the Internet (Taylor et al., 2001). Taylor and his colleagues argue for the term “ICT” because it covers more than just implying that new technologies are merely innocuous tools for information transmission. They explain:

We see them [ICTs] quite differently, as media of communication ... understood to mean the complex experience of human interaction in all of its dimensions. Thus, we have chosen to introduce the term ICT, to emphasize that the technologies are indeed employed, in contexts of work and

social interaction, as both information and communication support. (p. 27)

Similarly, Hamelink (1999) describes “ICTs” as all technologies that facilitate the handling of information and enable different forms of communication among human actors, between human beings and electronic systems, and among electronic systems. Conrad and Poole (2002) also use “ICT” as an umbrella term for “advanced telecommunication<sup>7</sup> systems and computerized systems.” (p. 175). Based on these arguments, the term “ICT” will be used throughout this dissertation, with the understanding that the term may be inappropriate when referring to “ICTs” decades ago.

#### Internet vs. World Wide Web

In this project I often refer to the Internet and the WWW. While it is common to see these labels used interchangeably in both popular and academic literature, they are not identical. In addition, labels like “cyberspace,” or just “the Web,” are also common. Simply explained, the Internet refers to the actual physical infrastructure of all computers and wires that transmit information between users. To transmit information over the Internet, users must share the same telecommunications protocol (e.g., common set of rules and standards). One such protocol is the HyperText Transfer Protocol (HTTP), on which the WWW is based.

The WWW provides a way to access information over the medium of the Internet. The WWW uses http, which is one of “languages” that enables users to share information through software applications (often referred to as “browsers”) such as Internet Explorer, Netscape, or Opera. Information can be found on

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<sup>7</sup> By “computerized systems” they mean those used to run databases, handle budgets, order or inventory information, coordinate work processes, and email and various conferencing services. Advanced telecommunication systems, on the other hand, include fax technology, voice-mail, videoconferencing, proprietary telephone systems, and wireless communication.

personal or company homepages, where documents are linked via hyperlinks. Such documents can contain text, sound, graphics, and video. The WWW is just one of many “languages” available to communicate and disseminate information over the Internet. Other services such as FTF (File Transfer Protocol), email, newsgroups, and instant messaging also exist on the Internet and use their own set of protocols.

### **1.7 Team Research**

As mentioned earlier in my Acknowledgments, the research presented here as my dissertation has been a collaborative effort involving multiple researchers. For the past four years I have been part of a research team, and the individual papers in this dissertation are some examples of the work that has been produced. Several other papers are in the pipeline, and a book<sup>8</sup> is to be published during spring 2004, based on the same dataset. In collaborative projects like this, it is not uncommon that multiple contributions are produced, often resulting in a different order of authorship for various reasons. I feel it is important to acknowledge how others have contributed in order to identify what is exclusively my own work. Accordingly, while the individual papers (Chapter Five) are produced in collaboration with others, the other chapters in the dissertation are solely my own work.

As a consequence, I use both “I” and “we” when referring to “our” and “my” work, but as a general rule I will write in the first-person when appropriate. I hope this candid declaration serves to both clarify and justify my choice of terms throughout this dissertation.

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<sup>8</sup> Browning, L. D., Sætre, A. S., Stephens, K., & Sørnes, J-O. (2004). Information and Communication Technologies in Action: Linking Theory and Narratives of Practice. Copenhagen: Copenhagen Business School Press.

## **1.8 Summary**

This research project examines ICT use in environments where users, in two different countries (Norway and the U.S.), have the full range of media available to them, including the WWW. In taking this approach, I follow the recommendations of scholars who have suggested that this is a fruitful area for research. Overall, they claim that despite the appropriateness and timeliness of the WWW as a topic of study today, little is known about how people use ICTs in naturalistic settings. Organizational theorists, such as Adler and Winograd (1992), Brown and Duguid (1991), and Orlikowski (2000), all employ a “work-practice” perspective in their research, emphasizing the importance of studying how work is carried out in complex technological environments. As stated by Adler and Winograd (1992): “Through practice, we produce the world. Practice is both action and reflection. But practice is also a social activity; it is produced in cooperation with others.” (p. 103). These authors have done groundbreaking field studies in the field of management and organizational studies, but research that specifically targets how individuals use ICT to meet business objectives in the workplace is still scarce” (Kakihara & Sørensen, 2002; Orlikowski & Barley, 2001). In fact, Orlikowski and Barley suggest that more grounded research addressing how individuals engage in situated practice is needed to better understand current practices. Similarly, authors like Conrad and Poole (2003), Dewett and Jones (2001), Flanagin and Metzger (2001), and Postmes, Spears, and Lea (2000) suggest that the new forms and functions of the WWW will alter the way individuals use ICTs to meet business objectives. Thus, in light of the rapid technological advances in society in general, and in the workplace in particular, I will develop and extend existing theories of ICT use. Furthermore, such theorizing will enable us to learn more about how new ICTs are used in naturalistic settings, if they are used similarly to or differently from traditional ICTs, and, finally, if they are replacing or complementing existing ICTs (Straubhaar & Larose, 1996).



## 1.9 Overview of Chapters

### **Chapter Two: Situating Our Research within Current Perspectives**

This chapter will identify and briefly present the prevalent perspectives and paradigms within the field of ICT use in organizations. I will first discuss the positivistic and the interpretivistic approach to research, and focus particularly on the functionalist vs. the interpretivist approach. I will then discuss the nature of causality and the two main forms of causal agency relevant to this field of study. Next, I will identify and describe two major meta-theoretical perspectives of theorizing in the field—technological deterministic and socially constructionist/emergent. Then, I will address *technological* paradigms, by providing a historical lens, with particular focus on infrastructure and applications. Finally, I will collapse all of these different perspectives into a table so as to position the work in this dissertation.

### **Chapter Three: Literature Review**

Based on the two meta-theoretical perspectives identified in Chapter Two, this chapter will note a few prominent theoretical perspectives. Due to the inductive nature of this research project, the goal of this literature review is not to review the entire body of research and to critique it for the purpose of formulating an hypothesis for subsequent testing. But it is important to summarize what we do know and, perhaps more importantly, what we don't know, in this particular area. This will allow me to (1) situate the current research within a larger context of the research program, (2) display the implications of the findings, and (3) suggest where future research should tread.

### **Chapter Four: Research Methods**

This chapter presents the specific methodology used to conduct my dissertation research project. While previous chapters have identified the overarching research problem and both the theoretical and philosophical underpinnings, this

chapter will introduce and argue for the actual methodological procedures used to complete this project. The various steps involved in doing a grounded theory analysis of interview data will be detailed, including selecting informants, interviewing, coding, and analysis, and delineation of the emerging theory will be offered.

### **Chapter Five: Individual Papers**

This chapter includes the four individual papers and represents the groundwork of this dissertation. The following papers are attached:

Sørnes, J-O., Stephens, K. K., Sætre, A. S., & Browning, L. D. (2004). The Reflexivity Between ICTs and Business Culture: Using Hofstede's Theory to Compare Norway and the United States. *Informing Science*, (7)1, 1-30.

Sætre, A. S., Sørnes, J-O., Browning, L. D., & Stephens, K. K. (2003). Social Actors Enactment of Media Use and Organizational Environments. *Informing Science and Information Technology Education Joint Conference, June 24-27, 2003, Pori, Finland*

Stephens, K. K., Browning, L. D., Sørnes, J-O., & Sætre, A. S. (2002, July 16-20). A Reflexive Model of ICT Practices in Norway and the United States. *52<sup>nd</sup> Annual Conference of the International Communication Association, Seoul, Korea.*

Browning, L. D., Sørnes, J-O., Stephens, K. K., & Sætre, A. S. (2003, May 23-27). The Study of Sequence: A Narrative Analysis of ICT Practices. *53<sup>rd</sup> Annual Conference of the International Communication Association, San Diego, CA.*

### **Chapter Six: Conclusion and Implications**

Here, I discuss the findings presented in the individual papers in Chapter Five. I present the main practical and theoretical contributions, and suggest areas for new research to explore. A few concluding remarks are also offered, as well as a brief postscript.

## 2 Situating this Research within Current Perspectives

As explained in the Introduction, this chapter aims to situate the research and analytical strategies epistemologically and ontologically. In the field of organization and management studies, several authors have stated the importance of being explicit about what perspectives guide one's study (Markus & Robey, 1988; Orlikowski & Baroudi, 1991; Walsham, 1993, 1995). While I don't intend to provide a comprehensive review of the different research perspectives or paradigms prevalent in the field, my goal is to be explicit about my approach and how I "make sense" of the world (Weick, 1995). The section will identify and give a brief presentation of the prevalent perspectives within the field of ICT use in organizations. I will first talk about the *positivistic* and the *interpretivistic* approaches to research, and focus particularly on the *functionalist* vs. the *interpretivist* approach (Burrell and Morgan, 1979). I will then discuss the nature of *causality*, and the two main forms of causal agency relevant to our field. Further, two major meta-theoretical perspectives of theorizing in the field—*technological deterministic* and *socially constructionist/emergent*—will be described. Then, I will address *technological* paradigms, by providing an historical lens with particular focus on infrastructure and applications. Finally, I will draw on all of these different perspectives and present a model displaying the current research landscape in our field. The purpose of doing this is to juxtapose technological developments (hardware), applications, and research perspectives utilized in a historical perspective.

### 2.1 Traditional and Emergent Perspectives: Positivism vs. Interpretivism

It's quite common to construct and organize reality through paradigms (e.g., Burrell & Morgan, 1979; Kuhn, 1970; Morgan, 1980, 1997; Schumpeter, 1964). Morgan (1980, cited in Clegg 1994, p. 459) stated that "organizations are many things at once!" illustrating that there are multiple ways of studying and interpreting organizational behavior. As a result, research has been based on

different ontological and epistemological assumptions. In any field of study, the ontological question deals with how researchers perceive *reality*. That is, do we perceive reality to be objective and external to individuals—often labeled *positivistic* (Searle, 1995), or is reality a social construction where we create a subjective reality based on experiences and interaction—frequently labeled *interpretivistic* (Berger and Luckmann, 1966, Clegg, 1989).

#### Positivistic view

A positivist view, ontologically speaking, of ICT use in organizations assumes that social interaction and technical artifacts (e.g., ICTs) exist independent of human action. Epistemologically, this view favors hypothetic-deductive logic and analysis, arguing that there exist unidirectional cause-effect relationships that can be tested. The researcher's role, then, is to “discover” the objective reality, often by using a sample survey, coupled with inferential statistics, for revealing causal relationships (Searle, 1995). As Searle puts it, “We do not make ‘worlds’; we make descriptions that the actual world may fit or fail to fit. But all this implies that there is a reality that exists independently of our system of concepts. Without such a reality there is nothing to apply the concepts to” (1995, p. 166). John Searle asserts that a socially constructed reality, the way he interprets it, presupposes a reality that is not socially constructed. He further contends that the world exists independently of our representations of it.

#### Interpretivistic view

Interpretivist ontology, on the other hand, sees reality as a social construction, where interaction and technical artifacts are the results of human action. Contrary to the views of Searle (1995), Clegg states that “Social reality differs from natural events in that the latter structures are intransitive, while those of the former are not. Social structures exist only in as much as they endure; they endure only in as much as there are social practices which reproduce them” (Clegg, 1989, p. 119). Epistemologically, this view calls on humans to interpret

the boundaries of social reality. Hence, ICT use in organizations cannot be understood independent of human action and our analysis thereof. This reciprocal relationship, between society and actors, is where social structures are created and maintained. Thus, the method of inquiry in interpretive research often targets naturalistic settings, such as the workplace, using an inductive qualitative approach such as interviews or observations. Similarly, Berger and Luckmann (1966) flesh out the notion of a “self-constructed” reality by illustrating that there is nothing “natural” about man’s social environment. To these authors, there is only “human nature” in the sense of anthropological invariability. They note: “But the specific shape into which [humanness] is molded is determined by those socio-cultural formations and is relative to their numerous variations.” Essentially, “man constructs his own nature or more simply man produces himself” (p. 49).

While the above brief introduction to these opposite views clearly identifies two separate outlooks about reality—positivistic and interpretivistic—I need to point out that they are oversimplified for the purpose of illustrating the different approaches. Positivistic and interpretivist research alike include other perspectives, making the larger picture more like a continuum rather than a dichotomy (Clegg, 1994; Morgan, 1993; Munkvold, 1998; Walsham, 1995).

### The larger context

Several authors have attempted to display comprehensive models of the various research perspectives (e.g., Clegg, 1994; Hirscheim & Klein, 1989, Markus & Robey, 1988; Orlikowski & Baroudi, 1991, Walsham, 1993, 1995) in the field of organizational and management studies with a particular focus on ICT use in organizations. Clegg (1994), building on existing work (e.g., Burrell & Morgan, 1979, and Hirscheim & Klein, 1989), suggests that there are four basic paradigms of social science research, each having its own underlying ontological, epistemological, methodological, and structural philosophies. These four

paradigms, labeled functionalist, interpretivist, radical structuralist, and radical humanist, are summarized in Figure 1.

Figure 1: Four Sociological Paradigms for Organizational Analysis

Concern for order, stability, and integration	
Functionalist	Interpretivist or Social Realist
Objective Reality	Subjective Reality
Radical Structuralist	Radical Humanist
Concern for conflict, change, and disintegration	

Adapted from Clegg (1994)

According to Clegg, most research focusing on ICT implementation and use in the workplace has followed the functionalist approach, while the interpretivist paradigm is gaining legitimacy and increasing publication. As our analytical focus in this project follows the interpretivist approach, I will briefly discuss it in relation to the more commonplace functionalist perspective.

### 2.1.1 Functionalist Point of View

Research applying this analytical lens adopts a realist ontology, a deterministic view of human nature, a positivist epistemology, and nomothetic methodologies. Research following this ontology will often seek objective, linear, and rational explanations for human behavior (Burrell & Morgan 1979; Clegg, 1994). Rational choice, or deterministic theories (e.g., technological determinism) of ICT use, often adopts this point of view.

### 2.1.2 Interpretivist Point of View

Research applying an interpretive lens, on the other hand, approaches things from an antipositivist epistemology and idiographic (methodologies) point of view.

Ontologically, researchers will seek to understand the world by relying on subjective descriptions of people's practices and their cognitive, emotional, and intentional attitudes in order to gain knowledge (Burrell & Morgan, 1979; Clegg, 1994). Emergent and socially constructed theories (social constructionist/emergent perspective) of media use often adopt this point of view.

In this project, following the interpretative approach, I attempt to gain understanding of a specific phenomenon (i.e., how people use the variety of different ICT when communicating) by describing and interpreting the multiple meanings based on naturalistic reports from our respondents. The *idiographic*<sup>9</sup> method used (see Chapter Four for details) enables interpretation of individual cases, to gain understanding and multiple interpretations, rather than relying on *nomothetical*<sup>10</sup> generalizations of occurrences with the goal of uncovering general and universal truths (Burrell & Morgan, 1979). Thus, I rely on Walsham's (1993) description of interpretivist research in the social and organizational sciences:

Interpretive methods of research start from the position that our knowledge of reality, including the domain of human action, is a social construction by human actors and that this applies equally to researchers. Thus there is no objective reality which can be discovered by researchers and replicated by others, in contrast to the assumptions of positivist science. Our theories concerning reality are ways of making sense of the world and shared meanings are a form of intersubjectivity rather than objectivity. (p. 5)

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<sup>9</sup> Hence, interpretive research does not predefine a dependent and independent variable, but focuses on the complexity of human sense-making of emerging phenomenon (Kaplan and Maxwell, 1994).

<sup>10</sup> In simple terms, the distinction between *nomothetical* and *idiographical* is based on the prospects of arriving at general and universally valid knowledge versus knowledge that is valid only within a context limited in time and space.

By focusing on knowledge-creation that is valid only within a context limited in time and space, I intend to build middle-range theories (Daft & Lewin, 1993; Glaser and Strauss, 1967; Weick, 1974). Middle-range theories, contrary to formal or universal theories, are applicable only to limited ranges of data, such as high-end ICT users in the workplace. Thus, the goal of middle-range theories, and this dissertation in general, is to develop insight that covers a specific phenomenon within organizations in a specific area (Sætre, 1998).

## 2.2 Meta-Theoretical Perspectives

As briefly noted and introduced in Chapter One, a wide range of social psychological theories have been advanced since the early 1970s in an attempt to understand media-use behavior. Accordingly, due to this rich history, there have been several attempts to categorize the various theories put forth (see Hollingshead & Contractor, 2002; Kling, 1996; Spears & Lea, 1994; Webster & Trevino, 1995, for reviews). Such categories are often referred to as *meta-theories* (Kling, 1996; Spears & Lea, 1994). Two such *meta-theories* deal with whether ICTs have a predictable effect on user behavior, or if the users, through social action, construct usage patterns themselves. In other words, both these two meta-theories attempt to explain the relationship between ICTs and society. The first is openly deterministic. Theorists who subscribe to this view assume that ICT use is invariably rational and thus predictable. For example, authors contend that the very features embedded in a particular ICT will affect users, organizations, and society at large. The rival view is socially constructed and emergent. Theorists subscribing to this view assume that ICT features and social factors are intertwined and thus together influence ICT use. Terms that are usually associated with this distinction are *technological determinism*<sup>11</sup> and *social constructionism*<sup>12</sup>. The core of this discussion is whether human behavior is determined by universal laws or is basically voluntary. A number of social

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<sup>11</sup> Other terms found in the literature often used synonymously are “objective/rational models” and “technological determinism” (Fulk, 1993; Markus & Robey, 1988; Webster & Trevino, 1995).

<sup>12</sup> Terms such as “social influence,” “technological indeterminism,” and “organizational imperative” and are also used (Fulk, 1993; Markus & Robey, 1988; and Webster & Trevino, 1995).



theorists have challenged this binary division and proposed integrated meta-theories that recognize both the deterministic and the voluntary dimensions of social reality (Orlikowski, 2000; Poole & DeSanctis, 1990). This integrated view is often referred to as the *emergent* perspective. As there seems to be no consensus of clear boundaries between *social construction* and *emergent* perspectives in the current literature, I group them together for the purpose of this meta-theoretical discussion. In fact, my impression is that they are often used interchangeably. In Chapter Three I will present some of the most popular and widely cited theories of ICT use. Consequently, the purpose is not to provide an exhaustive review of theoretical contributions in the area.

### **2.2.1 The Nature of Causality in Research on ICT use**

A number of studies have analyzed the various theoretical models used in ICT use literature, where the focus has been on identifying the nature of causality. Several of these studies (e.g., Hollingshead & Contractor, 2002; Kling, 1996; Munkvold, 1998; Spears & Lea, 1994; Webster & Trevino, 2000) cite Markus and Robey's (1988) two forms of causal agency: the *technological imperative* and the *organizational/emergent perspective*. In the following section I will briefly introduce these two different perspectives. As will be noticed, they are closely related to the above discussion of meta-theoretical views, and the positivist vs. interpretivist views.

#### Technological imperative

This perspective focuses on the various ways ICTs have been shown to enable changes in organizational forms. The technological imperative often takes a deterministic point of view, suggesting that organizational forms change according to the ICTs used and how they are used. The Internet is one example of an ICT that has been found to *impact* organizations and their forms (Negroponte, 1995). One such way that ICTs may have an impact on organizations is how the Internet has introduced new ways for overcoming time

and space constraints, and centralization vs. decentralization of control (Negroponte, 1995).

### Organizational and emergent perspective

While this perspective includes the opposite view from the technological imperative—social or organizational determinism, suggesting that organizational characteristics will *determine* both use and design of ICTs—it takes more of a middle ground, meaning that it combines the technological and social/organizational perspectives. However, while its components may vary in force, outcomes may unfold in unpredictable ways due to the ongoing and dynamic relationship—hence emergent. This relationship is also referred to as “dialectic of alternative possibilities,” as ICTs enable new options for organizational form, and new organizational forms as an opportunity to design new ICTs (Mansell & Silverstone, 1996). Furthermore, as ICTs and organizational forms dynamically align, they allow users of ICTs to participate actively in shaping the very design (Dutton, 1996; Fulk & DeSanctis, 1999).

### **2.3 Technological Paradigms**

While the discussion so far in this chapter has focused on different theoretical and philosophical perspectives, and in particular the interpretivistic approach adopted in this project, my purpose in this section is to situate the current research within the context of *technological paradigms*. Technological paradigms are used to describe the evolution of ICTs in organizations (Bijker et al., 1987; Pinch & Bijker, 2001; Schumpeter, 1964; Van den Belt & Rip, 2001). These authors argue that different eras are dominated by different technologies or technological paradigms. While there are many different views on the nature and evolution of paradigms in social research in general, Van den Belt and Rip (2001) offer some direction when dealing with technological paradigms in particular. They claim that paradigms may emerge as a consequence of confluent forces, such as a strong research community (e.g., the Chicago School of

symbolic interactionism or the Frankfurter School of philosophy). They further state that “The occurrence of a technological paradigm can be characterized by the clustering of successful heuristics around an *exemplary achievement*” (p. 140). Exemplary achievements, or, to use Kuhn’s terminology, an *exemplar*, may be an airplane, a fax machine, or the Internet, for that matter. Take, for example, the evolution of the networked personal computer. The constant improvement of processor speed and power, bandwidth, scalability (e.g., laptops, desktops, PDAs), and price has made it a necessity in both domestic and professional settings. The success of the Internet and WWW, usually involving a personal computer<sup>13</sup>, may be explained by their inherent features such as no ownership, largely free access, liberal policies, “unbreakable” infrastructure, and free speech. Our purpose for introducing technological paradigms in the larger context of research perspectives is that most theories are a product of the available portfolio of ICTs at a given time. For example, social presence theory (Short, Williams, & Christie, 1976) predates many networked ICTs and the Internet in particular, and is consequently not as influential today, for the ICT landscape is now much more complex. The Internet and WWW in particular represent an opportunity, according to authors like Flanagin and Metzger (2001), to study the “full range” of ICTs. As such, the “full range” represents a shift or perhaps a bifurcation point, in user behavior, thus leading to new opportunities for theorizing.

### **2.3.1 Emergent ICTs and Theorizing**

While organizational scholars have studied ICT use for almost four decades, only recently have researchers begun to include the Internet, and its various applications, as an object of study. It is important to recognize new and emerging ICTs because they have the potential to affect contemporary usage patterns, and hence they provide new opportunities for research (Kim & Weaver, 2002). It’s fair to say that the empirical base in this field has changed

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<sup>13</sup> Today it is also possible to access the Internet and browse the WWW from handheld devices and private television sets.

significantly during the past decades due to new ICTs, providing additional avenues for research. Consequently, social scientists in general and communication scholars in particular have analyzed and conceptualized emerging ICTs in different ways. In the following I will situate the Internet in the larger context of ICTs during the last four decades. I feel it is important to identify the various technological paradigms in order to fully understand empirical research in the field historically and technologically.

The notion of *technological paradigm* has been adapted to the realm of ICT in organizations by Conrad and Poole (2002) in their overview of the history of ICT use and impact on organizations. The role of ICTs has evolved from a supporting role in the back office to a competitive force in the marketplace (Flanagin et al., 2001; Conrad & Poole, 2003; Ives & Learnmonth, 1984; Porter & Millar, 1985) and a new communication channel for doing business worldwide (El Sawy & Bowles, 1997; Kambil, 1997). The combination of increasing technological capabilities to handle information processing coupled with decreasing costs has led to widespread dissemination of ICT-based applications in the workplace (Benbunan-Fich, 2002). The following overview will sum up the history, applications, and main research focus on ICTs during the last four decades.

### The early years

Starting over 40 years ago, in the 1960s, mainframe computers were introduced in large organizations to carry out major operational and routine tasks. The primary applications of these computers involved automating paperwork, previously carried out by clerical staff, in areas such as record-keeping and accounting. Compared to the functionality of computers today, these machines were basically used as calculators and were operated only by computer experts. To many organizations, such as the U.S. Census Bureau, these computers produced meaningful information through summary analysis of large amounts of

data (Conrad & Poole, 2003). Common features of these mainframe computers were their reliance on vacuum tubes, large size, high heat radiations, and high cost of purchase (Flichy, 2002)

### The silicone chip

A historic breakthrough was made in 1964 when a new generation of mainframe computers, using silicon chips, was introduced. Mainframes based on this technology were more durable, smaller, and more powerful. As a result, Management Information Systems (MIS) were introduced, enabling management to plan, evaluate, and control various activities of the organization (Flichy, 2002; McCloud, 1996). These systems enabled management to provide detailed performance information about the past and present, and also forecast future achievements. But many organizations painfully learned that such systems were only as good as the accuracy of the databases and the models used to analyze the data. A common mistake made by organization as they implemented MIS was to “overload” the system with information about the entire organization, often resulting in collapse due to overcomplexity (Conrad & Poole, 2003).

### Software applications in the early years

Decision Support Systems (DSSs) were introduced, in the late 1960s and early 1970s, as a response to the many problems encountered with the large-scale MISs. DSSs enabled managers to focus on a particular problem, and thereby make specific and localized decisions. Hence, unlike MISs, whose goal was to help manage the whole organization, DSSs helped managers through all steps of the decision processes, and their applications ranged from product-pricing decisions and patient-referral decisions to decisions about investments. GDSSs (Group Decision Support Systems) were developed later and are still used today, enabling support for decision-making by groups (McMillan, 2002)

### Breaking new ground—human communication via ICTs

About the same time DSS was evolving, during the early 1970's, another computer application emerged—Office Automation System (OA). OAs introduced a feature not previously possible, namely, communication between individuals inside and outside the organization. While early OA applications focused on word-processing and the ability to enter, store, and print documents from a computer, later applications allowed for email, electronic calendaring, and videoconferencing. This functionality marked a milestone, as organizational members were now able to communicate with each other both synchronously and asynchronously via computers on local networks (Conrad & Poole, 2003; McMillan, 2002).

### Early theorizing and research on ICT in organizations

Along with this functionality, which allowed individuals alternative ways to communicate, organizational-communication scholars began to study features and potential effects of these new ICTs. Thus, Short, Williams, and Christie (1976) introduced social presence theory, arguing that ICTs have certain deterministic features, and that users will chose the one “appropriate” social presence for a given task. These developments, especially the possibility for humans to communicate, stimulated further development of computer networks.

### The 1980's and the introduction of the personal computer

During the 1980's the cost and size of computers went down, and their power and capacity increased<sup>14</sup>. Hence, many companies could now afford to purchase mini and microcomputers for organizational members other than just top management and support staff. This enabled workers to have computers at their desk and access data needed to perform their daily tasks. Perhaps more

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<sup>14</sup>This illustrates what has become known as “Moore's Law,” named after Gordon Moore, then director of research and development at Fairchild Semiconductor. In 1965, Moore wrote a now-famous paper entitled “Cramming more components onto integrated circuits.” There he noted an exponential growth in the number of transistors per integrated circuit and predicted that this trend would continue. Moore's Law, which predicts the doubling of transistors every couple of years, remains true even today.

important, they were able to share costly resources such as storage space, printers, and software. For many, this development marks the first stage of perhaps the greatest milestones in ICTs—network computing or distributed computing (Star & Bowker, 2002).

### Early computer networks

While these early networks, with accompanying hardware and software, would be considered primitive by today's standards, they had some impact on organizational communication from the very beginning (Spears, Postmes, & Lea, 2000). The move in information-sharing from centralized (mainframes) to distributed (stand-alone computers in a network) had a major impact on control and power issues because other personnel besides just the highly skilled top management got access to computers for the first time. Concurrent with further development in software and hardware, it became more common to place personal computers in decentralized units where much of the actual work was done. As a result, power and control over information was moved to other parts of the organization. Further advances in networking technologies allowed organizations to connect their own computers with computers beyond the organizational boundaries, establishing links to other organizations such as buyers and suppliers. The development of networks gave room for a new type of system called Inter Organizational System (IOS). IOS, being a computer-based system, was able to be shared by two or more companies, thereby automating the flow of information among them (Ives & Learmonth, 1984; Scott-Morton, 1991). IOSs enabled organizational members to communicate more cheaply and with greater ease—and, most importantly, to keep track of the content and nature of the communication (Hiltz & Turoff, 1993; Huber, 1990). Yet this was only the beginning of networked computing as we know it today.

## The Internet<sup>15</sup>

During the early 1990's the Internet entered the scene, revolutionizing organizational communication and information-processing like nothing before. Today, the Internet's infrastructure—and WWW-based applications in particular—have opened up new possibilities for organizations to interact with their environments, including changing the relationships with customers and collaborators (El Sawy & Bowles, 1997), accessing customers, bypassing intermediaries or distribution channels, and gathering information about current and future customers on the WWW (Kambil, 1997).

### From connectivity to communality

In addition, Fulk, Flanagin, Kalman, Monge, and Ryan (1996) note that current ICTs have communal properties; thus the nature of ICTs has changed from connectivity to communality. By “communality” they mean people's ability to share access and use jointly held databases, and thereby communicate collaboratively. The amalgamation of computing with communication has thus enhanced the capability for communicating complex information, differentiating current ICT developments from more mature technologies like the telephone and fax-machine (Monge & Fulk, 1999). As a connective system, the telephone enabled people to communicate synchronously with other people, but the technology had little capability to modify, enhance, or manipulate the information being transmitted. However, the use of mobile

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<sup>15</sup> In the mid-'60s, Paul Baran, an employee at the RAND Corporation, made a proposal that changed the course of human interaction. Baran proposed that a computer network would endure a conventional or nuclear assault by the Soviet Union. The idea was to create a network that would have no central authority, as, in a military sense, a network without an “owner” would provide no clear point of attack. Another prerequisite proposed by Baran was that the network needed to be sufficiently robust and able to maintain critical functions even if large portions of the network were destroyed. In late 1969, Paul Baran's proposal became a military network called Advanced Research Projects Agency, part of the federal government's Department of Defense (ARPANET). The original network contained four nodes, or communication points, which connected major military research centers in the United States. ARPANET allowed military researchers to collaborate over great distances. By 1972, the network had expanded to 37. As the number of nodes increased, academic institutions got access, which led researchers to begin considering communicative implications of the new medium (Flichy, 2002; Kim & Weaver, 2002).



telephones/cellphones, and their integration with the Web, adds new dimensions to the Plain Old Telephone Systems (POTS). Beyond enabling users to be mobile, today's cellphones are nothing less than a computer, as they handle word-processing, Internet access, email, chat, and videoconferencing. Hence, we have moved away from technologies that were capable of handling single functions, such as the POTS. Today, the Internet is multifunctional, as it handles person-to-person contact through email, group communication through Netnews and chat programs, and mass communication through online newspaper, Web-TV, and radio.

#### From automating to *informating*

While early ICTs focused on the automation of manual tasks, the focus is now increasingly moving towards so-called *infomating* of work (Zuboff, 1988). Zuboff ascribes to ICTs *informating* capacities—that is, they are reflexive. Not only do ICTs, like the WWW, automate processes by substituting machines for human labor, but the data they create helps shape new perspectives on the social, organizational, and managerial situations where they are used. Zuboff states:

Information technology is characterized by a fundamental duality that has not yet been fully appreciated. On the one hand, the technology can be applied to automating operations according to a logic that hardly differs from that of the nineteenth-century machine system—replace the human body with a technology that enables the same processes to be performed with more continuity and control. On the other, the same technology simultaneously generates information about the underlying productive and administrative processes through which an organization accomplishes its work. It provides a deeper level of transparency to activities that had been either partially or completely opaque. (1988, pp. 9-10)

When individuals are able to gather information, communicate easily with others around the world, and publish their own views easily, they are less willing to accept arbitrary control of their lives from superiors—contrary to the consequences of automation. As a consequence, modern organizations have granted greater autonomy and responsibility to individuals in order to stay competitive. The speed and ease of communication, information access, and flexibility in method have caused organizations to change and to respond to those changes faster and more successfully than before. Organizations are therefore forced to continually change and adapt to rapid changes in their environment (Senge, 1990; Trist, 1981).

## 2.4 Combining perspectives

Table 1 offers a summary of the different perspectives discussed above, and specifies prominent technology, applications, meta-theoretical perspectives, and nature of causality. It is of course impossible to draw distinct lines between the different paradigms, as there will always be overlap. This is especially evident in the current body of research, where studies still draw on theoretical frameworks developed decades ago, such as media richness theory (Daft & Lengel, 1986). Specific theories relevant will be reviewed in Chapter Three (Literature Review).

Table 1 – Prominent Technology, Applications, Research Paradigm, and Causality

Period	IT Artifact	IT praxis (uses, applications, users)	Primary research perspective and nature of causality (in parentheses)
1960's	Mainframes	Automation of routine and repetitive tasks, aggregation of information	Functionalist (Technological determinism)
1970's-80's	Minis and Micros	Middle management, functions (decision-making, coordination and control)	Functionalist – (Technological and social determinism)
1980's-90's	Networks	Interfirm linkages, interorganizational systems (IOS)	Functionalist, but early attempts of interpretivist approaches (Deterministic)

			and social construction)
1990's-2000's	Internet and WWW, Wireless	Direct connection with customers, Organizational Web-sites.	Functionalist and Interpretivist (Deterministic and social construction)

## 2.5 Summary

ICTs in the 1960's, 1970's, and early 1980's were first and foremost capable of handling crude information, and the computers were confined to backroom mainframes operated only by highly skilled technicians (Dewett & Jones, 2001). In the 1980s the PC was introduced. By the early to mid-1990's, a shift toward using ICTs, such as the WWW, took place. This WWW, like no previous ICT, was able to handle communication in addition to information, which emphasized the importance of social functions and social psychological analyses (Postmes, Spears, & Lea, 2000). Although the WWW has been very popular during the last decade, it was not originally a site for interaction. In its original form, it served as a powerful way of accessing and linking Web-pages and documents. Today, as Flanagin and Metzger (2001) note, the WWW supports both asynchronous and synchronous communication such as application-sharing, chat, discussion groups, file-sharing, email, videoconferencing, and much more.

Due to the many new forms of communication and functions of the Internet, several authors suggest that this shift will alter how individuals choose and use ICTs to meet business objectives (Flanagin & Metzger, 2001; Conrad & Poole, 2003; Dewett & Jones, 2001; Postmes, Spears, & Lea, 2000). Kuhn (1970) suggests that when anomalies are encountered, researchers will be looking for new ways to conceptualize problems within their field. Sometimes when this happens, new paradigms of thinking will surface, and research efforts will follow. While it's not my goal to suggest a new paradigm for research to follow, the field of organizational communication—and the relationship between ICTs

and organizations in particular—has in its relatively short history been privileged by diverse conceptualizations and theorizing, partly due to the ICT developments. The two meta-theoretical perspectives presented here—technological determinism and social constructionist/emergent—are certainly examples of such paradigms that are well documented and established. As in any field, researchers in the organizational communication field are constantly gauging how research is done and what the purpose and object of study should be (Clegg, 1994; Hirschheim & Klein, 1989; Kuhn, 1970).

### **3 Review of Literature**

Having situated the research problem within a greater context of different research perspectives, I now move to a brief review of selected literature in the field. The purpose of this literature review is to provide a useful backdrop for the research problem addressed in the individual papers in Chapter Five.

#### **3.1 The Purpose of Literature Review in Interpretive Research**

Usually, the purpose of a literature review is to establish a gap in existing knowledge in a given area of scholarship, and then make propositions, hypotheses, or research questions in order to guide the study, with the goal of developing new knowledge. Another equally important purpose of a literature review is to provide readers with the necessary background to assess contributions within the larger theoretical framework, or research program, which in this case in media selection theories. The content and form of the literature review will vary depending on the nature and history of the particular field of study, the maturity of the research program, and the methodological approach. As will be demonstrated more fully in the next chapter on research methods, knowledge is generated either deductively or inductively. The inductive approach usually means generating knowledge based on empirical observations, where no exhaustive literature review is done prior to empirical data-gathering. In fact, qualitative researchers, such as early work on GT (e.g., Glaser and Strauss, 1967), claim that knowledge can only be generated from empirical data and not from preconceptions and pre-formulated hypotheses. To the contrary, the deductive approach usually generates knowledge from existing theoretical knowledge by making hypotheses or propositions, which are in turn validated or rejected through, for example, empirical observations or surveys. Clearly, the role and use of existing knowledge (literature) in these two distinct approaches vary, due to their different approaches toward theory generation.

## Our approach

Due to the inductive nature of this research project, it doesn't make sense to provide readers with a literature review in the deductive style, since the goal here is to generate theory as it emerges through parallel data-gathering and analysis (Glaser and Strauss, 1967). Grounded theory has a different approach to literature review than conventional social-science research. In GT, a literature review is often done, but not for the purpose of delineating a theoretical model, from other research, in order to make choices of research design. But it's important to situate the current research within a larger research program, by offering an historical review of prominent research and common critiques of the research program. In addition to this, related research will be addressed throughout this dissertation, especially through the contributions of the individual papers in Chapter Five, but also in the last chapter, where I offer theoretical and practical implications of our research. It is therefore fair to say that the review of literature was conducted at several stages throughout the research process, something that is also reflected in how this dissertation is written up. Thus, the literature review appears before the theoretical contributions in this dissertation, while in reality most of the literature review was done parallel to data-collection, analysis, and delineating the various theoretical contributions (Glaser and Strauss, 1967; Strauss and Corbin, 1998). Furthermore, as addressed in more detail later in this chapter, the researchers were somewhat familiar with the literature in this area before embarking on data-collection, which served as a *sensitizing device*<sup>16</sup> for all researchers during subsequent data analysis (Van den Hoonaard, 1997). Literature was reviewed more heavily during the later stages in the research process, as themes emerged from the data. While the research project is ongoing, the individual contributions in this dissertation all have at least one common feature—they deal with how individuals use ICT in

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<sup>16</sup> That is, using existing theories to substantiate the emerging theory as a: supplier of useful concepts during analysis; device for creating good research questions; device for future questioning when theoretically sampling new informants; and finally, as a supplementary validation device, as it aids the researcher in establishing the accuracy of the findings by making the contribution novel.

naturalistic settings. This allows us to situate the individual findings in the larger research program of media-selection theories.

In summary, the goal of this literature review is to stay consistent with the overarching epistemological, ontological, and methodological assumptions chosen—that is, to provide a useful backdrop for the research problem: who has studied it, what scholarship exists, common critiques, and suggested future directions.

### 3.2 What Determines ICT use?

In everyday business life there are many different variables that affect how, when, and why we select certain ICTs in a given situation. In this literature review, I will introduce several theoretical positions that attempt to explain some of these questions. As I will demonstrate, even with several decades of research, there are still many unanswered questions. “Media selection”<sup>17</sup> is an umbrella term for a research program of theories attempting to explain how communicators select various ICTs, including FtF, when solving problems or

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<sup>17</sup> While the terms *use* and *choice* are often used interchangeably when talking about ICT *choice/use* behavior, some authors argue that they need to be distinguished due to their theoretical and conceptual difference. Trevino, Webster, and Stein (2000) conceptualize media *use* and *choice* as part of “media-behavior.” Media *use* refers to the general use of ICTs; *choice* refers to a specific choice of an ICT. While general *use* “refers to an individual’s broad use over time,” *choice* “refers to an individual’s specific decision to use a medium in a particular communication incident” (p. 163). The authors differentiate between the two terms because they believe the factors influencing them are different. They argue that ICT *choice* is influenced by multiple factors related to the specific communication incident. Examples of such factors may be micro variables such as the content of the message, the distance between communicators, and the recipients’ attitude towards a particular ICT. *Use*, on the other hand, is more than just a pattern based on aggregated choices over time, because different factors can influence a specific *choice* and patterned *use*. *Use* patterns over time are influenced by macro variables like job content (equivocality), instead of message content (message equivocality). Even with this conceptualization of differences between *choice* and *use*, I feel it is hard to argue faithfulness favoring one over the other. One explanation for this ambiguity on our part is the epistemological nature of our project. In our in-depth interviews, the respondents were encouraged to use examples from current and completed projects in their answers. Due to the nature of people’s work, I argue that people are constantly influenced by both micro and macro variables affecting their ICT *choice/use*. This is vividly apparent in our data. I employ *use* here because all interviewees talk about their experience and use of ICTs in hindsight, contrary to responding to a hypothetical situation where they would *choose* a particular ICT. In addition, I argue that *use* includes the element of conscious individual choice, as it still allows for situations where choice is either unconscious or non-voluntary (Trevino et al., 2000)

communicating with others. It may be fruitful to compare ICT-mediated communication with FtF communication. According to Berger and Luckmann (1966), the FtF situation “is the prototypical case of social interaction. All other cases are derivatives of it” (p. 44). Others (e.g., Clegg, 1988; Morgan, 1997) claim that power relations—with one’s boss, for instance—will influence ICT choices. Another assumption of decision-making, pertinent to ICT use, in organizational science is that selecting ICTs can be based on bounded rationality—a limited ability to control information and a struggle for interpretation in a complex environment—or by “satisficing,” where people have to make choices based on incomplete information, from a limited number of alternatives, and where they are unable to attach accurate values to outcomes (March & Simon, 1958). Most organizations cope with such uncertainty not by maximizing a well-defined function, but by developing organizational and managerial “satisficing” routines (Nelson & Winter, 1982). These are adapted as firms collect new information, learn from experience, and imitate other firms.

These are just snapshots of possible influences and explanations for how and why ICTs are used, and the topic has received considerable attention in the business and communication sciences area during the last three decades. Thus, media-choice theories have evolved and matured considerably since they began to appear in scholarly journals in the 1970’s.

### **3.3 Prominent Theories of Media use**

In the theory section that follows, I present some of the most popular views on ICT use, looking first at the deterministic ones and then at the socially constructed/emergent ones. Hence, as mentioned earlier, this does not pretend to be an exhaustive review<sup>18</sup> of theoretical contributions in the area.

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<sup>18</sup> Other theories include, but are not limited to: Uses and Gratifications (Blumler & Katz, 1974); Social Learning Theory (Bandura, 1962); Activity Theory (Leontiev, 1978, Vygotsky, 1978); Critical Social theory (Habermas, 1979); Social Identity Model of Deindividuation Effects (SIDE) (Postmes, Spears, & Lea, 1998); Complexity Theory (Browning & Shetler, 2000); Self-Organizing Systems Theory (SOST) (Contractor & Seibold, 1993); Media Synchronicity Theory (Dennis & Valacich, 1999); Swift Trust



Table 2 presents the most prominent theoretical perspectives associated under these two meta-theoretical perspectives.

Table 2: Deterministic and socially constructed/emergent theories

<b>Technological Deterministic Perspective</b>	<b>Social Constructionist and Emergent Perspective</b>
Social Presence Theory (Short, Williams, & Christie, 1976)	Social Influence Model (Fulk, Schmitz, & Steinfield, 1990)
Cues Filtered Out (Kiesler, Siegel, and McGuire, 1984)	Dual Capacity Model (Sitkin, Sutcliffe, and Barrios-Choplin, 1992)
Media Richness (Daft & Lengel, 1984)	Adaptive Structuration Theory (Poole & DeSanctis, 1990)
	“Practice-Lens” (Orlikowski, 2000)

### 3.4 Technological Deterministic Perspective (TD)

The technological deterministic view is premised on an assumption of rationality and predictability. The TD view embraces a cause-effect vision of the relationship between ICT and organizations, and is to date the most prevalent meta-theoretical approach in the literature (Taylor et al., 2001). The basic principle is that ICTs are a determining factor, or have an impact on individuals or organizational change. For example, determinism claims that the features embedded in a technology—such as bandwidth constraints—forecast how individuals will browse the Internet. At the extreme level, technological determinism claims that people have no freedom to control their actions and are forced to carry out tasks in a particular way (Grint, 1991; Markus & Robey, 1988). Common for the theories presented under this umbrella is that they all predict that certain features of ICTs will have consistent static effects on users—usually meaning that interaction becomes less “social.” The term “social” in this context is often used as a benchmark for comparing ICTs to FtF interaction. The

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Theory (Meyerson, Weick, & Kramer, 1996); Channel Expansion Theory (Carlson and Zmud, 1999); Critical Mass (Markus, 1987); Channel Disposition (Swanson, 1987); and Hyperpersonal Communication Model (Walther, 1996)

term “bandwidth” is also frequently associated with the deterministic view, and deals with a given ICT’s capacity to transmit information in order to solve problems of uncertainty. Consequently, most theories here use FtF communication as the standard upon which to base all other modes of communication (Walther, 1992). Thus, it’s not surprising that a lot of studies compare FtF to other ICTs (e.g., D’Ambra, Rice, & O’Connor, 1998; King & Xia, 1997; Rice, 1993; Sellen, 1995; Smeltzer, 1992; Straus, 1997; Trevino et al., 2000; Westmyer, DiCioccio, & Rubin, 1998).

The three most influential theories that subscribe to the deterministic school of thought are social presence theory (Short, Williams and Christie, 1976), reduced social cues/cues filtered out (Kiesler, Siegel, & McGuire, 1984; Sproull & Kiesler, 1986); Culnan & Markus, 1987), and media richness theory (Daft & Lengel, 1984, 1986; Trevino, Webster, & Stein, 2000). Since these three theories have similarities, they are all referred to as the “cues-filtered-out” theories (Culnan & Markus, 1987). In the following section I will focus on these specific theoretical perspectives.

### **3.4.1 Social presence theory (SP)**

The social presence theory (Short, Williams, & Christie, 1976), despite predating many networked ICTs and the Internet in particular, has been one of the most influential early approaches to explain ICT use. The basic principle of this theory defines *social presence* as the extent to which an ICT is perceived as transmitting the genuine physical presence of a communicator. Hence, social presence is not only concerned with the communication of the spoken word, but focuses equally on a variety of nonverbal cues involved, such as the “capacity to transmit information about facial expression, direction of looking, posture, dress and nonverbal, vocal cues” (Short et al., 1976, p. 65). Hence, from a social presence perspective, ICT environments lack nonverbal, emotion, feedback and social-context cues to various degrees. For example, FtF meetings enable

participants to convey such cues, and are therefore considered to score highest on social presence compared to ICTs such as email and printed documents (King & Xia, 1999; Short et al., 1976). Hence, SP ranks ICTs along a continuum, where FtF ranks highest and print media lowest. This does not mean that FtF is required in any given situation; rather, it means that the emphasis is more geared towards finding an “appropriate” ICT (i.e., to find an ICT that “matches” the interpersonal involvement for a given task). Thus, diverse ICTs will receive different social-presence scores depending on the immediacy and intimacy of the particular medium (Short et al., 1976; Trevino et al., 2000).

Short and colleagues hypothesize that the users of any given ICT are in some sense aware of the degree of social presence of the medium and tend to avoid using the medium for certain types of interactions—specifically, interactions requiring a higher degree of social presence than they perceive the medium to have. Thus, an individual determines the social presence of a given ICT as being a cognitive synthesis of multiple influences (Short et al., 1976):

- Non-verbal cues: In a typical face-to-face situation, participants exchange multiple nonverbal cues through facial expression, posture, dress and physical appearance, and gaze.
- Dynamic nonverbal cues from the trunk and arms: Includes all nonverbal cues from the neck down (e.g., the way arms and feet are used and positioned).
- Proximity and orientation: When communicating via ICTs there is usually physical separation in space, whereas in face-to-face, individuals are physically present. Proximity deals with the particular orientations of the communicator (e.g., facing each other when talking, sitting opposite one another, side-by-side). In a

typical videoconference, individuals will normally “face” each other by looking into a camera and seeing the communication partner(s) on the screen at the same time.

- Physical appearance: This is particularly important for people who haven’t previously met. First impressions are usually made based on physical appearance.
- Facial signals: Facial expression (e.g., angry, sad, happy, surprised).
- Direction of eye gaze: Eye movement is important in conversation control (e.g., turn-taking) as well as for providing immediate feedback for message understanding.
- Comparisons of verbal and visual communication: Deals with the relationship between verbal and nonverbal cues. If there is redundancy in information—meaning a duplication of message both visually and verbally—it is hypothesized that the social presence of the medium would not be diminished by removing the visual channel.

SP has no doubt been controversial, and subsequent research has been critical of its presuppositions. Empirical research has not provided consistent support for its ability to predict ICT use. While some studies have proved to be partially supportive and influential for further theorizing (Daft and Lengel, 1986; Rice 1984; Rice and Love, 1987; and Trevino, Daft, & Lengel, 1987), others have offered only partial support (Bikson, El-Shinnawy, & Soe, 1992; El-Shinnawy and Markus, 1992; Lea, 1991; Markus, Rice & Shook, 1990).

### 3.4.2 The Reduced Social Cues Theory (RSC)

The reduced social cues theory (Kiesler et al., 1984; Kiesler, 1986; Sproull & Kiesler, 1991; and Kiesler & Sproull, 1992) posits that when communicators use ICTs instead of FtF, they will exhibit many undesirable traits due to the absence of important *social cues*. Social cues, simply put, are the nonverbal and *contextual cues* that complement human interaction. Social cues can further be divided into (1) *static cues*—information that relates to place, position, and person (Kiesler, 1986), and (2) *dynamic cues*, which can be drawn from people’s behavior in a normal FtF interaction (e.g., facial expression, gestures, and scent. While Kiesler and colleagues’ study was designed to look at the impact of ICTs on group interaction and decisions, the most interesting findings were centered more on individuals’ behavior and conduct rather than on decision-making. RSC posits that ICT-mediated communication has fewer *social context cues* compared to FtF, which has the most social context cues in communication. For example, Kiesler (1986) states that when using ICTs, “senders have no way to link the content or tone of messages to receivers’ responses so they can evaluate how their messages are being received” (p. 48). There are four distinct features that illustrate the lack of *social context cues* of ICT when compared to FtF (Kiesler et al., 1984): absence of regulating feedback, dramaturgical weakness, few social-status cues, and social anonymity:

- Absence of regulating feedback: Dynamic cues, such as smiling, nodding, tone of voice, and eye contact, are quite normal during a regular FtF conversation, and are necessary for feedback purposes. When people converse using ICTs, however, such feedback is difficult to convey and even harder to perceive.
- Dramaturgical weakness: Similar to the above features of smiling, nodding, and so on, this feature focuses on cues not intentionally given for the purpose of regulating feedback. Examples of this

would be tone of voice and facial expressions. The introduction in email of emoticons such as :-) (indicating a smile) and :-( (indicating a frown) shows how interactants try to compensate for this perceived deficiency.

- Few social-status cues: When using ICTs such as chat or email, it's much harder to gauge status or power cues than with a FtF conversation. Although the use of signatures in emails might give away information such as title, position, and education, ICTs are considered too "blind" and unable to recognize such information. As a result, ICTs have an equalizing effect on hierarchies and social relationships.
- Social anonymity: Combining the above features, the use of ICTs when communicating will make the interactants more anonymous. Unless emoticons are used, it's very difficult to determine the mood or facial expression of the person you are chatting with. Kiesler et al. (1984) hypothesized that this might lead to decreased inhibition in expressions and language while using ICTs, as compared to FtF situations, where the interactants would be less anonymous.

An implication of RSC theory is that a given ICT's reduced social-context cues will regulate social interaction, and hence reduce the social-cues information about the communicators. As communicators lack this type of information, it's likely to limit their ability to form impressions that are necessary to establish relationships (Kiesler et al., 1984). While Kiesler and her colleagues looked at this as an absolute limitation of ICTs, Walther (1992) contends that ICTs are just as capable of carrying these cues, but it happens differently from FtF and it takes more time.

Subsequent research and testing within this theoretical framework have been mixed (Spears et al., 2000). Contrary to what was hypothesized by Kiesler et al., uninhibited behavior, such as flaming, has been found to be more prevalent in ICT-mediated communication as compared to FtF (Kiesler, Subrow, Moses, & Geller, 1985; Siegel, Dubrovsky, Kiesler, & McGuire, 1986). Later studies (Postmes et al., 1998) question whether FtF is more powerful than ICTs for exercising social influence. In summary, the RSC model has been influential in identifying the various effects (i.e., reduced social cues) that ICT-mediated communication can have (Spears et al., 2000), but it lacks clarity on how to identify and test the mechanism causing such effects. Like other deterministic theories of ICT use, RSC is criticized for underestimating the social and psychological power of ICTs—and, as a consequence, their impact on potential users—when compared to the “ideal” situation of FtF (Spears et al., 2000).

I now turn to Media Richness Theory (Daft & Lengel, 1984), which is the last theoretical framework within the deterministic perspective I will cover here.

### **3.4.3 Media Richness Theory (MR)**

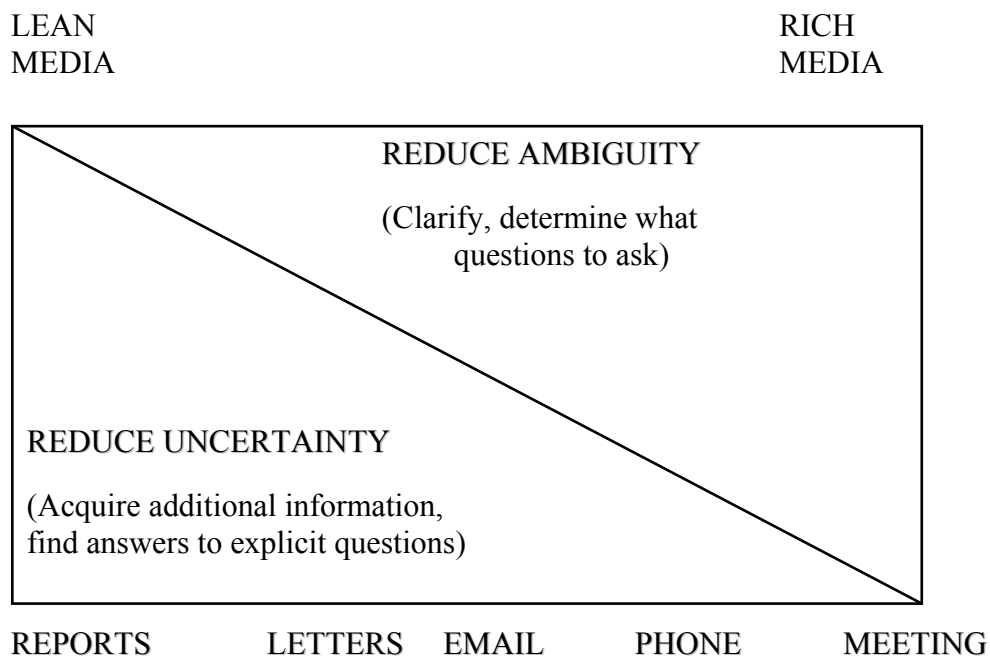
The Media Richness Theory (MR) (Daft & Lengel, 1984, 1986; Daft et al., 1987; Daft & Lengel, 1990; Trevino et al., 1990) is the final, and perhaps the most influential, theoretical framework that we will cover under the deterministic umbrella. Daft and Lengel extended the ideas of the social presence theory as well as earlier work by Daft and Macintosh (1981). Similar to SP and RSC theories, the MR theory ranks FtF communication above all other communication methods. Daft and Lengel’s major proposition is that ICTs vary in the *richness* they are able to provide in information-sharing. They argue that different ICTs vary in their ability to reduce equivocality (the existence of multiple and conflicting interpretations about a situation) and uncertainty (absence of information) of communication. They claim that *rich* ICTs, like FtF and videoconference, are better for carrying out equivocal tasks (to reduce

ambiguity), while *lean* ICTs like email and hard-copy reports are suited only for unequivocal tasks. The word *rich* is defined as “the ability of information to change understanding within a time interval” (Daft & Lengel 1986, p. 560). An example of a highly equivocal situation is an emotionally charged conversation. The MR theory suggests that information exchanges should occur by *matching* the appropriate ICT to the communication need. In this vein, *richness* is a function of four different characteristics:

- 1) The ability to transmit multiple signals/cues.
- 2) The availability of immediate feedback.
- 3) The opportunity to tailor the message to the situation.
- 4) The ease of incorporating conversational language such as slang and ambiguous references.

Media richness rates FtF as the *richest* way of communicating because it takes advantage of the possibility for instant feedback, the ability to transmit multiple cues, the use of natural language, and the personal focus of the medium (Daft & Lengel, 1984). Using these criteria, they rank different ICTs from very *rich* to very *lean*. See Figure 2 for a graphical illustration of this:

Figure 2: Media Richness Theory



Adapted from Daft and Lengel (1984)



While the first two characteristics (ability to transmit multiple signals/cues and availability of immediate feedback) are consistent with RSC and SP, the last two are new (Daft et al., 1987). Though the theory suggests that use of *rich* ICTs would take care of both equivocality and issues of uncertainty in all situations, Daft et al. (1987) assert that *lean* ICTs are appropriate when communicating objective information and routine decisions. Similarly, *rich* media should be used primarily when trying to resolve issues of a subjective nature.

Over the years, the MR theory has been critiqued and further developed by other theoretical views on ICT use (e.g., Carlson & Smud, 1999; Dennis & Kinney, 1998; El-Shinnawy & Markus, 1997; Kahai & Cooper, 2003; Straub & Karahanna, 1998; and Walter & Parks, 2002). While some studies (e.g., Daft et al., 1987; Russ, Daft, and Lengel, 1990; Trevino, Lengel, Bodensteiner, Gerloff, & Muir, 1990; Whitfield, 1996; and Zack, 1994) have supported MR theory, other follow-up studies have not (e.g., El-Shinnawy & Markus, 1997). The most dominant critique of the MR theory has been on the proposed objective features of ICTs. That is, ICTs have predetermined attributes regardless of who is using them (Culnan & Markus, 1997). Other scholars have criticized MR for proposing that *richness* is an objective dimension (see Hollingshead and Contractor, 2002, for a review).

#### **3.4.4 Summary of Deterministic Theories**

As the theories of ICT use began to mature in the early 1990s, researchers began to challenge the assumptions of SP, RSC, MR theories. Walther (1992), in particular, examined ICT studies using deterministic theories and found inconsistencies not only between competing theories but also between different methodological approaches testing the same theory. He contends that there is no clear agreement between the studies as to how different ICTs should be rank-ordered according to *richness*. In addition, Walther is one scholar who has challenged the often-assumed superiority of FtF communication to ICTs. Spears

and colleagues (2000) question deterministic approaches to ICT use in general. In particular, they are critical of the general *media-matching* hypothesis—namely, that communication efficiency is equated with non-redundancy of communication—since richer ICTs should only be used when there is more to communicate. Furthermore, they also argue that the sender in a given communication effort may have a different view than the receiver about what is appropriate ICT use—a difference that calls for a more refined conceptualizing of what *appropriate* means for both senders and receivers. Another critique deals with the common assumption of all the deterministic theories addressed: that maximum communication efficiency is equal to maximum organizational efficiency. In fact, there may be situations where ICTs are used to deliberately increase uncertainty, particularly in hierarchical organizations (Spears et al., 2000).

In summary, these deterministic theories show inconsistent findings (Walther & Parks, 2002). Although the deterministic perspective on the relationship between ICT's and society has been prominent, the ideas have been challenged and claim to be an inadequate description of this relationship between ICTs and society (see Lievrouw, 2002; Robey & Boudreau, 1999, for reviews). As a consequence, alternative theories have been proposed to account for the many inconsistencies found. However, as pointed out by Spears and colleagues (2000), it's important not to underestimate the value of these theories, as their assumptions are still widely shared today.

### **3.5 Social Constructionist and Emergent Perspective**

Social determinism, often mentioned in the literature as the polar opposite of technological determinism, contends that ICTs have no influence whatsoever on society, its organizations, or individuals. An overlapping concept, *organizational imperative*, was introduced as a counter perspective to technological determinism, and contended that organizations have “unlimited choice over

technological options and almost unlimited control over its consequences” (Markus & Robey, 1988, p. 587). Yet another term, *technological indeterminism*, was also introduced to argue that technologies are effectively neutral, and not capable of shaping organization or society (Adler & Winograd, 1992). But research claiming this kind of causality has not been prosperous. Rice and colleagues argue that this “dichotomy between ‘rational’ and ‘social’ influences seems artificial and perhaps unnecessary” (Rice, Kraut, Cool, Fish, 1994, p. 288). This is also evident in the large body of literature following the first set of rational theories, such as media richness. This is because models such as Fulk and colleagues’ social-influence model incorporates thoughts from both technological determinism and social determinism. This new perspective, which I call “social constructionist”<sup>19</sup> and “emergent perspective,” emphasizes a co-determined and often non-rational view of ICT use. By “co-determined” I mean that the use and effect of ICTs are determined by both technological and social factors. The central premise of this view is that ICTs cannot be fully understood without information about (1) the context in which they are used and (2) who uses them. Social construction is all about how social practices, representations, and discourses in different contexts help shape what actors within that context perceive as being the “social reality” (Berger & Luckman, 1966).

Social construction moves away from the view that ICTs have predefined attributes that constrain or determine human behavior, but it does not exclude all the objectively rational ICT choices (Fulk, Schmits & Steinfield, 1990). Hence, the interplay between ICT and society is central to the social-construction view of ICT use. A well-known example, illustrating the limitation of the deterministic view, is the telephone. The designers believed it was suited only for business-to-business communication, but today we all know that this invention has been domesticated throughout many parts of the world. It was the

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<sup>19</sup> Social construction is the process whereby users of, for instance, ICTs collectively establish norms, hence the label *social constructionism*.

users themselves who started to use the telephone for personal purposes, and thus socially constructed a *new* invention (Fisher, 1992).

In the late 1980's and early 1990's scholars began to look into the social and technological variables that affect ICT use. An early book that presents many of these theories is Fulk and Steinfield's (1990) *Organizations and Communication Technology*. Many of the featured scholars in this book dispute the validity of the deterministic models because those models fail to recognize social contexts, task considerations, organizational and national culture, and other organizational variables. Hence, they reject earlier work that argues for channel perceptions being invariant, objective, and independent of social and organizational contexts. They suggest that ICT perceptions are subjective, influenced by social factors, and vary between individuals and different contexts. Table 3 offers a summary of major differences between rational choice and social definition theories.

Table 3: Comparison of channel selection theories

<b>Rational Choice Theories</b>	<b>Social Interaction Theories</b>
<b>Media and Task Features</b>	
Fixed	Variable
Objective	Subjective and socially constructed
Uniformly salient	Variably salient
<b>Choice-making</b>	
Cognitive	Cognitive
Independent	Subject to social influence
Prospectively rational	Can be retrospectively rational
Objectively rational	Subjectively rational
Efficiency-motivated	Can be efficiency-motivated, but needn't be

Adapted from Fulk et al. (1990)

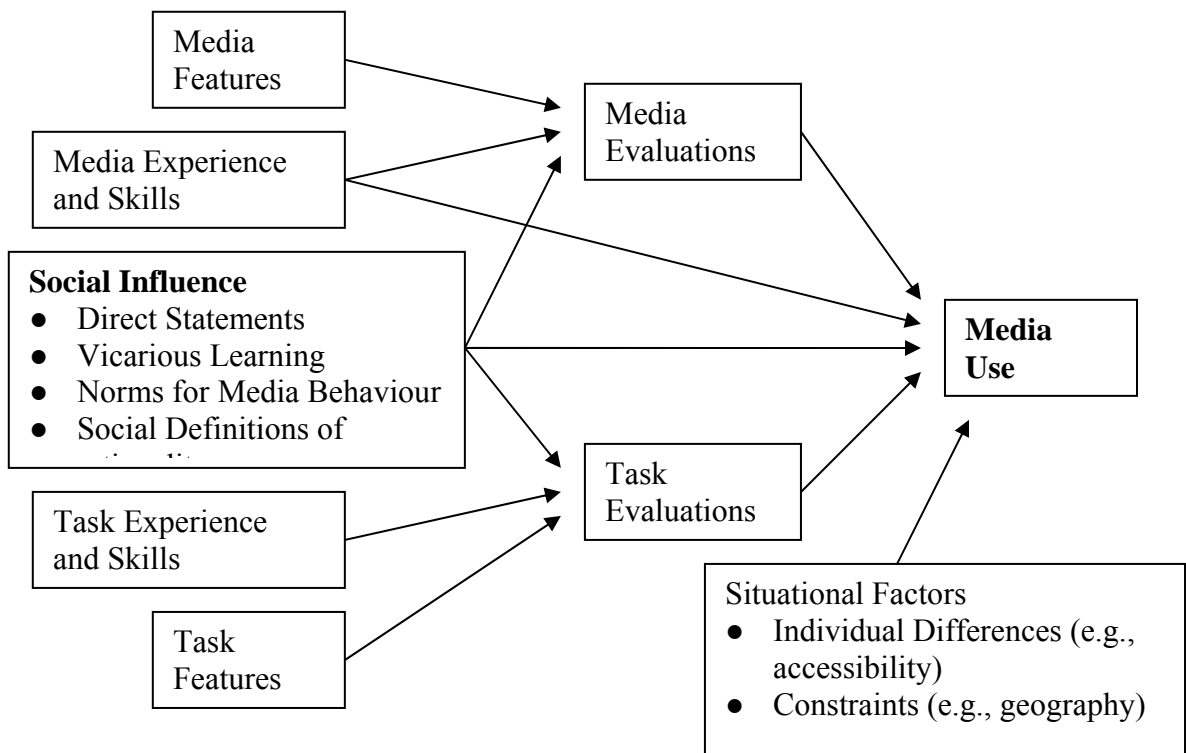
The four most influential theories within this perspective are: the social influence model (Fulk, Schmitz, & Steinfield, 1990; Fulk, 1993; Fulk, Schmitz, & Ryu, 1995; Schmitz & Fulk, 1991); the dual capacity model (Sitkin, Sutcliffe, and Barrios-Choplin, 1992); adaptive structuration theory (Poole & DeSanctis

1990, 1992); and Orlikowski's (2000) practice-lens perspective of technologies-in-practice. I will now briefly review each of these theories.

### **3.5.1 The Social Influence Model (SIM)**

The SIM was developed by Fulk and her colleagues (1990, 1993, and 1995) in response to rational-choice models such as media richness theory and social presence theory. This model assumes that use behavior is not constrained solely by the objective features of ICTs but is also influenced by social variables. The authors propose that the perceived strengths or limitations of ICTs are not inherent in a medium, but rather are a result of multiple factors such as individuals' experience, expertise, and social interaction. Hence, the use of ICTs by individuals occurs in a social world that is not neutral in its effects. The SIM also challenges the notion that ICT selection is entirely independent (without influence from the interpersonal setting), objectively rational (evaluation of both task and ICT to find right match), and efficiency-motivated (use of too *rich* ICT for unambiguous task is inefficient) (Fulk et al., 1990). While not abandoning the idea that ICTs have objective features, as proposed by media richness and social presence theory, they attempt to integrate these opposing views—technological determinism and social influence—and advocate a *middle-ground*. Figure 3 illustrates the key role of social influence in ICT selection. A description of the model follows.

Figure 3 – Social influence model of technology use



Adapted from Fulk, Schmitz, and Steinfield (1990).

Media evaluations (perceptions and attitudes) are a function of: (1) objective media features; (2) media experience and skills; (3) social influence (direct statements by co-workers, vicarious learning, norms for media behavior, and social definition of rationality); (4) media experience and skills.

Task evaluations are functions of: (1) objective task features; (2) task experience and skills; (3) social influence (direct statements by co-workers, vicarious learning, norms for media behavior, and social definition of rationality).

Media use is a function of: (1) media evaluations (perceptions and skills); (2) media experience and skills; (3) social influence (direct statements by co-workers, vicarious learning, norms for media behavior, and social definition of rationality); (4) task evaluations; and (5) situational factors such as individual differences and constraints.

The SIM predicts that the perception of a particular ICT's *richness* will vary from person to person, and that such variation is not idiosyncratic or random, but systematically linked to variations in ICT experience/skill and in social context.

Researchers have explored many of these issues and found that both the views held by others and an individual's own experience with ICTs affect technology use. In addition to these localized factors, organizations also influence use. Empirical research findings confirm parts of this model by demonstrating that ICT use is linked to *experience* (Carlson & Zmud, 1999; King & Xia, 1999), *knowledge of the channel* (Carlson & Zmud, 1999; King & Xia, 1999), and the *views held by others* (Hiltz, 1984; Schmitz, 1987; Shook, 1988; and Steinfield, 1986). Fulk and colleagues found that *use* and *attitude* toward email use were affected by social influence for supervisors, coworkers, and networks (Fulk, 1993; Schmitz and Fulk, 1991). Carlson and Zmud (1999) found that the knowledge-building experiences that one has with an ICT and with a given communication partner are positively related to their perception of the ICT's richness, thus affecting a user's media-selection process. King and Xia (1999) found that experience with particular ICTs links positively with employee learning opportunities. Trevino and Webster (1992) found that social expectations and individual differences affect employees' interactions with ICTs. But studies by Rice and colleagues found only limited support for social effects on ICT use (Rice, 1993; Rice & Aydin, 1991; Rice, Grant, Schmitz, & Torobin, 1990). Contrary to early theorizing on ICT use (predominantly deterministic theories), the SIM has been influential in both new ICTs and more traditional ICTs (i.e., before the WWW) (Webster & Trevino, 1995).

In summary, the SIM argues that task, ICT features, situational factors, personal experiences, and other forms of social influences—all co-determine which ICT is

used in a given situation. This view departs significantly from the previously described deterministic theories such as media richness theory.

### **3.5.2 Dual Capacity Model (DC)**

Having demonstrated how social variables can influence ICT use, scholars like Sitkin, Sutcliffe, and Barrios-Choplin (1992) have added another variable: ICTs themselves will develop shared symbolic meanings over time. For example, FtF is a rich medium of communication, but it also silently conveys the message (a symbolic *meaning*) that the person arranging the FtF meeting considers the topic important enough to justify a physical presence. Sitkin et al. therefore developed what they call the *dual capacity model* showing that every ICT is “a carrier of both data and meaning” (p. 564).

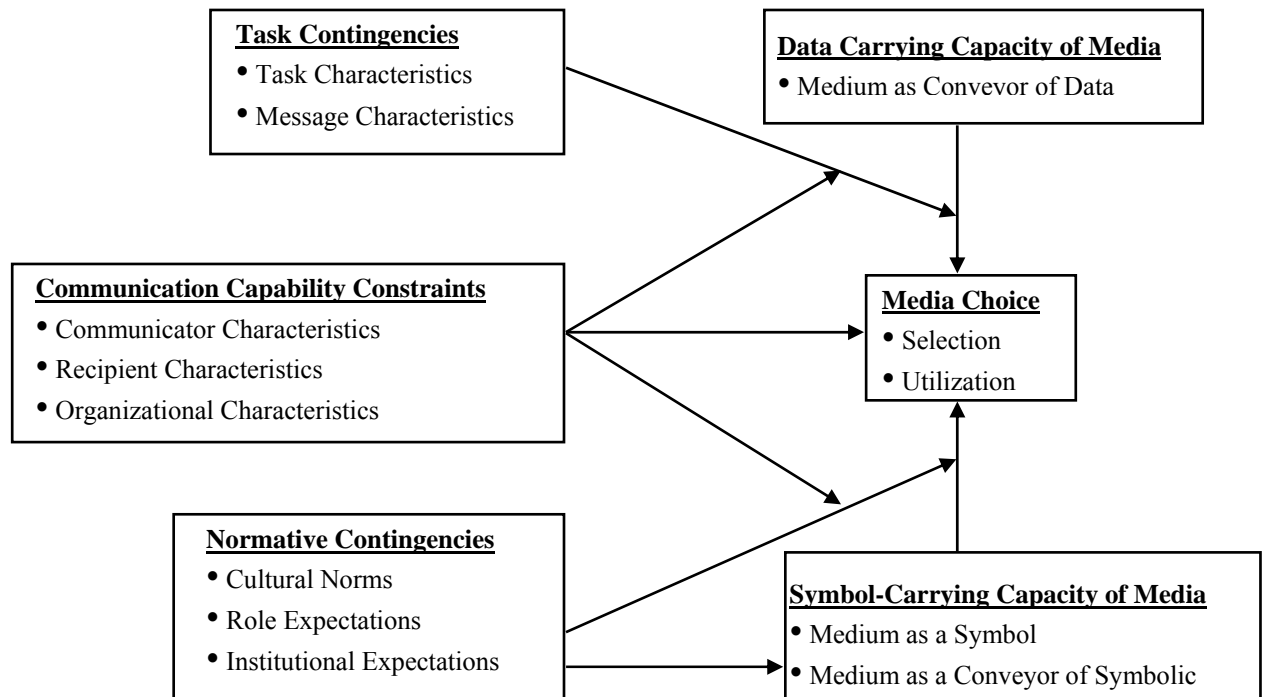
It has been argued that ICT use is often governed by individuals’ need to appear intelligent, legitimate, and powerful (Feldman & March, 1981). Beyond the ICTs’ objective characteristics and capabilities to carry data, as shown in the previous theories, later contributions claim that they are also capable of carrying symbolic meaning (Trevino, Daft et al., 1990; Sitkin et al., 1992). Sitkin and colleagues elaborate on the distinction between an ICT’s capacity to *express* symbolic meaning, and its capacity to *manifest* symbolic meaning.

Conceptualizing ICTs as neutral carriers of information and their ability to transmit symbolic cues, such as nuances or metaphors, is different from ICTs’ capacity to *manifest* symbolic meaning. To *manifest* a symbolic meaning, the ICT itself acts as a symbol. Sitkin and colleagues claim that this occurs when ICTs attain the status of a symbol through consistent use over time. While such symbols will vary within and between organizations, the symbolic meaning of, for instance, email may become entrenched in particular organizations. To follow the email example, Zmud (1990) found that it symbolizes power or competence, which is important to some managers. Similarly, other managers prefer to meet FtF to indicate a personal interest in a particular topic.



Sitkin and colleagues propose a model (see Figure 4) of what factors determine individuals' ICT choice, reflecting both its ability to carry data and its symbolic meaning. There are five elements that influence media use, according to this model.

Figure 4 - Dual Capacity Model



Adapted from Sitkin, Sutcliffe, and Barrios-Choplin (1992)

One element is what they call *Task Contingencies*, which in turn consists of two components:

1. Task Characteristics, consisting of:
  - a. Task uncertainty
  - b. Task analyzability
  - c. Task time pressure
2. Message Characteristics, consisting of:

- a. Message complexity
- b. Message ambiguity
- c. Data volume
- d. Message value (good news/bad news)
- e. Message relevance

A second element is what Sitkin and his associates call *Communication Capability Constraints*. As communicators, we are not totally free to select communication media, but instead always some clear limitations.

- Communicator Characteristics
  - a. Competency
  - b. Access to the media
  - c. Comfort level
  - d. Media sensitivity and flexibility
- Recipient Characteristics. Characteristics of the recipient (same as above) that impact the recipient's understanding and use of the message.
- Organizational Characteristics
  - e. Experience
  - f. Structure
  - g. Resources
  - h. Available time
  - i. Needs
- Third is *Normative Contingencies*. Simply stated, this refers to the norms and values that determine symbolic meaning, including cultural norms for the meaning of each medium, role expectations,

and institutional expectations (organizational standards and routines).

- Fourth is the *Data Carrying Capacity* of the ICT, meaning that the physical features of a given ICT will influence its use.
- And fifth is the *Symbol-Carrying Capacity* of the Media. This is the new contribution, as discussed above, to our understanding of how people choose their media.

Several studies have empirically examined the proposition that ICTs have unique symbolic meanings, and that those meanings are socially constructed. Trevino and his associates (2000) surveyed 1,704 technical and low-to-middle-management employees representing different organizations and found that respondents *can* articulate the symbolic meanings of their ICT use. Trevino and colleagues made another important discovery, namely, the symbols carried by the various ICTs don't necessarily cross organizational borders: "Depending upon the organizational culture...meetings may represent teamwork in one setting and time wasted in another" (p. 179). O'Sullivan (2000) offers a reason for this: ICTs can "embody symbolic meaning reflecting the codes and values of the organization" (p. 412).

### **3.5.3 Adaptive Structuration Theory (AST)**

While the social influence model and the concept of symbolic meaning have expanded our understanding of how shared meanings associated with ICTs are shaped by social interaction, these do not account for how ICT use then shapes organizational structures (Contractor & Eisenberg, 1990). Essentially, many of the theories I have discussed thus far fail to consider that media use, like the ICTs themselves, inevitably changes over time. Orlikowski (2000) calls these "technologies in practice" (p. 407) and argues that ICTs change over time, which

might explain why people use ICTs differently if they change jobs or have new communication responsibilities. To understand more about the interaction between ICTs, their users, and the organization, scholars are relying on structuration theory (Giddens, 1979, 1982, 1984, 1987, 1990).

### Giddens' theory of structuration

A major component of structuration theory is what Giddens calls *duality of structure*. The essence here brings us back to the previous chapter and the question of whether human behavior is driven by objective universal laws, or if human action is voluntary, individual, and changes over time. Giddens claim that social reality is constituted by both. Just as social structures influence individuals, these same individuals will also be influencing social structures. According to Giddens, *structure* is not necessarily something physical. It can include general procedures that span both time and space. Thus, *structures* exist as *actors* apply them; they are the medium and outcome of human interaction. Or, in Giddens' own words, "Man actively shapes the world he lives in at the same time as it shapes him" (1982, p. 21).

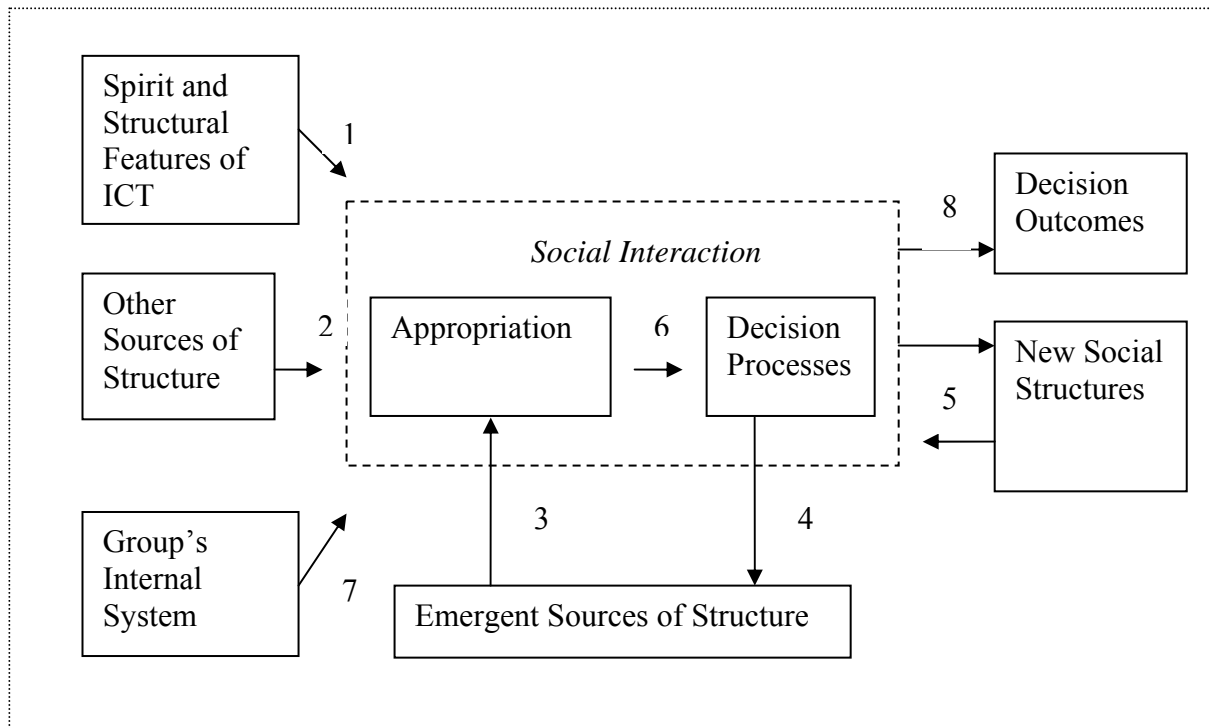
Giddens' structuration theory has been extended to consider the role of ICTs explicitly. Among the early attempts were Orlikowski (1992) and Orlikowski and Robey (1991) in their efforts to use structuration theory for studying the interaction between ICTs and organizations. While Orlikowski focused on the concept of *duality*, other approaches include: *emergent causality* (Robey & Sahay, 1996) and *analyses of the time-space dimension* (Sahay, 1997, Walsham & Sahay, 1999). Structuration theory demonstrates that ICTs are structured by users in their contexts of use (Barley 1986; Orlikowski, 1992; Walsham, 1993; Weick 1990). The way people use ICTs, for example, can fall under the rubric "general procedures." So *duality of structure* means that ICT use is not a one-way street. While users clearly rely on structures (norms, expectations, "rules") to guide their ICT use, they also have the ability to change those very structures.

The most relevant extension of Giddens' work here is the work by Poole, DeSanctis, and associates on adaptive structuration theory (AST).

### AST

Adaptive Structuration Theory extends many of Giddens' ideas, and focuses on how designed arrangements, like technology and work processes, both constrain and sanction individual action in organizations (Poole & DeSanctis, 1990). Thus far, AST has been applied to various aspects of organizational communication, but here I will narrow the scope and focus on its influence on ICT use (e.g., Contractor & Seibold, 1993; DeSanctis, Snyder, & Poole, 1994; DeSanctis & Poole, 1994; Poole & DeSanctis, 1990; Poole & DeSanctis, 2004; Scott, Quinn, Timmerman, & Garrett, 1998). AST is a promising means for studying the interplay between ICTs and human actors because it enables researchers to study and understand the role of ICTs, and to examine both the various structures that ICTs provide and what structures emerge as human actors interact with ICTs. In short, AST provides "a model that describes the interplay between ICTs, social structures, and human interaction" (DeSanctis and Poole, 1994). The AST model in its full context is presented in Figure 5. The eight arrows in the model reflect hypotheses listed below:

Figure 5 - The AST model



Adapted from DeSanctis and Poole (1994)

The reason why Poole and DeSanctis added the concept of *adaptive* is that adaptation to a situation is seen as the primary goal of action. Hence, the approach accepts different outcomes under identical conditions.

AST – seven hypotheses:

1. ICTs provide *structures*<sup>20</sup> which can be described in terms of their *spirit*<sup>21</sup> and *features*. Diverse sets of spirits and features cause different forms of interaction with the technology.
2. Use of ICT structures varies, depending on other contingencies that offer other sources of structures.

<sup>20</sup> Structuration is the process of rules and resources from ICTs—or some other source of structure—brought into action (DeSanctis & Poole, 1994).

<sup>21</sup> AST proposes that each ICT carries a certain *spirit* that guides individual users. However, the spirit materializes only when users appropriate the ICT. This means that certain users may choose to use an ICT consistent with the spirit, or not in line with the spirit.

- 3 & 4. New sources of structure emerge as ICTs and other sources of structure are applied during interaction.
5. New structures emerge in interactions as the *spirit* and *features* of ICTs are *appropriated*<sup>22</sup> in a given context and then reproduced in group interactions over time.
6. Decision processes vary depending on the nature of ICT appropriation.
7. The nature of ICT appropriation varies depending on the group internal system.
8. Desired outcomes will be achieved when structures, such as ICTs, are ideally *appropriated* to decision processes that fit the task at hand.

AST specifically focuses on changes that occur when ICTs are introduced in social settings and communication processes. AST assumes that the effects of ICTs are not a function of the ICTs themselves but of the way they are used. Structures, like ICTs, can be divided into *structural features* and *spirits*. *Structural features*<sup>23</sup> deal with the specific rules, resources, and capabilities of the technical parts of ICTs, while *spirit* deals with the *intention* that the technology features. The *spirit* of an ICT involves “the general goals and attitudes the technology aims to promote” (Poole & DeSanctis, 1990).

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<sup>22</sup> When ICTs are brought into action, they are *appropriated* in a certain way. This means that a particular ICT may be appropriated differently, from one group to the next, because “Each group forms its particular amalgam of structural features which it employs in its practices” (Poole and DeSanctis, 1990, p. 180). ICTs are appropriated (realized) through actual user behavior, and not by deterministic features of the ICTs themselves.

<sup>23</sup> In addition to the ICTs, the task at hand, the organizational environment, organizational culture, rules and regulations—all are potential sources of structure. Hence, these structures also influence how a particular ICT provides structure. Different groups may therefore *appropriate* a certain ICT differently based on: (1) direct use of the structure; (2) relating the structure to other structures; (3) constraints or interpreting the structures as they are used; (4) making judgments about the structures.

Furthermore, the concept of *spirit*, or “interpretive flexibility,” as labeled by Orlikowski (1991), assumes that the realization of any ICT may differ between situations, and the ICT itself can change as individuals change their mode of using it. Furthermore, a certain ICT may be *faithfully* or *unfaithfully* appropriated. This means that users may choose to use an ICT either consistent with the *spirit* or inconsistent with it. Furthermore, the *potential* of any ICT is open-ended. Although it isn’t difficult to list a tool’s intended functions, its actual uses prove as varied as the goals it supports (DeSanctis et al., 1993). In addition, users have *agency* in that they constitute, give meaning to, and add value to ICTs (Eisenhardt, 1989). According to Contractor and Eisenberg (1990, p. 143): “There is no such thing as a pure technology. To understand technology one must first understand social relationships.” In other words, until applied by a user in a specific context, technology is “simply dead matter” (Poole and DeSanctis, 1990, p. 178).

AST continues to be an influential perspective in explaining how groups appropriate different ICTs through social construction (Hollingshead & Contractor, 2002; Spears et al., 2000). Hollingshead and Contractor further argue that while AST is often used to explain how ICT use unfolds in complex processes, it is critiqued for being indeterminate, vague, and difficult to “test” in a given context. Rice (1992) has argued for more theoretical structure and a need to identify the underlying processes that might explain or predict ICT use. Similarly, Baym argues that researchers are left “without precise pointers about where to look or what to look for in search of appropriation” (1995, p. 150). Orlikowski (2000) argues against the notion that ICTs embody certain *stable structures* and are “static and settled artifacts with built-in arrays of fixed and determinate structures” (p. 406). In the final theoretical framework review here, I will take a closer look at Orlikowski’s practice-lens perspective of technologies-in-practice.



### 3.5.4 Practice Lens

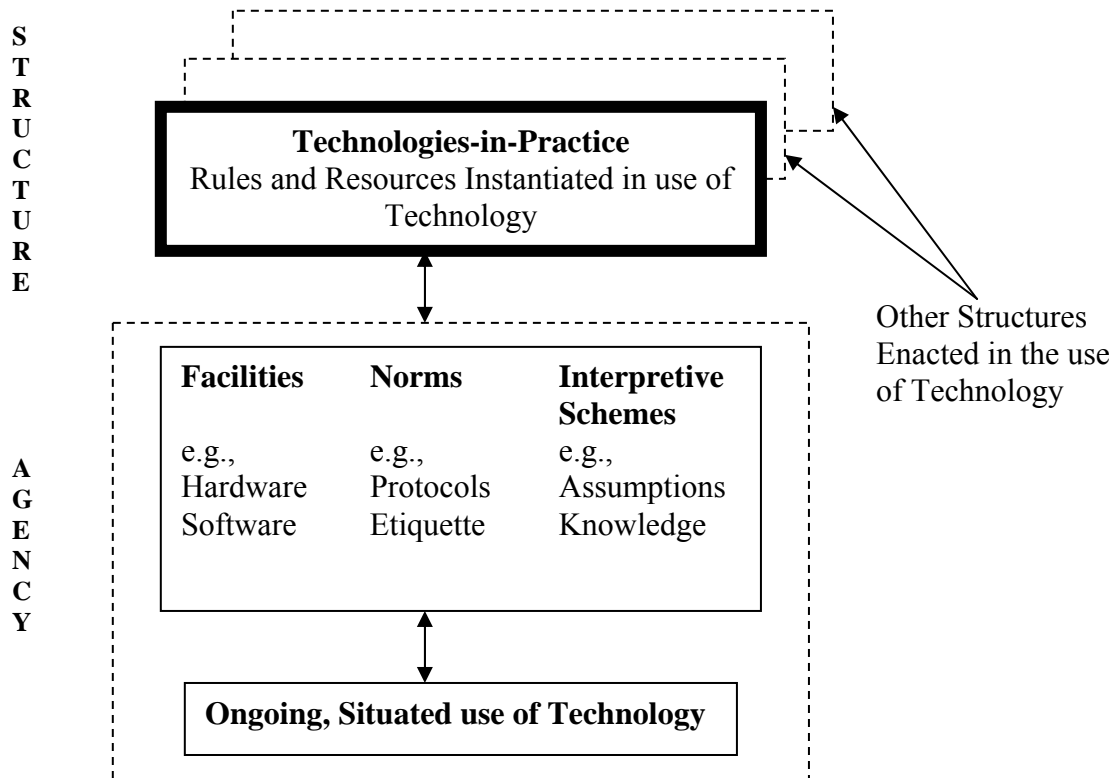
Recently, Orlikowski (2000) expanded previous work on structuration, developing a “practice-lens” to study how individuals interact with ICTs. Orlikowski attempts to move beyond both the deterministic and social influence views to recognize that features of ICT are actually decided by users. According to the “practice lens” approach, individual ICT use is understood through use in a specific context. Orlikowski argues that ICTs themselves change over time, and this can perhaps explain why people use technology differently if they change jobs or have new communication responsibilities. The “practice lens” perspective contrasts with AST (DeSanctis & Poole, 1994), as laid out in the previous section, which claims that structures are embedded within ICTs. While acknowledging that AST argues a *dualistic* view of ICT use, Orlikowski is critical of the argument that embedded features within ICTs shape use. In contrast, her focus is directed at how individuals personally adapt ICTs, while recognizing that the technology itself remains constant. Thus, “rather than starting with the technology and examining how actors appropriate its embodied structure, this view starts with human action and examines how it enacts emergent structures through recurrent interaction with the technology at hand” (Orlikowski, 2000, p. 407). Orlikowski further asserts, contrary to AST, that ICTs are not *stabilized* after development, since individuals can adapt them to specific purposes, time after time. Hence, the “practice-lens” view argues social construction of ICTs beyond the so-called “embedded features” of a particular communication technology.

#### Emergent and enacted

Two central tenets in the “practice lens” perspective are that ICTs are “enacted” and “emergent.” “Enactment” refers to the actual practices of users as they appropriate specific ICT features and produce structured patterns of action through their repeated behaviors. According to this view, *impacts* or

*consequences* of ICTs are enacted by users rather than determined by specific *embedded structures* of the ICT. This enactment process presupposes that ICTs must be used before they are capable of shaping work patterns (e.g., a cellphone must be turned on to enable people to reach you when you're not at the office). While AST provides a framework for analyzing how *embedded structures* of ICTs are used, misused, or not used by individuals in various contexts, the "emergent" perspective in the "practice lens" argues for more focus on human action. Orlikowski observes, "Focusing attention on how structures are constituted and reconstituted in recurrent social practice acknowledges that while users can and do use technologies as they were designed, they also can and do circumvent inscribed ways of using technologies" (p. 407). An example of this can be found in Whittaker and Sidner's (1997) study of Lotus Notes. They found that while email was originally designed for simple information-exchange purposes, it is now also used for task management and personal archiving. These additional "features" of the ICT are socially constructed in practice. Orlikowski's "practice-lens" perspective on "technologies-in-practice" demonstrates how structural properties of social systems are enacted through three modes of mediation: facilities, norms, and interpretive schemes (see Fig 6).

Figure 6 - Enactment of Technologies-in-Practice



Adapted from Orlikowski (2000)

When individuals use ICTs, they draw on these three modes in order to structure their recurrent interactions. Specifically, ICT users draw on a technical artifact's properties (e.g., software and hardware functions, specific data content); on their own knowledge of the relevant conventions of the context of use (norms); and on their own knowledge, skills, and assumptions about the ICTs (interpretive schemes). Hence, individuals' use of ICTs becomes structured by meanings, experience, habits, power relations, and norms, which consequently enact structures for future use as individuals continue to use ICT "in practice" (Orlikowski, 2000).

### **3.5.5 Summary of Social Constructionist and Emergent Perspective**

The social constructionist and emergent perspective challenges some of the central tenets of the deterministic and rational choice models such as media richness. According to the social constructionist and emergent perspective, social interaction, such as using the telephone or communicating FtF, creates shared meaning between people. Relevant to organizations, this means that statements, behavior of co-workers, behavioral norms, and social definitions of rational behavior are key influences on the use of ICTs (Fulk, 1993; Webster & Trevino, 1995; Kling 2000). This implies that the use of ICTs is very community-centered (Orlikowski, Yates, Okamura & Fujimoto, 1999). Users of different communities, such as organizations and national cultures, construct their own unique way of ICT use (Fulk et al., 1996). Hence, ICTs may serve as general-purpose tools and facilitate a range of tasks and functions across different contexts. Weick (1990) labels this “equivokes,” indicating the open-endedness and many plausible interpretations of ICTs. Lee (1994), for example, found that email is a “rich” communication channel. This turns the deterministic view of “richness” completely around, based on earlier theories suggesting that email is a “lean” medium.

### **3.6 Summary of Literature Review**

The purpose of this literature review, as explained in my introduction to this chapter, has been to provide examples of theoretical frameworks prevalent within the larger research program of ICT use. The structure used has sought to identify two meta-theoretical frameworks—technological determinism and social constructionist and emergent—and showcase some theoretical perspectives under each. While I have selected only a few, our goal has been to address those of particular importance to this research project (especially the social construction/emergent), in addition to providing examples of a few mature theories to display the depth of the historical developments of the area. Due to the inductive nature of this research project, the goal has not been to review and

critique current research in order to formulate an hypothesis for subsequent testing. Instead, our goal has been to provide an overview that identifies, broadly, what we know, and don't know, within this field to date.

A common critique of the deterministic theories is that subsequent testing has produced mixed results. Orlikowski (2000) argues that deterministic approaches are based on false premises, for they presume that ICTs embody certain *stable structures* and depict “static and settled artifacts with built-in arrays of fixed and determinate structures” (p. 406). In her view, this assumption ignores users’ ability to modify ICTs, and their conceptions of them, long after they are designed. Another likely explanation can be that as we isolate ICT use from actual practice, as prevalent in many studies reviewed, we lose the ability to see how ICTs are used *in combination* to achieve tasks. Walther and Parks (2002) explain that both observational and experimental studies of ICT use often find results that illustrate how people use lean media for rich communication. They claim that “communication efficiency may rest on sequences or combinations of media rather than on isolated choices about a single medium” (p. 534). They further speculate that communicators may not search for the “best” or most optimal ICT for a given task because that task is part of a larger strategy. Our own findings in Chapter Five (Stephens, Browning, Sørnes, & Sætre, 2002) confirm this point since we found that communicators regularly satisfice—make suboptimal choices because of organizational constraints and receiver communication preferences, among other reasons. Furthermore, even in simple tasks, experienced ICT users often send an email and then call on the telephone to verify that the information was received and understood. Sequence of ICT use is important and it can be affected by things such as the organizational environment and communication structures (Browning, Sørnes, Sætre, & Stephens, 2003).

Hollingshead and Contractor (2002) criticize AST in particular for being indeterminate, vague, and difficult to “test” in a given context. Similarly, Baym, referring to AST, argues that researchers are left “without precise pointers about where to look or what to look for in search of appropriation” (1995, p. 150). Today, organizations are not passive receivers of new ICTs, and seldom do they attempt to implement them in rational ways (Contractor & Eisenberg, 1990; Fulk, Schmitz, & Steinfeld, 1990). Moreover, when work-related practices depend on new ICTs for carrying out communication and business tasks, these technologies will invariably have some impact on an organization. However, both organizations and their workers will have a say in how they are implemented and used. In other words, the interactions between ICTs and organizations are recursive. But, as demonstrated, particularly with Orlikowski’s “practice-lens” perspective, this recursive interaction also takes place at the micro-level. That is, not only do technological, organizational, and social factors interact with each other, they also interact within their particular groups (Badham, 1995). What has become clear from reviewing theories situated within the social constructionist and emergent perspective is that research on ICT use is complex because it goes beyond the deterministic focus where ICTs are thought to have embedded features capable of influencing both organizations and the people using them. Thus, research on the relationship between ICTs and organizations (DeSanctis & Fulk, 1999) has demonstrated that this relationship is highly unpredictable, and more like an emergent process (Dutton, 1999; Fulk & DeSanctis, 1999; Poole & DeSanctis, 1990).

Flanagin and Metzger (2001) have noted: “Despite current studies, however, we do not yet have a thorough understanding of individuals’ motivation for media use in view of their many options in today’s complex media environment. This observation, coupled with the rapid development of and sparse research on the Internet as a communication and information tool, suggests that many questions about individuals’ media choice and use remain unanswered.” (p.154).

### Theoretical underpinning of this research

Following Orlikowski and Iacono's (2001) view of ICTs as "ensemble," this project seeks to understand ICT use within a certain socio-technical, constructed, and emergent context. Thus, as I don't rely on a deterministic logic, dependent and independent variables can be defined. On the contrary, the focus, at the outset, is on the complexity of human sense-making as it actually emerges in practice (Klein and Myers, 1999). While this research is not theory-testing, our theoretical underpinning relies on both AST and Orlikowski's "practice-lens" because these works provide a suitable conceptual basis for the research to the extent that it is grounded in human action and inherently dynamic and emergent. This also follows Orlikowski's claim that her "practice-lens" is particularly well suited for studying emergent and ongoing use of ICTs in situated practice (Orlikowski, 2000). Similarly, Sydow and Windeler (1997), inspired by Giddens (1984), have labeled AST as *an ontology of potentials*.

## 4 Research Methods

This chapter will introduce and spell out the specific methodology used to conduct this dissertation research project. I will first provide a review of the conception and evolution of Grounded Theory (GT), and then move on to the research design and steps involved in this particular project.

### 4.1 Historical Backdrop and Evolution of Grounded Theory

More than 30 years ago, Barney Glaser and Anselm Strauss published their seminal book *The Discovery of Grounded Theory* (1967). While it was controversial at the time, particularly among positivistic researchers, it is today widely celebrated beyond its original field of sociology. The methodology emerged as an alternative strategy to more traditional approaches, which relied greatly on hypothesis testing, verification techniques, and quantitative forms of analysis. Grounded Theory (GT) is often claimed to fall within the research paradigm of American pragmatism and interactionism—and in particular, symbolic interactionism<sup>24</sup>—within the field of sociology. In short, symbolic interactionism, expressed through its forefathers William James, George H. Mead, John Dewey, and in later years Herbert Blumer, promotes a way of thinking or conceptualizing that focuses on the meanings of events to people in natural settings. Using this approach, GT provides a means of studying human behavior and interaction, creating new perspectives, and understandings of common behavior (Blumer, 1969). Thus, meaning is created, handled, and

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<sup>24</sup> According to Blumer, social actors are not merely a product of the structural elements of their society but how they actively shape their environment. Thus, society for Blumer is not the product of structural or deterministic factors. To the contrary, society is composed of many social actors, all of them interacting and with each person reflexive in their own definition of the situation. Blumer states that symbolic interactionism rests on three simple premises: (1) Human beings act towards things on the basis of the meanings that those things have for them. (2) Meanings of such things occur through social interaction (e.g., we only recognize a cellphone as a way to communicate with people because we are taught this through our interaction with others). (3) Meaning is handled and modified through an interpretative process by the person who is interacting with any given object. This means that social life is an ongoing process of activity whereby the social actor interprets the situation that confronts him and acts accordingly (Blumer, 1969).



modified through an ongoing interpretative process wherein people interact with each other or any given object. Furthermore, social life is an ongoing process of activity whereby the social actor interprets the situation that confronts him and acts accordingly (Blumer, 1969). This logic is in line with the ontological and epistemological assumptions of the interpretivistic research perspective detailed in Chapter Two.

Today, qualitative studies of psychology, education, management, information science, organizational science, and health sciences make use of GT. The 1967 monograph was, for a long time, the only methodological reference on GT, but in later years, perhaps best illustrated by Strauss and Corbin's work (1998), more procedural references on the methodology appeared. Strauss and Corbin's book challenged the original work in the monograph, which in turn inspired Glaser (1992) to write a rebuttal. A related issue deals with the many adaptations made to the GT method as it has spread to other domains— "adapting and integrating them with the logic and practices from other qualitative analytic styles" (Locke, 2001, p. viii). As a consequence, the GT approach cannot simply be described and referenced by the groundbreaking work of Glaser and Strauss alone. Before giving more substance to our interpretation and use of GT in this particular project, I will first provide a historical backdrop and offer arguments for its relevance to organizational studies.

#### **4.2 Linking Grounded Theory to Organizational Communication**

The studies contained in this dissertation relied on a GT methodology, and thus did not rely on an *a priori* conceptual framework. GT was chosen primarily for its ability to generate descriptive and explanatory accounts of contemporary organizational ICT use behavior by advanced users. The GT approach has been effectively used in similar organizational research (Fernandez 2001; Maznevski

& Chudoba, 2000; Nandhakumar & Baskerville, 2001; Orlikowski, 1993; Partington, 2000; Zafeiriou, Nunes, & Ford, 2001).

Grounded Theory has been one of the most prevalent qualitative methods used in studies of organizational behavior over the last 30 years. One explanation for its popularity in management studies, and organizational settings in particular, is that the major theoretical focus in this field is on distinct matters like decision-making, communication, socialization, and change. According to Locke (2001) “Grounded theory is particularly useful for examining those situated processes” (p. 45). As to ICT’s use and implementation in organizations, Orlikowski (1993) explains that the GT approach is well suited because

The complexities of the organizational context have to be incorporated into an understanding of the phenomenon, rather than be simplified or ignored ... a number of theoretical approaches emphasize the criticality of organizational context in shaping technology use in organizations ... and the use of a grounded theory methodology allowed the inclusion and investigation of this key organizational element. (p. 312)

Furthermore, organizational studies are predominantly interested in behavioral issues of groups and individuals—again, a research focus where GT and its interactionist tradition are useful (Glaser, 1992; Locke, 2001).

In addition to our justification for using GT when studying ICT use in organizations specifically, more general arguments relevant for the organizational and management science can be identified. Locke (2001) argues that GT is appropriate when researching individuals in organizational settings for four reasons: capturing complexity, linking well to practice, supporting the theorizing of “new” substantive areas, and enlivening mature theorizing.

### Capturing complexity

Grounded Theory is well suited for capturing contextual complexities of action as it unfolds or is told, enabling researchers to better identify what is going on in a particular substantive area (Locke, 2001). Similarly, Martin and Turner (1986) argue that GT is suited to study complex entities due to its ability to produce multifaceted accounts of human action in context. As mentioned earlier, Orlikowski (1993) advocates the use of GT when investigating the implementation and use of ICTs in organizations because it enables researchers to better understand the complexity involving adoption and use of such technologies in specific contexts.

### Linking well to practice

According to Glaser and Strauss (1967), good theory must be pragmatic and useful. Otherwise, practitioners, be they nurses or engineers, will not be able to understand, identify, and, not least, implement suggested changes from the substantive GT. For example, Glaser and Strauss' (1964) theories on patient-nurse relationships had great impact on nurses, giving them new and intelligible insight about how to provide better care for their patients. These new theories were powerful because they were grounded in existing practices, and through their pragmatic analysis, they helped the practitioners see things in a new light.

### Supporting theorizing of “new” substantive areas

Central to GT is the discovery of new theory, grounded in current practices or observations. Data collection in naturalistic settings, such as workers' ICT practices in organizations, allows researchers to carefully develop new substantive theory<sup>25</sup> as new ICTs arrive on the scene (Locke, 2001). New ICTs can potentially have revolutionary effects on existing structures and usage

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<sup>25</sup> By “substantive theory,” Glaser and Strauss (1967) mean development of theory, empirically, in a specific area such as patient care or professional education. “Formal theory,” on the contrary, is a conceptually derived theory within sociological inquiry, such as stigma, deviant behavior, and socialization. Hence, substantive theory is prior to formal theory, and it is closely linked to a practice domain.

patterns within organizations, and GT can allow researchers to “discover” such impacts. Eisenhardt and colleagues, for example, successfully adopted the GT method to investigate organizational features of decision-making behavior in high-technology organizations (Brown & Eisenhardt, 1997; Eisenhardt, 1989; Eisenhardt & Bourgeois, 1988).

### Enlivening mature theorizing

The GT approach is also used extensively to distinguish new theory from existing theory (Strauss, 1970). By utilizing a GT approach in ICT-use research, researchers can make adjustments or new discoveries from existing theories. One example of enlivening mature theories by using new empirical data, taken from this study, is our paper on culture where Hofstede’s (1980) framework for national culture differences is used to compare contemporary ICT usage patterns. A more general example from the organizational sciences is *punctuated equilibrium theory*. Its theoretical underpinnings fit very well industrial restructuring due to radical innovation, or what Tushman and Romanelli (1985) call *discontinuous innovations*. The GT approach may therefore serve an important purpose in ensuring that theories stay current and thus able to explain contemporary phenomenon (Locke, 2001).

### Grounded Theory and ICT use

In addition to these four general arguments about the suitability of GT in organizational studies, a few more specific arguments can be made pertaining to this project. Given the paucity of empirical research, as laid out in Chapters One and Three, concerning the use of multiple ICTs in an emergent contemporary media environment, an inductive<sup>26</sup> qualitative approach was chosen. This follows suggestions that whenever the topic of inquiry is emergent or ill-defined,

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<sup>26</sup> In hypothetico-deductive models of research, the investigation begins with theory, and then moves from the definitions of concepts and their proposed relationships on to the “real world” where they are tested. In Grounded Theory, an inductive process, this order of events is reversed as it moves from empirical observations to the definition of concepts and their relationships (Locke, 2001).

it should be explored in the field using a qualitative methodology (Patton, 1990; Steinfield & Fulk, 1990). Strauss and Corbin (1990) explain that qualitative research is useful for giving “intricate details of phenomena that are difficult to convey with quantitative methods” (p. 19). Also, GT is particularly adept at registering variation because of the flexibility it gives researchers to modify their analyses as further data are gathered (Charmaz, 2000). Thus, by targeting naturalistic settings, and meeting people on their home court, we are better able to capture how they use various ICTs. As demonstrated in the literature review in Chapter Three, theoretical approaches emphasize the criticality of both organizational context and technological features. Grounded Theory allows us to explore this complex and reflexive relationship. Finally, GT facilitates “the generation of theories of process, sequence, and change pertaining to organizations, positions, and social interaction” (Glaser and Strauss, 1967, p. 114). As indicated in Chapter One, the potential impact of new ICTs on organizations and its members, and visa versa, is a process that is highly dynamic and constantly changing. An example in our data illustrating this is the impact on ICT use of the September 11<sup>th</sup> terrorist attack on the Twin Towers in New York City.

From this short introduction to GT, its history, philosophical principles, and some arguments pertaining to the appropriateness of using it in organizational studies, and ICT use in particular, I now move on to a more detailed discussion of the GT procedure carried out in this project.

### **4.3 Glaser vs. Strauss**

The procedures of GT were first outlined in a 1967 monograph (e.g., constant comparison, coding procedures, and theory write-up). But later publications by Strauss and Corbin (1990, 1998) and Glaser (1992) laid out important differences in how they envisioned GT and its use. Consequently, it can be argued that the work in the monograph has evolved into two distinct methodologies, or schools-

of-thought, each with its own epistemology and properties (Cutcliffe, 2000). It's important to look closer at the "battle" between Glaser and Strauss because there are fundamental principles and operational properties of GT methodology which can affect its execution throughout the various stages of the research process, and ultimately affect the conclusions reached (Charmaz, 2000; Locke, 2001). While detailed descriptions and interpretations of the epistemological differences between Glaser and Strauss have been explicated elsewhere (e.g., Charmaz, 2000; Cutcliffe, 2000; Hartman, 2001; Glaser, 1992; Strauss & Corbin, 1990, 1998), my focus will be geared toward justifying my own approach. Thus, I follow the advice of Cutcliffe, who says, "providing that the researcher explains what she/he has done and how she/he did it, staying outside of the boundaries of one particular version is less of an issue than limiting the potential depth of understanding that strict adherence to one version would produce" (2000, p. 1483). Based on this argument I will not attempt to tie every methodological decision to either Glaser or Strauss. But a few general observations are in order to justify our approach. (See also the section on data analysis for further detail.)

Glaser's (1992) approach towards GT's operational practices tends to focus on flexibility and openness in the description of analytical steps in the discovery of theory. Strauss and Corbin's (1990, 1998) approach, on the other hand, "tends towards increased prescription and formal elaboration of operational procedures" (Locke, 2001). Many novice researchers—in particular, graduate students like myself—will often prefer the Strauss and Corbin "version" of GT due to the step-by-step process description (Hartman, 2001). While it's fair to claim that the current research was conducted primarily following the procedures detailed in Glaser and Strauss (1967) and in Glaser (2002, 1998, and 1978), a few key clarifications are in order.

### An open mind vs. an empty head<sup>27</sup>

One of the most frequently discussed differences between Glaser and Strauss in the literature focuses on a major premise of the 1969 monograph: entering the field as a *tabula rasa*. While this research wasn't driven by any *a priori* conceptual framework, it would be disingenuous to argue that the researchers were not inspired and sensitized by existing concepts and terms. In fact, the research group had some knowledge about existing scholarship in the area of media use prior to data collection. This awareness of the literature was crucial in order to identify the dearth of existing knowledge, which in turn led us to choose GT as an appropriate avenue for further investigation. As far as reviewing literature throughout the research process, sometimes referred to as “the second review of literature” (Cutcliffe, 2000; Strauss & Corbin, 1994), this was conducted during the later stages of data collection and analysis. But, as our data analysis progressed, and categories emerged, I was inclined to turn to new bodies of literature.

While Glaser (1992) is still critical of any type of literature review prior to studying a phenomenon, Lincoln and Guba (1985, p. 208) argue in favor of this, and claim, “Admitting tacit knowledge not only widens the investigator’s ability to apprehend and adjust to phenomenon in context, it also enables the emergence of theory that could not otherwise have been articulated.” One of the 20th century’s most influential philosophers of science, Imre Lakatos, offers the following reflection about scientific discovery in general:

...for classical empiricists the right mind is a *tabula rasa*, emptied of all content, freed from all prejudice of theory. But it transpires from the work of Kant and Popper—and from the work of psychologists influenced by them—that such empiricist

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<sup>27</sup> Dey, Ian (1993). *Qualitative Data Analysis: A User-Friendly Guide For Social Scientists*. London & New York: Routledge.

psychotherapy can never succeed. For there are and can be no sensations unimpregnated by expectations and therefore there is no natural (i.e., psychological) demarcation between observational and theoretical propositions. (Lakatos, 1970, p. 99)

Similarly, Turner (1981) argues that GT researchers should allow the interplay between knowledge, values, beliefs, and the data to occur—to allow for the exploration and articulation of theoretical links. Consequently, by not allowing researchers access to this knowledge and by restricting the creativity necessary to use it, will possibly limit the in-depth understanding of the phenomenon (Turner, 1981; Cutcliffe, 2000). In the following I will provide a detailed description of our methodological approach.

#### **4.4 Research Sampling, Participants, and Sites**

The sampling procedures reflected the overarching research question:

*How do workers use ICTs to meet business objectives when a full array of ICTs is available to them?*

Hence, we targeted high-end ICT users in organizations. The rationale for selecting high-end users is based on Pettigrew's (1990) argument that this might serve as a lens to magnify the research topic or research phenomena. In our project, this was addressed by targeting workers with considerable experience with ICTs at work. Another argument for targeting experienced users is to minimize the so-called "wow factor," meaning that usage levels are stabilized following initial exposure to new ICT (Hudson, 1997). However, a more detailed explanation for our sampling procedure is warranted. We used a theoretical sampling method (Eisenhardt, 1989), as opposed to a random sample, whereby individual respondents were chosen based on their experiences, ability to reflect, and ability to articulate the information solicited (Morse, 1991; Patton, 1990).



### Wide vs. narrow sampling

Another issue pertinent to sampling that needs justification is that of *wide* vs. *narrow* sample (Cutcliffe, 2000). Advocates of wide sampling procedures argue that this ensures extensive data that covers behavior in varied situations and with maximum variation (Hutchinson, 1993; Lincoln & Guba, 1985). Those supporting narrow sampling of participants, meanwhile, claim that only people who have “the most experience” in the area of interest should be interviewed (Morse, 1998). They question whether others, not having the same shared experience of the social or psychological process under study, can comment on it. We argue for a combination of these two approaches, as we have a narrow sample of high-end ICT users, and a wide sample within this “category” of high-end users spanning cultures, industry, gender, and generations. This follows Glaser and Strauss’ (1967) suggestion of selecting participants for their similarities as well as their differences. Such a selection process ensures that the substantive area addressed in our project was kept similar, or, as Eisenhardt (1989) notes, “is likely to replicate or extend the emergent theory” (p. 537). Hence, our sample consisted of people in various levels of management who worked for organizations based in Norway and the United States. The industries represented were diverse in both size and type. They included e-learning, farming, fish-farming, higher education/R&D, medicine, the law, software-production, telecommunications, semiconductors, oil and gas, and government agencies (see Appendix C for a complete list). They consisted of a cross-section of users from different functional areas, ethnicities, professional and organizational tenure, and genders. These differences in organizational conditions allowed useful contrasts to be made during data analysis, which challenged and elaborated the emerging concepts.

### Data collection

The data was collected over a two-year period, from Fall 2000 through Fall 2002. During this time, four researchers conducted 72 individual interviews—36 in the U.S. and 36 in Norway. Each interview lasted 45–90 minutes and was audio-recorded. To collect the data, we used semi-structured, in-depth interviews. Because this research involved many sites and multiple interviewers, and because we wanted to maintain cross-case comparability (Miles & Huberman, 1994), we felt it especially important to use a similar format for all our interviews. To ensure this consistency, we created an interview guide based on Spradley's (1979) "grand tour type" design (see Appendix B). This approach focuses on relaxing participants during the data-collection process, and it also invites detailed responses from them. The interview guide began with questions focused on how participants used ICTs in their daily work. From this point, questions moved on to a more interactive level by querying interviewees about their ICT use when working with others. The recordings of these interviews, once transcribed, resulted in over 2,000 pages of text. The Norwegian data set was translated into English by the two Norwegian interviewers. Then these two researchers carefully verified each other's translations to ensure contextual and semantic accuracy. The transcription and translation were done side-by-side on a word processor. We found this to be helpful not only while doing the actual translation of interview text, but especially during coding and analyzing, as the Norwegian researchers could constantly compare and identify possible misinterpretations in the translation line-by-line (see Appendix D). While many influential writers on GT (Glaser and Strauss, 1967; Glaser, 1998; and Strauss and Corbin, 1998) have been critical of taping and transcribing interviews because they believe it distracts from the "real process" of discovery of social phenomenon, our research team found it to be the only way to handle our bilingual dataset. Transcribing interviews was warranted in order to allow subsequent translation, which in turn allowed the American researchers to work with the Norwegian interviews. Strauss and Corbin (1998) generally discourage

translation of interviews because meaning “is lost in translation (quoting Hoffmann, 1989), and because of large overhead costs. While I concur with the latter argument, our translation of the interviews will always be subject to scrutiny. Being aware of this, the Norwegian researchers in the group sought to overcome possible misunderstanding or misinterpretations by going back to the original Norwegian text when needed, and also in part by working with the original Norwegian text as much as possible.

### Strengths and weaknesses of interviews as a method for data collection

It is important to recognize the various strengths and weaknesses associated with semi-structured in-depth interviewing as a method for data collection. As laid out by Lincoln and Guba (1985), and Patton (1990), strengths with this method includes: (1) The researcher can move back and forth in time to construct the past, construct the present, and predict the future, (2) gather information systematically about complex and sensitive issues, and (3) gain new insights and perceptions. It is equally important to recognize the weaknesses involved with this method, including: (1) Highly reflective of interviewee's perceptions and biases, (2) reliance upon the interviewees ability to recall, (3) influences by interviewee's physical and emotional state and appearance, and (5) depend heavily on the interviewing skills of the researcher (Lincoln and Guba, 1985; Patton, 1990). To safeguard against some of these weaknesses, or risks, associated with interviewing, I was able to observe and co-conduct interviews with the more experienced researchers in the team.

### Data analysis

Data analysis was conducted according to the procedures detailed in Glaser and Strauss (1967) and Glaser (2002, 1998, and 1978). Consequently, we did not follow the later work by Strauss (Strauss & Corbin, 1990, 1998). Given their distinctive uses of the method (see Charmaz, 2000, for a review of these differences), we followed Glaser's method because it gives particular guidance

for developing concepts and models from data. He places importance on generating concepts directly out of the field data rather than simply accepting the “received” concepts of previous researchers (p. 2). Glaser recommends focusing on the emergent conceptualizations of the data and generating integrated patterns that lead to abstractions.<sup>28</sup>

In analyzing the data, we used *constant comparative analysis* (Glaser & Strauss, 1967; Glaser, 1998). This research is aligned with the constructivist approach to GT because it assumes that “categories, concepts, and theoretical level of analysis emerge from researchers’ interactions with the field and questions about the data” (Charmaz, 2000, p. 522). The strength of this method is its inductive progression from detail to abstraction (Browning, 1978). The constant comparative method involves several steps, and it’s important to emphasize that these steps of data analysis, including data collection, are iterative and overlapping. They include: (1) comparing incident applicability to each category, (2) integrating the categories and their properties, (3) delimiting the theory, and (4) writing the theory (Glaser & Strauss, 1967). The first three steps will be addressed in the following discussion on open and selective coding, while the fourth step, writing the theory, is described in our findings in Chapter Five.

What distinguishes GT from other qualitative methodologies is the constant comparative method, in that data collection and data analysis are overlapping, which in turn enables the researcher to modify the emerging theory should further data be gathered (Glaser, 1978, 2002; Charmaz, 2000; Glaser & Strauss, 1967). According to Eisenhardt (1988), this “not only gives the researcher a head start in analysis, but more importantly allows researchers to take advantage of flexible data collection. Indeed, a key feature of theory-building case research is the freedom to make adjustments during the data collection process” (p. 539). As concepts emerge during the early stages of data collection and analysis, later

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<sup>28</sup> But some of these abstractions, at least indirectly, stem from our knowledge of previous research and theory.

interviews allow the researcher to elaborate, contrast, and qualify initial patterns and interpretations of the data (Orlikowski, 1993). Because each of these stages in GT analysis has different characteristics and analytical focus, I will now explain how we approached analysis.

### Open coding<sup>29</sup>

The first step in the microanalysis of data is called “open coding,” or “line-by-line analysis,” and involves breaking down data into discrete parts that are in turn examined and compared to other parts for differences and similarities (Glaser, 1998). This process can be further broken down into two main steps: (1) incident identification, and (2) categorization. For the first step, Glaser (1978) advocates a line-by-line inspection of the data, in this case involving 2,000 pages of transcribed interviews, to gain a full theoretical accounting of the data. We started by identifying individual units of data—called “incidents”—ranging from single sentences to short paragraphs. For example, “I always check my email in the morning when I get to work.” The example illustrates an *en vivo* code, taken either verbatim or in some interpreted form from the respondents. Or the incident can be coded and given a label based on analysis by the researcher (e.g., “email norms”). We used topic change as the demarcation for establishing incidents. Three of four researchers (the fourth conducted the particular interview, and did not code it) went through the 72 interviews, line-by-line, labeling the incidents; these were consequently combined into an Excel file (see Appendix E), and duplicates were removed. This initial process of labeling incidents is helpful for synthesizing the many observations and for providing insight into our research questions. The process resulted in 4,972 individual incidents.

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<sup>29</sup> Open coding deals with the first two steps in constant comparative method, while selective coding deals with steps three and four.

### Focused coding

The second step involves focused coding (Glaser, 1978), where we sorted incidents into a category system in order to generate a smaller, more manageable representation of the data. This procedure involved detailed scrutinizing of the 4,972 incidents, through constant comparison, where new data pieces were compared, contrasted, and verified in order to fit them into one of the emerging categories (Glaser, 1978). In this process, each new incident has the potential to redefine the property or meaning of existing categories, or prompt the researchers to create new ones. When comparing new incidents yields no new insight to a category, through its properties, saturation is achieved. According to Glaser (1998), there is no need to keep coding incidents on the category at this point. For example, the categories of email norms, telephone norms, and the value of face-to-face, to mention just a few, soon emerged as incidents were compared. But we didn't stop placing incidents into these categories, as we wanted to capture the richest possible sample of narrative examples for future use in writing up the theory. Further justification for this is offered by Glaser and Strauss (1967), who state:

If the analyst's purpose, besides developing theory, is also to count incidents for a category to establish provisional proofs, then he must code the incident ... to count for establishing provisional proofs may also feed back to developing the theory, since frequency and cross-tabulation of frequencies can also generate new theoretical ideas. (p. 111)

Once again, three of the four researchers participated, and since the three categorizers didn't always agree, a final categorization was undertaken. In this process, two of the four researchers independently categorized the entire data set. Then, by working together to resolve any disagreements, they achieved a "doubly categorized" data set that resulted in 59 categories (see Appendix F). Glaser and

Strauss (1967) refer to this reduction process as one of the vital procedures in the course of discovering what they term “core categories,” which leads into the next level of analysis—selective coding.

### Selective coding

The “core” categories are the central “story” which has emerged during stages of constant comparison, and all other categories that are created during focused coding will directly or indirectly be related to the core categories (Glaser & Strauss, 1967). Thus, other categories will shape the “core” categories’ actions, relationships, conditions, interactions, contexts, and outcomes (Glaser, 1998). Selective coding is a more conceptual treatment of the data compared to previous stages, and thus we examined each category to determine if it signified an event, a relationship, or a process, and how, if at all, it connected with other categories. During this stage, “the analyst learns to see his categories in terms of both their internal development and their changing relations to other categories. For example, categories such as email norms, telephone norms, FtF, use of paper, Palm pilot, and videoconference all collapsed into the core category labeled *communication channels*. As categories are reduced and reshaped during this stage of constant comparison, it is quite normal that the new core category, such as *communication channels*, will have multiple dimensions, complex properties, and even conflict, as a result of the properties inherent in the sub-categories (Glaser and Strauss, 1967). In the core category of *communication channels*, we found distinct theoretical differences between the subcategories. For example, while email allows for only asynchronous communication, the telephone allows for synchronous communication. Such differences may have serious implications in a given business situation. When such discoveries occur, Glaser and Strauss advise the researcher to “stop coding and record a memo on your ideas” (p. 107).<sup>30</sup> When working in a team, it is “also a good idea to discuss

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<sup>30</sup> “Memos are the theorizing write-up of the ideas about substantive codes and their theoretically coded relationships as they emerge during coding, collecting and analyzing data and during memoing” (Glaser, 1998, p. 177).

theoretical notions with one or more teammates” (p. 107). As our research team met once a week, such theoretical notions were discussed and recorded for future reference in writing the theory. Another important step in the analysis process deals with discarding categories not fitting with the emerging theory. We employed three strategies when dealing with this issue: (1) recoding incidents in “outlier” categories into other categories for better fit, (2) renaming and collapsing entire “outlier” categories with other categories, and (3) removing the category from the emerging theory because it didn’t fit. Such categories were not dropped entirely, but kept for future conceptualization and theory development from the data. By employing all the steps and procedures described in this section, the selective coding process reduced our total number of coded categories from 58<sup>31</sup> to 13 core categories.<sup>32</sup>

### Writing up Grounded Theory

Glaser and Strauss’ (1967) preference and advice to others is to pursue manuscripts, or write-ups, that richly illustrate the theory. They mention two ways of doing this, preferably in combination: (1) descriptive analyses of the emerging theory in their own voice, and (2) illustrations given in the form of narratives directly from data. Such a style of writing, labeled “telling” and “showing,” enables researchers to present their theory through a style of writing that moves back and forth between theoretical presentation and “live” snapshots from the field (Booth, 1961; Golden-Biddle and Locke, 1997). According to Glaser, this demonstrates authenticity by illustrating the direct relationship between theory and data (1998). Locke agrees: “The data incidents demonstrate that researchers authentically were present to and captured the realities of those they studied, while the theoretical points underscore that researchers understood the general significance of those particular incidents” (Locke, 2001, p. 117).

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<sup>31</sup> Two of the individual papers in Chapter 5 were based on an analysis of 42 interviews (first year). Hence, the total number of incidents and categories will not correspond with the description offered here.

<sup>32</sup> This reduction incorporates data from both years, and thus is not used as the basis for any of the contributions in this dissertation. The research group is currently working on write-ups based on this 13-category system.



The emphasis in the original work by Glaser and Strauss (1967) was discovering new theory from data, as illustrated by following all the steps in constant comparative analysis. In Chapter Five, papers three and four are empirical theory-building pieces. However, as described in the introduction of this chapter, an additional analytical feature of GT is that it can enliven existing theories (Strauss, 1970). The first two papers in Chapter Five illustrate this approach. In these two contributions we take advantage of the 59-category system as it serves as a database on ICT use. Furthermore, the fact that each raw code (incident) was attributed several sorting variables (e.g., nationality and gender) enabled us to sort the entire dataset in different ways. This functionality was achieved as we organized our data in an Excel spreadsheet.<sup>33</sup> We used the researchers' intimacy with the data, as well as searches in the Excel database, to select the narratives used for analysis in these papers. This is consistent with Glaser's (1978) view that researchers may flexibly draw on and construct frameworks based on the theoretical leads suggested by their data. However, as both Glaser (1978) and Strauss (1970) underscore, such use of the data can only be done as long as it has been carefully grounded in research. In the current context, this means, to use paper one in Chapter Five as an example, that we used as our starting point the 59-category system, already analytically conceptualized by constant comparison analysis. By looking at the properties of each of the 59 categories, we could determine if it had the potential to inform an existing theoretical framework, and from there we could search amongst the 4,972 codes for "rich" narratives.

### Writing styles and form

Glaser (1978) emphasizes that researchers should flexibly draw on and construct frameworks based on theoretical leads suggested in the data. This view is consistent with Weick's (1995) notion of "in process theorizing." As a

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<sup>33</sup> While I am now aware that there exists software to handle both data analysis and management (e.g., Nudist, Envivo, and Atlas.TI), I had invested a lot of time organizing our data into Excel, and thus could not afford to redo this work in the middle of the project.

consequence of this rather flexible approach, no predominant scheme of theorizing and presentation style has emerged in academic literature. Hence, theories can be composed in multiple ways, constrained only by plausible interpretations and by the researchers' creativity (Locke, 2001). In management and organizational studies, however, grounded theorizing seems to depict human action associated with decision-making. This is not surprising given the centrality of decision-making in organizations (Eisenhardt, 1989). The research presented in Chapter Five echoes this trend, by presenting our findings, often drawing on existing theoretical frameworks, to conceptualize human action in naturalistic settings. This form of "writing up" GT also varies across fields. The traditional way to present GT, echoed by the suggestions by Glaser and Strauss (1967), can be outlined as follows: summary of theoretical frame, sequential presentation of elements from the theory illustrated with data, and, finally, summary of the theoretical frame (Isabella, 1990; Locke, 2001). In recent years, however, alternative ways of presenting GT can be identified in the literature. Some authors advocate using propositions, research questions, and hypotheses in GT (Burgelman, 1994; Eisenhardt & Bourgeois, 1988; Hylmo & Buzzanell, 2002). While Glaser (1978) cautions against this form, claiming that researchers had a particular theoretical framework in mind from the beginning, others argue that the theoretical frame needs to be developed before the GT is presented and discussed.<sup>34</sup>

#### **4.5 Criteria for Judging the Quality of this Research**

Just as in quantitative research, *relevance*, *reliability*, and *validity* are the three chief criteria for soundness in qualitative research. Without assessing the *reliability* and *validity* of an instrument and/or research design, the results from analyses as well as the conclusions drawn from it cannot be upheld. Similarly, the quality criterion *relevance* is common to apply when judging the quality of

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<sup>34</sup> A little paradox to Glaser's study (1978), but also to Glaser and Strauss's (1967), is that in their own studies of dying (1965a, 1965b), they use literature in the opening to introduce the phenomenon to their audience.

research. A study's *relevance* is usually assessed from two perspectives: (1) A study may have high practical value but lack, or have limited, theoretical contributions. (2) A study may be scientifically significant but lack practical usefulness. The issues of theoretical and practical value will be addressed further in Chapter Six.

#### **4.5.1 The Problem with *Validity* and *Reliability* in Interpretivistic Research**

In qualitative studies generally, and in GT specifically, these concepts and definitions become problematic. The primary reason for this is that interpretivist research by definition makes it impossible to guarantee reliability in the traditional or objectivistic sense (in laboratory studies, for example, every effort is made to restrict the potential for varying effects). In interpretivistic studies relying on naturalistic inquiries, for example, there is often a dynamic interplay of multiple variables. Thus, obvious variations in time, actors, and contexts will lead to unpredictability. As a result, in interpretivistic research, such as GT, more emphasis is put on making a study pragmatically useful, lucid, descriptive, and understandable to other people (Guba & Lincoln, 1985). In order to make findings convincing, researchers must make underlying conceptualizations, procedures, and choices transparent. As noted by Walsham (1993), "the validity of an extrapolation from an individual case or cases depends not on the representativeness of such cases in a statistical sense, but on the plausibility and cogency of the logical reasoning used in describing the results from the cases, and in drawing conclusions from them" (1993, p. 15). Similarly, Yin (1994) argues that qualitative researchers' aim should be on analytical abstraction rather than statistical treatment of the data. In this project we have sought to be explicit about the above-mentioned issues, and I have offered detailed description and arguments for our steps earlier in this chapter.

#### 4.5.2 Framework for Assessing Soundness in Qualitative Research

While some attempts have been made to suggest stepwise procedures, or frameworks, for this in GT<sup>35</sup> (e.g., Strauss & Corbin, 1998), it is not possible to identify or define a standard for such procedures. This realization echoes Patton's realization: "There are no perfect evaluation designs, only more and less useful ones" (1990, p. 168).

As demonstrated above, the concepts for *validity* and *reliability* are based on a positivist approach, following a set of epistemological and ontological assumptions characteristic for this position; many argue that the same measurements cannot be used in interpretivistic research (Altheide & Johnson, 1994; Glaser and Strauss, 1967; Guba and Lincoln, 1989; Munkvold, 1998). Guba and Lincoln (1989) propose an alternative set of criteria for judging qualitative research, and Table 4 presents a set of parallel criteria comparable to *validity* and *reliability*. There, I describe the concepts *credibility*, *transformability*, and *dependability*, and explain common goals and tactics associated with each. Following Table 5, I offer further explanations for how these concepts related to the conventional ones of *validity* and *reliability*.

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<sup>35</sup> Glaser and Strauss (1967) avoid such terms as *validity* and *reliability*, and talk about *faithfulness*, *credibility*, and *trustworthiness* in relation to the constant comparative method. They introduce concepts like *fit*, *work*, *relevance*, and *modifiability* as criteria for judging the quality of theory.

Table 4 - Criteria for evaluating interpretive research

<b>Interpretivist criteria</b>	<b>Positivist criteria</b>	<b>Goal</b>	<b>Tactic</b>
Credibility	<i>Internal validity</i>	Establishing the match between the constructed realities of respondents (or stakeholders) and those realities as represented by the evaluator and attributed to various stakeholders	<ul style="list-style-type: none"> <li>• Field work</li> <li>• Discussion of data and results with fellow researchers, external peers, and informants (member checks)</li> </ul>
Transferability	<i>External validity</i>	Presenting a sufficiently detailed account of the findings as to enable the reader to judge how they can be transferred to other contexts	Thick description
Dependability	<i>Reliability</i>	Ensuring that methodological changes and the interpretive process are documented so that the reader can follow the process and the researcher's choices	<ul style="list-style-type: none"> <li>• Making the research process explicit</li> <li>• Making data available</li> <li>• Describing the logic used for moving from data to the final results</li> </ul>

Adapted from Guba and Lincoln, 1989; Miles & Huberman, 1994; and Munkvold, 1998

### Credibility vs. internal validity

According to Yin (1989), the *internal validity* criterion is not a suitable measurement<sup>36</sup> in explorative or interpretivist studies. While internal validity, in a positivistic sense, can be explained as the degree that variations in an outcome can be linked to controlled variation in a dependent variable, the aim of credibility is to ensure that such “causal” relationships truthfully mirror how

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<sup>36</sup> To Yin (1989), “reality” is a social construction, hence not concerned with causal relationships and objective truths.

things (i.e., the phenomena under study) really are. Glaser and Strauss' (1967) concept of "fit" roughly matches this criterion; they argue that categories and theories must be grounded in data from the phenomenon under study.

#### Transferability vs. external validity

While *external validity* seeks to describe the field to which findings can be generalized, *transferability* concerns the ability of researchers to describe their results in enough detail for readers (e.g., other researchers) to apply them to other settings. Hence, the burden of "proof" is reversed, from the researchers (external validity) to the receiver (transferability) (Guba and Lincoln, 1989). Geertz's (1973) concept of "thick description" is a known tactic for establishing transferability. Glaser and Strauss' (1967) concept of "work" is related to this criterion. They contend that theories and categories should provide interpretations, explanations, and predictions about what is going in the area under investigation.

#### Dependability vs. reliability.

*Reliability* commonly refers to whether a research technique will yield the same results if applied several times to the same object, even by another researcher. Implied in *reliability* is that data will be stable over time. This is not the case in interpretivistic research, where the researcher is involved in a hermeneutical process whose goal is fresh insight about the data through interaction (Yin, 1989). Hence, to imagine that other researchers can arrive at the exact same findings is highly unlikely. The goal of *dependability*, then, is to provide documentation of decisions and interpretations for readers to trace what actually have been done and how conclusions have been reached (Guba and Lincoln, 1989). Glaser and Strauss' concept of "modifiability," referring to a process where theory and categories go through a "loop" of changes as new data is gathered and analyzed, can roughly be compared to the hermeneutical process

involved in achieving *dependability*. In the next section I summarize some of the steps taken in this project.

### 4.5.3 The Current Approach

Many of the issues identified in the preceding section have already been described previously in this chapter, especially in the section focusing on data collection, analysis, and writing-up the theory. Still, I summarize some of these tactics more explicitly here:

- *Credibility* and *transferability* are attained by employing the *constant comparative method*, central to GT (Strauss & Corbin, 1999). As incidents in the data are identified, they are constantly compared and found similar to or different from existing incidents. This constant comparison enables researchers to place incidents in separate and unique categories (Glaser and Strauss, 1967).
- Another technique to increase *credibility* and *transferability* is *replication*, which entails collecting data from new informants until saturation is achieved. “Saturation” refers to the stage in the research process where little or no new insight is gained relevant to the emergent theory (Glaser & Strauss, 1967).
- A different tactic to improve credibility and transferability is to draw from published literature when presenting findings. Previous findings can be used to substantiate findings. They can also be cited to show why and how findings deviate (Cooper, 2001; Strauss and Corbin, 1996; Johnson, 1997).
- If several researchers are used, as in the present study, training can increase the *dependability* of data collection by establishing common

standards. As this team used semi-structured interviews, which can potentially vary widely given their informal and conversational nature, an interview guide was designed to ensure cross-case comparability (Fontana & Frey, 1998).

- Employing several researchers throughout the research process increases *dependability* because, as Kirk & Miller (1986) explain, having a lone researcher collect, analyze, and present findings may aggravate the issue of *dependability*. For example, if two or more persons are taking part in the initial line-by-line incident identification, their efforts can be compared, and, if they're divergent, training can improve greater *dependability*. Miles and Huberman (1994) refer to this technique as "check coding."
- A third method to increase *dependability* is to collect data at different times and locations (Adler & Adler, 1998). For example, findings may vary if data is gathered in different sites (e.g., Norway and the U.S., small vs. large organizations). If the same patterns occur during data collection at such different locations, it probably means that data is genuine, and not an effect of chance (Denzin, 1989; Cooper, 2001).
- Finally, a common technique that addresses all concepts is *triangulation* (Kirk and Miller, 1986). Researchers can triangulate by data type (e.g., quantitative, qualitative), by data source (e.g., persons, times, places) or by researchers or investigator triangulation (e.g., multiple researchers) (Johnsen, 1997; Miles and Huberman, 1994). In this study, the latter two techniques were employed. On a more general note, being cautious when arguing the significance of the research, and acknowledging limitations to the generalizability of the findings, may improve the quality of the study (Silverman, 1989).



### Our reflective approach

Alvesson and Sköldbberg (2000) argue for a reflective approach, also acknowledged in more recent approaches to GT (e.g., Strauss and Corbin, 1998). As explained in section 4.3, we did not enter the field as blank slates, as our goal was to develop categories and theory based on a reflective process where existing literature and empirical data both contribute to the emerging theory. In addition, such a reflective approach also acknowledges that the research process is a result of constant interpretation and refinement (Alvesson and Sköldbberg, 2000). In a sense, this research strategy implies aiming at several moving targets simultaneously. According to Strauss and Corbin (1998), it makes sense to adopt such an approach because it's impossible to be completely bias-free. Thus, it makes the research process more transparent and "valid" by being explicit about preconceptions (Yin, 1994).

The purpose of this chapter has been to make the research process explicit by providing a discussion of the methodological considerations, with the focus on data collection and analysis. The presentation of the individual papers in Chapter Five includes a detailed description of how findings have been identified from the data. The final section in this chapter addresses some of the steps taken by this research group to meet quality criteria.

## 5 Introduction to Individual Papers

The research reported here employs an interpretivistic approach to understanding the relationship between social and technical elements. Thus, it views their relationship as intermingled and dynamic rather than as a set of predefined dependent and independent variables. Implicit in the interpretive approach, and hence in this study, is a requirement to avoid viewing social and technical elements as having a unidirectional and distinct impact.

This chapter reprints all four papers by my colleagues and me that reported on what became the groundwork for this dissertation. The 72 in-depth interviews with high-end users were analyzed using GT methodology (Glaser and Strauss 1967), resulting in 59 conceptual core categories. These categories, in turn, provide the backbone for the findings in the four papers. The strength of GT is that it produces a discovery, not necessarily about the technology itself, but more about how ICTs are used in naturalistic settings. In this dissertation the GT analysis of the data is used in different ways. After having produced the “original” GT piece (Paper Three) from the data, it was possible to go within the data and do selective interpretations (Papers One, Two and Four). Hence, the goal with Paper Two, for instance, was not to create a model of the entire dataset but rather to create a representation of enactment with examples from the data. Thus, middle-range theory of enactment is produced. A middle-range theory involves taking data and using it to inform yourself about theory, and consequently also inform yourself about the theoretical meaning of your data (Rogers, 2003, Sætre, 1998).

In summary, Paper Three set out to create an overarching view of the entire dataset, while the other papers used GT codes/categories to produce specific theoretical analyses, because there is previous work on media use that this data allowed us to make more specific links to. What links the four individual papers

in this dissertation is that they all contribute to existing knowledge of ICT use in organizations. In the introductory chapter, four distinct areas were identified that need further research. Additionally, in Chapter Three, a brief literature review was conducted to situate this research within the larger framework of research on ICT use.

## 5.1 Individual Papers

The following four papers are included in this chapter:

1. Sørnes, J-O., Stephens, K. K., Sætre, A. S., & Browning, L. D. (2004). The Reflexivity Between ICTs and Business Culture: Using Hofstede's Theory to Compare Norway and the United States. *Informing Science*, 7(1), 1-30.<sup>37</sup>
2. Sætre, A. S., Sørnes, J-O., Browning, L. D., & Stephens, K. K. (2003). Social Actors Enactment of Media Use and Organizational Environments. *Informing Science and Information Technology Education Joint Conference, June 24-27, Pori, Finland*<sup>38</sup>
3. Stephens, K. K., Browning, L. D., Sørnes, J-O., & Sætre, A. S. (2002, July 16-20). A Reflexive Model of ICT Practices in Norway and the United States. *52<sup>nd</sup> Annual Conference of the International Communication Association, Seoul, Korea.*<sup>39</sup>
4. Browning, L. D., Sørnes, J-O., Stephens, K. K., & Sætre, A. S. (2003, May 23-27). The Study of Sequence: A Narrative Analysis of ICT Practices. *53<sup>rd</sup> Annual Conference of the International Communication Association, San Diego, CA.*<sup>40</sup>

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<sup>37</sup> An earlier version of this paper titled "Leveling Differences and Reinforcing Similarities: The Impact of Information and Communication Technologies on National Culture" was presented at the Informing Science and Information Technology Education Joint Conference, June 24-27, 2003, Pori, Finland. The paper was accepted as a *Best Paper* after a triple blind review.

<sup>38</sup> An earlier version of this paper: "Organizational Members' Enactment of Organizational Environments and Media use: A Study of ICT Practices in Norway and the United States" was presented at the Informing Science and Information Technology Education Joint Conference, June 24-27, 2003, Pori, Finland. The paper was accepted after a triple blind review.

<sup>39</sup> Paper accepted after double blind review.

<sup>40</sup> An earlier version of this paper was accepted after double blind review.

Paper 1 is not included due to copyright.

## **Paper Two**

# **Social Actors Enactment of Media use and Organizational Environments<sup>41</sup>**

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<sup>41</sup> An earlier version of this paper: “Organizational Members' Enactment of Organizational Environments and Media use: A Study of ICT Practices in Norway and the United States” was presented at the Informing Science and Information Technology Education Joint Conference, June 24-27, 2003, Pori, Finland. The paper was accepted after a triple blind review.

## **Abstract:**

This paper uses the concept of scripts to couple Weick's notion of enactment and Langer's theory of mindfulness/mindlessness with empirical data on the use of ICTs in organizations. Our research is based on 72 in-depth interviews of advanced ICT users in the United States and in Norway. The findings: (1) show that the notion of clear cut boundaries between an organization and its "environment" is problematic, and illustrates how organizational members indeed enact—or co-create—the environments of their organizations, (2). The findings validate the assertion that mindfulness is required for media richness theory to be predictive, (3). The paper also illustrates how organizational members construct the richness of one media through the use of other media. This study, not only enriches our understanding of Weick's theories, but also has important implications for organizational practice since it expands media richness, and social information processing theories.

**Keywords:** Enactment, Information and Communication Technologies, Scripts, Mindfulness/Mindlessness, Communication Media Richness.

## Introduction

This paper extends our understanding of information and communication technology (ICT) practices by interpreting these in light of Weick's (1979) framework of enactment, which is the pivotal element in Weick's perspectives on organizing (1979), and sense-making (1995). In this research we use the notion of scripts (Ashforth & Fried, 1988; Barley, 1986; Gioia, 1986, Gioia & Poole, 1984)—as opposed to Weick's (1979) “causal maps”—to focus the enactment toward communication behaviors—instead of the processes of organizing and sense-making. Using scripts instead of causal maps allows us to link enactment to Langer's (1978, 1989) theory of mindfulness/mindlessness. As we will demonstrate, the integration of enactment, scripts, and mindfulness/mindlessness, yields an analytical framework that furthers our understanding of communicative behaviors in organizations.

Our empirical data stem from 72 in-depth interviews of advanced ICT users from the United States and Norway. The data offer examples from everyday work life of the implications ICTs have for social actors who use them to meet business objectives. We use narrative data on ICT usage in organizations to illustrate how behaviors and communication choices can be understood in light of the integrated conceptual framework.

In the conceptual framework section we present the concepts of enactment, scripts and mindfulness/mindlessness. The next section details the qualitative methods used in this study. Following the conceptual treatment and the methods section, we bring our narrative data to life by providing concrete examples that establish the relationship between data and theory. The final section of the paper includes the discussion and conclusion.



## Conceptual Framework

### The role of enactment in organizing

In his book “The Social Psychology of Organizing,” Karl Weick (1969, 1979) compares the process of organizing to the process of natural selection and presents a model that consists of the following four elements, *ecological change, enactment, selection and retention*. These four elements constitute organizing. Enactment is a concept that captures the role of action in organizing and sense-making. Because all social actors are involved in it, enactment is a crucial process for individuals and organizations alike. Weick (2001, p.187) claims that, “enactment drives everything else in an organization. *How enactment is done is what an organization will know.*” Stated differently, “A pattern of enactment establishes the foundation of organizational reality, and in turn has effects in shaping future enactments” (Smircich & Stubbart, 1985, p. 724). The same holds true for individuals.

In the following text we give a brief summary of Weick’s theory of organizing—showing the centrality of enactment, to his theory—while relating it to the concept of scripts which is fundamental to understanding Langer’s theory of mindfulness. Briefly stated, Weick’s (1969, 1979) theory of organizing is as follows:

- Ecological change is an alteration in the flow of experience of social actors. These alterations or differences provide opportunities for social actors to make sense of them, to reduce ambiguity. As research on cognition shows, these exceptions are the items individuals tend to monitor to register change (Einhorn & Hogarth, 1986). “Ecological changes provide the *enactable environment*, the raw materials for sense-making” (Weick, 1979, p. 130). An example of this is the introduction of a new technology such as wireless local area networks (wlans) that allow for fast wireless internet connection on a site.

- Enactment is the intersection between the activities of social actors and the ecological or environmental changes. Weick states that, “enactment is to organizing as variation is to natural selection” (1979, p. 130).<sup>42</sup> This is an apt analogy, in that the activities of social actors take different forms in different contexts. That is, over time, certain activities seem to prevail at the expense of other activities, even across contexts. For example, if an individual is now spending two hours a day communicating via email on his/her computer and they were doing none of this fifteen years ago, some form of trial and error—natural selection—has taken place. The term enactment includes the actions of both social actors and the environment, and implies a co-creation of activities. What these terms have in common is their focus on change and movement.
- Selection involves arranging enacted experiences to reduce their equivocality. This arranging or structuring can be represented in the form of causal maps—or sequences—built on the enacted—or past—experiences. A causal map is a picture of how a social actor perceives elements to be causally and sequentially related. (Weick, 1995). For example the sequence of media choices as a relationship is maturing. Over time, certain causal maps gain priority because they reduce equivocality more consistently than do other causal maps, even across different contexts.
- Retention involves the storage of the products of successful sense-making—or equivocality reducing activities. What social actors store are selected or “preferred” causal maps—that illustrate how variables are causally and thus sequentially related. Weick uses “the terms *enacted environment* and *cause map* to refer to retained content” (Weick, 1979, p.131). An example of this is the retention of e-mail as a primary means of communication, substituting various technologies such as the written letter, telex, and the fax. It is thus clear that the term causal map is fairly

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<sup>42</sup> Natural selection is at the core of Darwin’s notion of “survival of the fittest.” Nature tries out variations of species and the ones who are the best suited to (enact) their particular environments prevail.

broad and encompasses how social actors understand “things” to fit together. Causal maps are thus central to both organizing and sense-making.

Both organizing and sense-making take place through the processes of ecological change, enactment, selection, and retention. In the research detailed in this paper, different ICTs are examples of the raw materials used for sense-making. It is, however, important to note that ecological change and alterations—or enactable environments—frequently arise in connection with some action on the part of the social actor. This capacity for the actor to both create the environment through action as well as respond to it is vital to our understanding of how individuals enact their work environment through the use of ICTs. There is however little written about the enactment of ICTs.

Kreps & Bosworth (1993) studied the unique dimensions of role enactment—status-role nexus, role links and role performance—in communities immediately following disasters such as hurricanes and earthquakes. Under such conditions there is sufficient upheaval to normal role structures to facilitate studying role enactment. Kreiner (1989) discusses the enactment of wage systems on construction sites. Choo (2001) argues that sensemaking and enactment are integral parts of an organizations knowledge generating system, and thus organizational learning. Czarniawska-Joerges and Wolff (1991) argues that the three roles, managers, leaders and entrepreneurs are enacted archetypes of “principal” roles in organizations.

The central premise forwarded by Abiola and Kilduff (1988) is that market participants create (or at least co-create) the environment which then impinges on their activities. Edwards, McKinley & Moon (2002) argue that organizational decline can be enacted by both internal managers of an organization and its external constituents through self-fulfilling prophecies. “When predicted decline has been construed as an external inevitability, the logical choice for wise decisionmakers is disinvestment” (p. 60). Smircich and

Stubbart (1985) discuss *Strategic management in an enacted world*, and argue that the “environment of which strategists make sense has been put there by strategist’s patterns of action—not by a process of perceiving the environment, but by a process of making the environment” (p. 727).

Gallant, Boone and Almquist (2003) sought to integrate sensemaking and enactment with organizational informatics creating what they label a communicative organizational informatics (COI) framework, which they then employ to study wireless use of PDAs (personal digital assistants). The aim of this paper is different; we seek to show how organizational members participate in the enactment, not only of their environments, but also of their media usage and indeed the very richness of the media they employ.

In the following paragraphs we will elaborate on the enactment process of Weick’s (1969, 1979) model, while relating it to a subset of causal maps, namely scripts, which links enactment to Langer’s (1989) theory of mindfulness. We feel that using scripts instead of causal maps increases the focus on self in relation to action and outcomes.

Scripts: The linking pin between enactment and mindfulness

### **Scripts as a subset of causal maps**

Weick uses the broader construct of causal map because his focus is on organizing and sense-making. Causal maps are the product of social actor’s enactment and depict how various elements are causally related (Weick, 2001). In this paper we use the more specific concept of “script,” since our focus is on behavior and practices. A script can be viewed as a causal map that is used as a recipe for behavior (Ashforth & Fried, 1988). A script is a causal map that not only guides understanding, but guides behavior. Stephen Barley views scripts as “behavioral grammars that inform a setting’s everyday action” (1986, p. 83). The term grammar here implies a certain sequence of behavior. Gioia and Poole elaborate on the importance of sequences in scripts through their definition of a

script as, “a schematic knowledge structure held in memory that specifies behavior or event sequences that are appropriate for specific situations (Gioia & Poole, 1984, p. 449). Ashforth and Fried (1988, p.306) maintain that a, “script is a cognitive structure that specifies a typical sequence of occurrences in a given situation.” Therefore, sense-making—the enactment of meaning—is the process of making sense of experiences by tracking the sequence of events. These writers’ conceptualizations of scripts validate our assertion of scripts as a subset of causal maps. Given our focus on specific communication behaviors, scripts are more useful than causal maps.

### **The Enactment of Scripts**

Over time certain scripts perform more consistently than others, even across different contexts, thus they come to be preferred; this is selection in Weick’s terminology (1979). Individuals’ reports of ICT and communication media practices are examples of scripts in this research. The prevalence of certain scripts—in this instance related to ICT usage—over others is at the very core of selection and retention.

The essence of Weick’s (1969, 1979, 1995, 2001) notion of enactment is that people receive input or stimuli as a result of their own actions. When people act, “these actions become the raw materials from which a sense of the situation is *eventually* built (Weick, 2001, p. 183). Ecological changes—for example the invention of new ICTs—and people’s actions—such as the adoption of new ICTs in the workplace—are both important parts of the raw materials for enactment. Mary Parker Follett pointed to the challenges associated with drawing distinctions between environments (stimulus) and actors (response) almost 80 years ago.

What physiology and psychology now teach us is that part of the *nature* of response is the change it makes in the activity which caused so-to-speak the response, that is, we shall never catch the stimulus stimulating or the response responding (Follett, 1924, p. 60).

The point that Follett (1924) and later Weick (1969, 1979, 1995, 2001) makes is that it is complicated, at best, to distinguish between actors and their environments. This is also the case when individuals relate to one another, whether it be face-to-face or through the use of ICTs. It is difficult to separate senders (stimulators) and receivers (respondents) simply because when we are communicating we are continuously senders and receivers (Wenberg & Wilmot, 1973).

In summary, social actors and organizations can operate as co-creators of their own context and environment. As we strive to make sense of our environment and reduce uncertainty and ambiguity, we are—in effect—enacting context and creating meaning. Weick sees enactment as the essence of sense-making, stating that “sense-making is about the ways people generate what they interpret” (1995, p.13). His statement makes the connection between sense-making and enactment explicit. However, our primary interest here is not in sense-making but in the enactment of scripts.

The invocation of a script results in behavior that is supposed to be appropriate for the situation. Scripts are created as a shortcut that allows the person using the script to take action based on only a limited part of the available information. Therefore, using a script reduces the person’s level of awareness or mindfulness in any given context (Gioia & Poole, 1984). We now turn to the issue of conscious or unconscious processing, or mindfulness or mindlessness.

## Mindfulness and mindlessness

Mindfulness can best be understood “as the process of drawing novel distinctions” (Langer & Moldoveanu, 2000, p.1). People who are mindful of what they are doing often behave quite differently from those who find themselves acting mindlessly (Langer, 1978). Mindfulness and mindlessness can be viewed as the anchor points on a continuum in that it is possible to locate most communication behaviors within such a framework.

Langer (1989) gives a very illustrative example of mindlessness/mindfulness. Imagine it is 2 a.m. and your door bell rings. Outside is a well dressed man who hands you a business card and says that he is a part of a contest and that he will give you 3.000,00 Euro (now he has your attention even if it is 2 a.m.) if you can provide him with any kind of a 2 meter by 80 centimeter board but he needs it right now. Depending of whether you are able to re-categorize the door to your shed as a 2 x 0.8 board or not you are either mindful or mindless.

Mindlessness occurs when social actors respond based on only a select number of general cues (the label “board”) and ignores other more specific, contextual cues (“any kind” and “2 x 0.8) that might suggest a new course of action (like taking the door to the shed off it hinges and handing it to the man) (Langer, 1978). Burgoon and Langer (1996) have defined mindlessness as, “limited information processing, rigid categorical thinking, single perspectives, and failure to recognize context” (p. 107).<sup>43</sup> This definition fits well with the purposes of this study.

Repetition and familiar situations move us in the direction of mindlessness, yet people learn through repetition. The problem is that, “[u]pon each repetition, less information is processed. Thus, those actions guided by these cues are based eventually only on minimal information” (Langer, 1978, p. 36). The creation of meaning, sense-making, learning and “the drawing of novel distinctions” are mindful behaviors, but “[o]nce distinctions are created, they take on a life of their own. ... The categories we make gather momentum and are very hard to overthrow” (Langer, 1989, p. 11). Thus we have moved from the mindful enactment of categories and scripts to the mindless invocation of them. “We build our own and our shared realities and then we become victims of them—blind to the fact that they are constructs, ideas.” (Langer, 1989, p. 11). Burgoon and Langer explain that mindlessness “should be more common when

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<sup>43</sup> When people are mindless they “treat information as if it were context-free—true regardless of circumstances” (Langer 1989, p.3). A collective form of mindlessness is when a group of people—such as a department, an organization, or even a nation state—treat the norms and morality of their “culture” as if they were the laws of nature.

situations are familiar and un-involving, when little effort is required, when consequences are similar to previous ones, and when behavioral routines are not disrupted” (1996, p. 110).

Ashforth and Fried (1988) argue that due to the repetitive nature of many tasks facing organizational members, much organizational behavior occurs quite mindlessly. Burgoon, Berger, and Waldron (2000) assert that much interpersonal communication occurs mindlessly. Repetitive tasks such as checking your e-mail and selecting a communication media for each communicative interaction are prone to mindless behavior. Because social actors have limited communication and channel capacities for processing information (Broadbent, 1958; Shannon & Weaver, 1949) people process information selectively, causing them to also ignore information (Langer, 1978, 1989).

Mindlessness can also be viewed as entrapment by categories (Langer, 1989). That is, we attend to only a limited set—the evoked set (Abougomaah, Schlacter & Gaidis, 1987)—of available cues while ignoring other potential distinctive cues that would allow us to draw novel distinctions. In the words of Timmerman (2002, p. 114): “Mindlessness is a state in which one does not attend to information in the environment, but rather behaves in an automatic fashion, minimally attentive to behavior.” Mindlessness can stem from an assortment of reasons: (a) overlearned behavior, (b) cognitive commitment and, (c) reliance on existing categories, and (d) limited attention paid. It is reasonable to expect that most, if not all, of these reasons are present to various degrees whenever mindless behavior occurs. Timmerman (2002) argues that media selection theories such as media richness and social influence theories are non-predictive unless one takes into consideration the mindlessness/mindfulness of the actor.

It is also worth noting that in most of the writing on mindlessness and mindless behavior there seems to be an implicit assumption of linearity. That is, social actors observe some familiar cues which trigger a script and lead to a specific mindless behavior that is, according to the script, appropriate to the



situation. However it might as well be that these cues that social actors observe trigger a set of scripts that in turn focus their attention toward certain types of information, like trying to confirm that a script is appropriate, and away from other types of information, like what is unique about this situation or event and therefore requiring a modification of a script or even a completely new script. This explanation fits well with Weick's (1979, 1995, 2001) notion of retrospective sense-making.

This paper applies a new integrated framework to ICT practices in organizations. Our integrated framework links enactment to mindfulness, by replacing cognitive maps with the more specific term "scripts." This framework allows us to distinguish between mindful and mindless enactment and mindful and mindless invocation of enacted scripts, thus yielding a deeper understanding of organizational behaviors.

In the following section we lay out our methodology for this study.

## **Methods**

### **Data Collection**

The data for this study was collected in a two stage research effort. Data collection in stage one started in the fall of 2000 and ended in the spring of 2001. Data collection in stage two started in the winter of 2001 and ended in the fall of 2002. A total of 72 individual interviews (36 in Norway and 36 in the US), were conducted by four researchers over the course of these two years. The participants were selectively sampled based on their reputation as advanced ICT users. Special effort was placed on identifying ICT users from a wide range of professions and organizations, and consisted of a cross-section of users

representing different functional areas, professional and organizational tenure, and gender.

Each interview lasted 45–90 minutes and was audio-recorded. The recordings were then transcribed, resulting in over 2,000 pages of text. To facilitate subsequent data analysis, the Norwegian data set was translated into English and checked for semantic and contextual accuracy by the Norwegian researchers. For analysis, the Norwegian interviews were printed with Norwegian and English translations side-by-side. This was done in order to retain the richness and nuances imbedded in the language of any statements/instances that we wanted to examine more closely.

Data was collected using loosely structured, in-depth interviews—a method that is flexible and that favors adaptation to each context and individual (Miles & Huberman, 1994). Because this research involved multiple sites and multiple interviewers, it was especially important to employ a similar format for the interviews, developing a common framework and maintaining cross-case comparability (Miles and Huberman, 1994). An interview guide was designed for this purpose. The structure of the interview guide also permitted the exploitation of opportunities that presented themselves. The interviewer introduced a topic, and provided the transition to the next topic when appropriate.

## Data Analysis

The research presented in this paper is a part of a larger investigation on ICT use in the workplace in Norway and the United States. In a previous paper, a comprehensive grounded theory analysis (Glaser & Strauss, 1967) of the data was reported (Stephens, Browning, Sørnes, & Sætre, 2002). All data was coded by multiple coders yielding almost 5000 individual codes, which were subsequently categorized into 58 core categories through constant comparative analysis (Glaser, 1978, 1998). For this study we select vignettes or narratives from the interviews that contain accounts relevant to our proposed conceptual framework. We used the researchers' intimacy with the data, as well as searches

of our data base to select the narratives used for analysis in this paper. We searched separately for examples of the 3 central theoretical constructs of this paper; enactment, scripts and mindfulness/mindlessness. This is consistent with Glaser's (1978) view that researchers may flexibly draw on and construct frameworks based on the theoretical leads suggested by their data. Similarly, Strauss (1970) admits that while the emphasis in the 1967 monograph with Barney Glaser, was theory generation, its analytical style could also be used in the context of previously developed theory – as long as it had been carefully grounded in research.

While we, as researchers, acknowledge that it is difficult to talk about mindlessness in behaviors when we in fact have asked them to be mindful of their own behaviors through interviewing them. Due to retrospective sense-making, we expect that interviewees will make sense of even their mindless behavior as they tell us about their actions and their reasons for acting (Weick, 1995). However, through such self-reported examples we can provide plausible evidence that routines are established and result in ICT use that happens without much consideration. Indeed, social actors are often mindful of some aspects of a situation, but as we will show, they are frequently not mindful of other, and perhaps more important aspects of the same situation. Hence we can show, at least in part, examples of mindless behavior in organizations.

In our analysis—presented in the following sections—we couple our theoretical framework—as laid out in the previous sections—with the selected narratives from our substantial pool of raw data. The theoretical frameworks served as a sensitizing device for looking at, interpreting and analyzing the narrative data (Browning & Henderson, 1988; van den Hoonaard, 1997). The close coupling between the data and the theoretical framework is reflected in the following sections.

## **Findings: Linking Data and the Conceptual Framework**

Using our integrated theoretical framework for data analysis, we find examples of enactment, scripts and mindfulness in all 72 of the interviews. Since the focus of this study was on ICT use, it is not surprising that the data showcase numerous examples of how the individual actors use ICTs as their raw materials and re-arrange ICTs to respond to different situations. Since the goal of this study is to contribute a clarifying explanation of how ICTs are used in organizations, we provide the following theoretical clustering of concrete examples. In support of our integrated theoretical framework, our examples will show the constructs of enactment, scripts and mindfulness/mindlessness are not just tightly related, they are in fact integrated, and this integration is reflected in our analysis.

### **Enactment as a Supercategory**

Enactment functions as a “supercategory” and permeates the data set. Many organizational theorists characterize organizations and their external environments as complex systems that constantly interact (Anderson, 1999; Daft & Lewin, 1990). These complex interactions create opportunities for enactment as well as sense-making to take place. For example, interviewees who are sales representatives discuss how they adjust their own personal ICT use scripts to accommodate the needs of their customers. Without an external agent driving their script formation or execution, ICT use would be different. Essentially, ICT practices do not happen in a vacuum; they are consciously and unconsciously influenced by the environment. This suggests that organizational boundaries are often ambiguous and the environment is a powerful agent affecting ICT use. The reciprocal interaction between organizational members and organizational environments—enactment—permeates the data that this study is based on and is the foundation upon which our findings are based.

## Mindfulness in Action

Our findings suggest that while most script enactment is mindful, sometimes it is less than mindful. Prior research has indicated that the invocation of scripts<sup>44</sup> can be mindful or mindless (Gioia & Poole, 1984); but the data presented below suggest that this bifurcation is overly simplistic. The examples from the data suggest that not only are there different levels of mindfulness in ICT script use, but there are also mindful combinations of ICT use. In these examples, mindful social actors actually consider, at least some of, the underlying dimensions of media choice theories—opportunity for fast feedback, ability to convey multiple cues, opportunity to tailor the message to the situation and, ability to convey ambiguous and subjective material—when selecting their communication media.

If we place enactment on a continuum ranging from highly mindful to completely mindless, we can learn more about ICT use. Somewhere between the middle and the high end of this mindfulness continuum is an example of ICT use where successful practices are actually “stolen” from others and implemented in new organizations. A member of the staff at a Norwegian college told the story of how they went about constructing the web pages for the college, which they did in collaboration with an external web design firm. “We tried to describe to this little company what we were aiming for. . . . In doing this we have stolen shamelessly from all the other solutions on the market.” The people behind the construction of this web page are mindful of how they present their organization to the environment, to the extent that the environment itself becomes a part of how the organization seeks to set itself apart from the environment. However it is not evident how mindful they are of the fact that by mostly looking at organizations similar to their own colleges and small universities they are not only setting themselves apart they are indeed communicating membership by having similar structures and design on their own homepages.

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<sup>44</sup> A script is said to be invoked when it is applied to a situation in such a manner that it guides behavior and understanding.

For example, the economy can serve as an ecological change agent and alter the degree of mindfulness about previously enacted scripts. A consultant in the high-tech industry in Silicon Valley explains the impact of the economic downturn on the use ICTs in the following manner: “well, certainly, in our firm there's a lot less travel, and so there's a lot more emphasis on electronic communications.” This interview also shows that ecological change (downturn in the economy) increases mindfulness of certain elements like cost, “it is not cost efficient to travel to Atlanta, lets have a video conference.” Furthermore, events like 9/11 increased peoples’ awareness of the risks of traveling plus it increased the cost of air travel due to increased security measures and hence the time it took to travel. In sum, whereas previously there would have been a meeting in Atlanta, under these altered conditions there is not. In other words, ecological change lead social actors to be more mindful than they were previously. This does not mean that all social actors are fully mindful all the time, but on average they are more mindful of certain variables—such as what media to use—than they were prior to the ecological change.

Several of our informants, on both sides of the Atlantic, were very mindful of their communication partners’ media preferences. In fact, some of them were so mindful of their preferences that client’s media preferences become a communication media selection script. One of our American informants—a salesperson in the high-tech industry—made this explicit:

Some people say, ‘send me an email on everything you want to communicate because I’m very disciplined about reading my email.’ That is fine and that’s what I’ll do. Other people say, ‘page me and I’ll always call you back.’ That is fine too.

One of the main reasons that it is important to learn about these preferences is that if a salesperson ignores the customer’s desires, the customer will not communicate with them. Our informant made this very clear, “I could leave him three voicemails a day, he never talked to me. Page him and he’ll be back to me in 30 seconds.”

There are also examples of mindfulness found in other types of customer interactions. A project coordinator at a Norwegian software company—who told us a story of how customer requirements are often enacted—claims that: “Some customers have a clear strategy for their learning needs and methods, which we strongly disagree with.” What he is implying is that customers often do not know what they want, and certainly not what is good for them, but his organization does know. “The idea is to educate the customer about e-learning based on the products we sell. ... The idea is to educate our customer before our competitors do”. He is mindful, that if he can help the customer define the problem, the customer is perhaps more likely to let him help them solve it. However, this strategy is not a “carte blanche” for short term exploitation of customers. He says, “It does not pay off in the long run for us to sell a product that the customer will not use, or is not able to use.” So he is mindful of the longevity of the relationship. Since, they know what is best for the customer, then it is his job to *enact the customer requirements* that his company is facing.

### **Importance of Face-To-Face in Mindful ICT Use**

The most prominent mindful ICT theme in the data concerns the importance of face-to-face communication in important or emotional situations. The importance of using of face-to-face communication was consistent both in the Norwegian and in the US interviews in two types of situations. One was when initiating a relationship with for example a potential customer and the second was when you were closing a deal. In both these situations in both countries, the common script was “use face-to-face communication.” One US salesperson explained: “If a customer has any sort of emotion, if it's a subject that's emotional, whether positive or negative, I'll go see him. Because in sales every decision is emotional.” This person is mindful of the power of the “face-to-face to close deals” script, because he sees every closing or decision as emotional, and emotions can best be dealt with through rich communication channels, or media, such as face-to-face (Daft & Lengel, 1984, 1986). He is also

enacting his own work context by setting client expectations through his media choices. If he switches to a leaner media, such as e-mail then the switch will convey a message in itself (Sitkin, Sutcliffe & Barrios-Choplin, 1992).

One of our Norwegian respondents offered some additional insights into an expanded version of the same script for reaching an agreement and closing a sale. This person was a sales and marketing director for an IT firm offering “real time” solutions. Over 70% of his contact with customers was by e-mail. Nevertheless, he pointed out that the most important part of the customer relationship takes place face-to-face. “Face-to-face is a must in the initial stages, throughout the process to resolve conflicts or disagreement, and in the closing of a sale.” Not only does he include the deal closing scripts, but he also extend the script to include using face-to-face for initiating relationships. But he is also acutely aware—mindful—of why face-to-face is so useful in the closing of a deal, and it is very simple, really. “E-mail is not suited to deal with conflicts, because it is too rigid.” So his mention of the flexibility of a particular media is still another formulation or reason for choosing a media.

The next examples provide sheds some light on how this face-to-face script is enacted. An American interviewee who conducted a fair amount of international business stated: “For a decision of that size I think, in almost every case, there's got to be at least one or two face-to-face meetings.” This person also had a colleague that worked internationally and they had concluded that in closing such deals, face-to-face communication was required: “it's rare that a deal gets concluded without face-to-face.” The following US example from a person who conducted most his business domestically makes a similar point.

If you're going to spend that kind of money, they're going to want to meet our sales people, our sales managers, our vice-president, our executives. The bigger the deal, the more face-to-face time it requires. ... In our industry there's a lot of CEOs who spend half their time just closing deals.



The Norwegian interviewee recognized a “face-to-face for closing deals” script, whereas the US interviewee was aware of this as well as the ubiquity of this script within the industry. That is, he was mindful of the presence of this enacted script.

### The Mindful Enactment and Mindless Invocation of Scripts

Thus far we have focused on findings that illustrate mindful enactment of ICT use scripts; however, there is a much wider range of mindfulness. One of our American interviewees had a very clear script for how to search for novel and hard to find information for a management consulting company. “So I probably use Google very systematically 20 times a day. And *anything* [emphasis added] that I want to know about I'll do a Google search.” The latter part of her statement makes it clear that this is—in her mind—a reliable method or script, for finding information; one that she invokes every time she needs to know about something. Although being fairly mindless with regards to the specifics of her search when invoking this Google script, she was mindful when she created it.

What Google does -- other engines will return a result as a function of how frequently a certain term is used on that Web site. Google looks at how many times a Web site is accessed that has those terms. So you always come up with the most used sites, which are usually the most useful sites. ... And the real power, I think, from Google is that you have implicitly built into it the wisdom of hundreds of millions of people. Right?

Not everyone places such great confidence in the collective intelligence of people. Although, mindful of why she constructed her own search script at least retrospectively. Nevertheless, as she herself told us that she was looking for novel information we see that she does not see the paradox in finding this where the most people have looked before. Keeping in mind social actors limited rationality and cognitive capacity we see that although fully mindful of some aspects of her task she was at the same time mindless of other important aspects

of her task. When using search engines using search criteria as explained above the collective wisdom and obtuseness of people are amplified and disseminated. As Thornton Niven Wilder stated: “Ninety-nine percent of the people in the world are fools and the rest of us are in great danger of contagion” (1954, *The Matchmaker*, act I.).

A few scripts result from mindless behaviors based on less than rational reasons. A continued education (executive education) counselor at a Norwegian University told of how he and his colleagues used various media. With colleagues in the same building a combination of face-to-face and electronic media were used. However some of his colleagues were located in the next building over—“it is not far, but almost all of their “discussions and communication happens through e-mail.” Our informant and his colleagues had a script that if they needed to communicate with their colleagues in the other building then they would use electronic media because it was too far to walk, and when ever the need for communication with these colleagues arose then they paid less attention to the content and purpose of the communication than to the physical distance. While this example illustrates a certain degree of mindfulness in their choice of email, it also illustrates a certain level of mindless script invocation. In other words, they attended to only a few of the available cues (distance, time and weather), and ignored other and perhaps more important cues (content, context and purpose of the communication). This selective cuing supports the notion that there are levels of mindfulness to be found in ICT use.

The US salesperson who viewed decisions as emotional placed a tremendous premium on face-to-face communication.

My philosophy is very simple. If I have an opportunity to meet with a customer, I will drop everything else -- because it's more important. And even if I spend two hours and only get five minutes worth of information, I never would have got it if I didn't see them.

He went on to say that he might do quick questions on voice mail, or even send an e-mail “if it is unimportant”, but if he thinks the information has “any significance” he will definitely use face-to-face. He does not believe that leaner media are complementary to rich face-to-face communication, but that leaner media are only for insignificant and unimportant short messages. This script—the superiority of face-to-face communication at all times—leads him to spend 120 minutes to get something that should have taken 5 minutes, and to him finding the time and effort spent was rational and worthwhile. Although he thinks he is mindful (“I do this because everything is emotional, and emotions can only be dealt with face-to-face”) he is in fact mindless (he does not attend to any of the cues that might lead him to use leaner media, such as receiver preference, convenience, speed, availability of media, and so forth) when invoking this script that leads him to utilize an inappropriate media, at least according to media choice theories (Daft & Lengel, 1984, 1986; Fulk, Steinfield, Schmitz & Power, 1987; Sitkin, Sutcliffe & Barrios-Choplin, 1992). The initiative to act face-to-face, even though it is a significant allocation of resources, is less mindful than routinely considering several variables. An alternative explanation is that he can be mindless—and automatically choose to use face-to-face communication—because he knows that face-to-face is a “mindful” media with many simultaneous cues.

### Unintended Consequences of Mindful ICT Use

Some mindful script invocations begin with one objective and result in novel unintended consequences that may or may not be desirable. A management/IT consultant acquired a broadband Internet connection to enhance her productivity when working out of her home. “When you have broadband you don't have to tell the kids to get off and when you have broadband it's easier to share a connection. So there are more people communicating.” As a result of this ICT implementation, she had more desirable family interactions and she expanded the ICTs used to communicate with others in her organization. In this

instance technologies acquired to improve her ability to work from home did just that but both directly as she expected, and indirectly through improving other family members' ability to access the Internet while she worked, reducing strife, and thus her working environment.

In the following example we see that the mindful use of Microsoft Outlook to actually facilitate information sharing during vacations. A section leader at a US historical center said:

“I’m such a dictatorial person—and my boss is too—that everyone is required to have the same scheme on their computer.” The rationale behind this requirement for similarity was quite simple. We have to pinch hit for each other so frequently. And we do want to take vacations. So we try to keep things organized so we can fill in for each other. And so if I’m answering an e-mail reference, I answer it and then I file it in a certain spot. And then the next person who comes on for the next shift knows exactly where I was supposed to put it.

To achieve this common structure they simply used folders in Microsoft Outlook. So enactment can be merely establishing a common standard rather than a unique and personal practice.

In addition to desirable unintended consequences, we also see examples where mindful ICT use creates new problems. A Norwegian college professor was using technology to impose a specific learning experience on students. He deliberately reduced the functionality of a previously used software application so that the students had to use a new software package to complete some of the course assignments. This mindful creation of a learning environment had some unforeseen consequences. He discovered that the word traveled fast about his requirements and students monitored whether others were being required to do the same thing and students “started to question why others did not do it.” The professor monitored these misgivings and noted the mounting pressure on his colleagues to do the same, which placed him “ahead of the game.” In this

example, the professor thought he was creating—mindfully enacting—an environment for his students to learn, but he also affected the working climate for the faculty in his department and at the university at large, by setting the expectations of students—unintended consequences.

Another example of unintended consequences is provided by one of the IT firms in Norway that attempted to create an exchange relationship with their employees. The firm provided employees with a cell phone and in exchange, the firm claimed the right to contact employees at all times to request assistance in solving company problems. As our interviewee said, the firm “had a “crystal clear policy that when the cell phone is on, we can call them anytime day or night”. He offered the example of having problems with software code and if such a moment occurred, they would “call the number, and if the cell phone is on, which it often is if you use the number for all your friends as well, then we reach the person.” The motivation for this policy was quite clear, as was the incentive for programmers to leave the cell-phone on.

However, this policy and the employee’s exploitation of it created an enacted environment that almost eradicated the distinction between company time and private time. This led to the problem that a person was never really off work. One of the three founders of this company—and the institutor of this cell-phone policy—our interviewee solved the problem thusly. “So I often turn the phone off for a whole day, to people’s great irritation. It is one way of doing it – so people can choose between cheap phone and at the same time be called.” This example shows that there are stages to enactment. One might be mindful of what is intended by a certain behavior, in this case a cell-phone policy, but one is not able to see the eventual consequences of the policy—thus the dramatic exchanges he describes

Our next example comes from a Norwegian dairy and pig farming couple that had invested heavily in farming technologies and also ICTs, in order to increase the efficiency of their farm. Their investments had led to a new kind of problem. “We can’t call the relief worker – ring just to say that now we want a

relief worker – that doesn't work for us – there is too much technology in our cowshed for doing that.” The new farming environment that they had enacted through their investments in high-tech placed a new “environmental” problem in that relief workers with the right set of competencies were hard to find. In this case, enactment that generated one kind of opportunity also restricted other options.

A Norwegian professor gave us an example of being more or less mindful when writing e-mails. “When I communicate with colleagues then I am more thoughtful on what I am actually writing. ... They also require a more thought out answer. ... I feel that with the students I can be a bit more lax.” He is mindful of whom the receivers of his e-mails are, and adjusts his communicative efforts accordingly. Once he sees who the receiver is, he pays little attention—is not mindful—to the content and purpose of the e-mail. He has a script for how much writing effort to put into his e-mails based on whom the receiver is.

Furthermore this professor is in fact creating an important part of his own working environment, since both colleagues and students are important parts of his work day how they view him and interact with him is largely based on how they perceive him. The way he communicates with people—students and colleagues alike—influence how they perceive him and thus how they interact with him, which is an important part of his working environment. Although he is mindful of his communicative efforts, he may not be aware of the enacted environment or work context than his mindful behavior creates.

### The Enactment of Media Richness Through the use of Another Media

While many interviewees have mindful preferences for one ICT over another, they also explain another unintended consequence of mindful ICT use: how one ICT choice impacts a different ICT. One Norwegian executive education counselor explains that when there is no relationship established he is mindful of how he crafts e-mail messages. “I do relate more formally to this person [someone new] in written form, and I am more careful then ... because I

will spend time on formulating myself in a good way.” Phrases such as, “relate more formally,” “I am more careful,” and “spend time formulating myself” indicate a high degree of mindfulness when communicating. As the actors interact they enact or co-create a relationship that consist of trust and to various degrees, mutual understanding.

What I say is that it is easier, for example some project managers that I been working with in 3-4 years now, and they know me very well, in a way ... and I am much more effective towards them than I am towards others.

Being “effective” means “achieving more with fewer words and less time spend carefully crafting messages,” the communication, and hence relationship, become more effective. Social actors enact—through the use of interaction and multiple media—the richness of a media such as e-mail.

I know some people very well because I have met them physically in many occasions ... because we have established a relationship—a working relationship, but I do feel that the use of the net [e-mail] is much easier now when I know the people from the physical meetings. I can write them in another way.

In this case, the use of one media—face-to-face—impacts the perceived and experienced richness of another—e-mail. This relationship enacted over time, through the use of multiple and rich media, facilitates communication. In other words, the richness of a particular media—in this case e-mail—is not only a function of the objective media characteristics—media richness theory (Daft & Lengel, 1984 1986), or the collective perception in a group of that media—social information processing (Fulk, Steinfield, Schmitz & Power, 1987), but it is also a function of how the richness of said media has been enacted among the communication participants on previous encounters and thorough the use of other media.

For example you might learn that a person is laid-back but really sarcastic, so you read his e-mails a little differently than you read the e-mails of others.

Then you receive one e-mail you don't understand what he means so you give him a call and he explains that it was an understatement, and suddenly it makes sense, not only does it make sense, it is also amusing. As your relationship progresses in this manner you jointly negotiate (enact) the use of e-mail as a richer medium than media richness theory (Daft & Lengel, 1984 1986), and social information processing (Fulk, Steinfield, Schmitz & Power, 1987) would indicate.

A famous illustration of “enacted richness” is the correspondence between the Victor Hugo and his publisher following the publication of his novel, *Les Misérables* in 1862. Victor Hugo sent his publisher a card containing only the symbol “?”. In return he received another card containing only the symbol “!”. Within the enacted context of Hugo's relations with his publisher (and the public's reactions to the publication), these single symbol messages were loaded with meaning; lacking such an enacted context, such messages would be utterly meaningless.

The use of rich media—such as face-to-face communication—to increase the richness of leaner media can also be seen in the following example from an American salesperson. He offered some additional insight into the enactment of the previously described “rich media for closing deals” script. He stated that, “I will spend a lot more personal time with somebody I don't know. I will very rarely page a new customer.” He does not feel that it is appropriate to use leaner media until a relation is established. “I will very rarely send them emails until I get to know them.” His reason for this was that before he could use leaner media such as e-mail and pagers he needed to “build confidence and trust within that individual.” Once he had done that, then, “it's acceptable to send them pages, send voicemails, or emails. But I try to keep that to a minimum until I really feel comfortable with them as well as they fell comfortable with me.” Through the use of face-to-face communication he establishes a relationship that allows him to subsequently use leaner media in the relation; he enacts the richness of the leaner media through the use of richer media.



One of our Norwegian respondents who does a great deal of her business internationally has met most, if not all, of her worldwide contacts. Meeting people face-to-face is important because “then [you] have a tie that makes it much easier to get in touch with them.” Not only is it easier to communicate with colleagues when you have actually met them in person, and have through rich face-to face interaction enacted a better understanding of each other as people. This enacted understanding helps determine how to approach a conversation, “because then you know what guy this is – if the guy is very formal or informal.” She says that having met a person she knows if it is a person that she can “joke around” with. This kind of personal understanding is difficult at best to enact through leaner media. Having an understanding of what kind of person it is that you are communicating with is important because, “if you communicate with some group in the US, then you know who you can joke with when it comes to Bush and not.” She says that this is important to know, because if you don’t “you should not take the chance either.” Enacted personal relationships allow for both greater flexibility and understand as well as improved effectiveness of communication.

Face-to-face communication is considered appropriate for dealing with emotion and conflict since the ability to pick up on multiple, and perhaps conflicting cues, as well as allowing for flexible communication and immediate feedback is essential (Daft & Lengel, 1984, 1986; Lengel & Daft, 1988; Rice, 1993). For these processes—initiating relationships, and closing deals—face-to-face communication is preferred by several of our informants both in the US and in Norway. They prefer rich media for these tasks because of the ability of rich media to deal with multiple cues and to be flexible, but also due to a (perceived) need for immediate feedback. In both the initial stages of a relationship and when closing deals uncertainty and ambiguity is high, and richer media are therefore considered more appropriate (Daft & Lengel, 1984,1986). Our findings of the mindful use of rich media in situations of high ambiguity, and in augmenting the richness of leaner media, lends partial support to Timmerman’s

(2002) claim that it is when social actors are mindful that media choice theories (Daft & Lengel, 1984, 1986; Fulk, Steinfield, Schmitz & Power, 1987; Sitkin, Sutcliffe & Barrios-Choplin, 1992) are predictive.

In these examples, mindful social actors actually consider, at least some of, the underlying dimensions of media choice theories—opportunity for fast feedback, ability to convey multiple cues, opportunity to tailor the message to the situation and, ability to convey ambiguous and subjective material—when selecting their communication media.

## **Summary and Conclusions**

In this paper we have used empirical examples of ICT use to link enactment and mindfulness. Figure 1 below summarizes our main findings and assertions. The two dimensions in our figure are enactment (co-creation) of scripts, and invocation (employment) of scripts. Both enactment and invocation can be mindful or mindless.

*Figure 1. The Enactment and Invocation of Scripts*

		Invocation	
		Mindless	Mindful
Enactment	Mindful	Most common. In the face of ecological change new scripts are enacted that meet the requirements of these altered conditions. Enacted scripts are then invoked mindlessly, and this works quite well as long as new conditions are stable.	Opportunity for revision and refinement of existing script, or starting point for enactment of new script.
	Mindless	Subtle changes that lead to minor alterations in existing scripts. The evolution of scripts. Or scripts based on old habits.	When mindlessly enacted scripts meet substantial ecological change. Leads to either termination of existing script and the mindful enactment of new more appropriate scripts.

Our finding is that enactment of scripts is most commonly quite mindful. Social actors faced with a new situation or some alteration, are more acutely aware of environmental cues and strive towards behaviors—communicative or otherwise—that allows them to cope or even excel under these altered conditions. These mindfully enacted scripts tend to work quite well given that these “altered” conditions do not change again. Given stable conditions, mindful invocation of mindfully enacted scripts works quite well, allowing social actors to ration their finite cognitive abilities. If, for one reason or another, social actors are mindfully invoking scripts then this mindful usage of a script is either a basis for revising existing scripts or the starting point for the mindful enactment of a new script.

If however, ecological changes are subtle to the point of being imperceptible, but over time amount to substantial changes then the mindless evolution (or evolutionary failure) of scripts occur. The mindless invocation of mindlessly enacted scripts is probably the most precarious position for people to find themselves in, as it often leads to inappropriate behaviors. As behaviors

become inappropriate to the point of being socially unacceptable (behavioral failure) social actors suddenly become mindful of their invoked scripts (through the failure of the prescribed behavior). This sudden mindfulness usually leads to termination of old script and the mindful enactment of new more appropriate scripts.

This study suggests that the constructs of enactment, scripts and mindfulness/mindlessness are not just tightly related, they are in fact integrated, and can be used together to better understand ICT use. The findings support the view that ICT use scripts are often co-created between individuals and their environments. These scripts are often enacted mindfully; however, mindfulness occurs on a continuum and is influenced by a number of factors. The most common mindfully enacted script is that face-to-face communication is used for emotional or ambiguous and important situations. Scripts can also be mindfully created, yet mindlessly invoked and used even when they might be ineffective. Mindful ICT use can also have positive and negative unintended consequences. Finally, varying levels of mindful ICT use can impact perceptions and use of additional ICTs.

While this study serves to integrate Weick's theory of enactment and Langer's theory of mindfulness, several opportunities for future research exist. Prior research has theorized the concept and while this study drew implications from data, actually measuring mindless behavior remains a challenge. Interview data relies on self-reports of behaviors, which means that interviewees are engaged in retrospective sense-making of mindless when giving accounts of behaviors, mindless and otherwise. We believe that observational data in combination with interview data would shed further light on issues related to mindless behaviors in organizations.

Another area for future research is in the exploration of unintended consequences of mindful ICT use. The findings of this paper validate the prevalence of unintended consequences of mindful behavior; however, we know very little about how these unexpected outcomes affect behaviors and ICT use.

For example, if highly mindful ICT use results in something unexpected, does that result in the mindful modification of scripts? The answer from studies of disaster is that we do learn from mistakes and unintended outcomes (Weick & Sutcliffe, 2001) As our findings indicate, mindfulness/mindlessness is not a dichotomous variable, but a continuous one. Is then, the degree of “unintendedness” really just a reflection of the level of mindfulness? Since—as we have shown in this paper—social actors are more or less mindful, and enactment is something that occurs when we are relating to our environments—as social creatures this is something we do constantly—then a fair amount of us enacting our environments should occur in a state of more or less mindlessness. Exploring the implications and scope of mindless enactment should prove a ripe field for future research.

The complexity of ICT use is not likely to decrease in the near future. Regularly we find that new ICTs emerge through technology advancement and by combining existing ICTs. As individuals make sense of ICTs, they will continue constructing, using, and modifying scripts. As scholars it is our task to study the scripts, create models of use, and empirically test the models. It is through our theoretical contributions that we develop sustainable explanations for behavior.

## **References**

- Abolafia, M. Y., & Kilduff. (1988). Enacting market crisis: The social construction of a speculative bubble. *Administrative Science Quarterly*, 33, 177-193.
- Abougomaah, N. H., Schlacter, J. L., & Gaidis, W. (1987). Elimination and choice phases in evoked set formation. *The Journal of Consumer Marketing*, 4(4), 67-73.
- Anderson, P. (1999). Complexity Theory and Organization Science, *Organization Science*, 10, 216-232.
- Ashforth, B. E., & Fried, Y. (1988). The mindlessness of organizational behaviors. *Human Relations*, 41(4), 305-329.
- Barley, S. R. (1986). Technology as an occasion for structuring: Evidence from observations of CT scanners and the social order of radiology departments. *Administrative Science Quarterly*, 31, 78-108.

- Broadbent, D. (1958). Perception and communication. New York: Pergamon.
- Browning, L. D., & Henderson, S. C. (1988). One-way communication transfers in loosely coupled systems. In J. A. Anderson (Ed.), *Communication Yearbook* (Vol. 12, pp. 638-669). Newbury Park, CA: Sage.
- Burgoon, J. K., Berger, C. R., & Waldron, V. R. (2000). Mindfulness and interpersonal communication. *Journal of Social Issues*, 56(1), 105-127.
- Burgoon, J. K., & Langer, E. J. (1996). Language, fallacies, and mindlessness-mindfulness in social interaction. *Communication Yearbook*, 18, 105-132.
- Choo, C. W. (2001). The knowing organization as learning organization. *Education + Training*, 43(4/5), 197-205.
- Czarniawska-Joerges, B., & Wolff, R. (1991). Leaders, managers, entrepreneurs on and off the organizational stage. *Organization Studies*, 12(4), 529-546.
- Daft, R. L., & Lengel, R. H. (1984). Information richness: A new approach to managerial behavior and organizational design. In B. M. Staw & L. L. Cummings (Eds.), *Research in Organizational Behavior* (pp. 191-233). Greenwich, CN: JAI Press.
- Daft, R. L., & Lengel, R. H. (1986). Organizational information requirements, media richness and structural design. *Management Science*, 32(5), 554-571.
- Daft, R.L. & Lewin, A. Y. (1990). Can Organization Studies Begin to Break Out of the Normal Science Straitjacket: An Editorial Essay, *Organization Science*, 1(1).
- Edwards, J. C., McKinley, W., & Moon, G. (2002). The enactment of organizational decline: The self-fulfilling prophecy. *The International Journal of Organizational Analysis*, 10(1), 55-75.
- Einhorn, H. J., & Hogarth, R. M. (1986). Judging probable cause. *Psychological Bulletin*, 99, 1-39.
- Follett, M. P. (1924). Creative experience. New York: Longmans.
- Fulk, J., Steinfield, C. W., Schmitz, J., & Power, J. G. (1987). A social information processing model of media use in organizations. *Communication Research*, 14(5), 529-552.
- Gallant, L. M., Boone, G. M., & Almquist, G. (2003, June 24-27). *Wireless organizational communication: A framework for communicative informatics*. Paper presented at the Informing Science and Information Technology Education Joint Conference, Pori, Finland.

- Gioia, D., & Poole, P. P. (1984). Scripts in organizational behavior. *Academy of Management Review*, 9(3), 449-459.
- Gioia, D. A. (1986). Symbols, scripts and sensemaking: Creating meaning in the organizational experience. In H. P. Simms & D. A. Gioia & a. Associates (Eds.), *The thinking organizations* (pp. 49-74). San Francisco: Jossey-Bass.
- Glaser, B. G. (1978). *Theoretical sensitivity: Advances in the methodology of grounded theory*. Mill Valley, CA: The Sociology Press.
- Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: strategies for qualitative research*. Chicago: Aldine.
- Kreiner, K. (1989). Culture and meaning: Making sense of conflicting realities in the workplace. *International Studies of Management and Organization*, 19(3), 64-81.
- Kreps, G. A., & Bosworth, S. L. (1993). Disaster, organizing, and role enactment: A structural approach. *American Journal of Sociology*, 99(2), 428-463.
- Langer, E. J. (1978). Rethinking the role of thought in social interaction. In W. I. J. Harvey & R. Kidd (Eds.), *New directions in attributional research* (Vol. 2, pp. 35-58). Hillsdale, NJ: Erlbaum.
- Langer, E. J. (1989). *Mindfulness*. Cambridge, MA: Perseus Books.
- Langer, E. J., & Moldoveanu, M. (2000). The construct of mindfulness. *Journal of Social Issues*, 56(1), 1-9.
- Lengel, R. H., & Daft, R. L. (1988). The selection of communication media as an executive skill. *The Academy of Management Executive*, 2(3), 225 - 232.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Thousand Oaks, CA: Sage.
- Rice, R. E. (1993). Media appropriateness: Using social presence theory to compare traditional and new organizational media. *Human Communication Research*, 19(4), 451-484.
- Shannon, C. E., & Weaver, W. (1949). *The mathematical theory of communication*. Urbana, IL: University of Illinois Press.
- Sitkin, S. B., Sutcliffe, K. M., & Barrios-Choplin, J. R. (1992). A dual-capacity model of communication media choice in organizations. *Human Communication Research*, 18(4), 563 - 598.
- Smircich, L., & Stubbard, C. (1985). Strategic management in an enacted world. *Academy of Management Review*, 10(4), 724-736.

- Stephens, K., Browning, L. D., Sørnes, J.-O., & Sætre, A. S. (2002, July 16-20). *A reflexive model of ICT practices in Norway and the US: An integration of adaptive structuration theory and self-organizing systems theory*. Paper presented at the International Communication Association's Annual Conference, Seoul, Korea.
- Strauss, A. (1970). Discovering new theory from previous theory. In T. Shibutani (Ed.), *Human Nature and Collective Theory*. Englewood Cliffs, NJ: Prentice-Hall Publishing.
- Timmerman, C. E. (2002). The moderating effect of mindlessness/mindfulness upon media richness and social influence explanations of organizational media use. *Communication Monographs*, 69(2), 111-131.
- van den Hoonaard, W. C. (1997). *Working with sensitizing concepts* (Vol. 41). Thousand Oaks, CA: Sage.
- Weick, K. E. (1969). *The social psychology of organizing*. Reading, MA: Addison-Wesley.
- Weick, K. E. (1979). *The social psychology of organizing* (2nd ed.). Reading, MA: Addison-Wesley.
- Weick, K. E. (1995). *Sensemaking in Organizations*. Thousand Oaks, CA: Sage.
- Weick, K. E. (2001). *Making Sense of the Organization*. Malden, MA: Blackwell Publishers.
- Wenberg, J., & Wilmot, W. (1973). *The personal communication process*. New York: John Wiley and Sons.



## **Paper Three**

# A Reflexive model of ICT practices in Organizations<sup>45</sup>

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## **Abstract**

This paper reports a study of information and communication technology (ICT) use in Norway and the United States. Forty-two depth interviews completed in both countries provide the data source. Using grounded theory as a research method, and Adaptive Structuration as our conceptual bases, we analyze these interviews to generate an empirical model of ICT use. The 1490 incidents identified in our analysis are first reduced to 49 categories. These categories are further reduced to four: satisficing, channels, communication structure, and environmental agents. These four categories comprise the major parts of the reflexive model. The findings suggest that the parts of the model are interdependent and mutually causal in that individuals consider and even reconsider the use of multiple communication channels within and between tasks. As a conclusion we address future research including, credibility and time issues in ICT use.

## **Introduction**

Traditionally, empirical studies that have looked at information and communication technologies (ICTs) in organizations such as email, fax, voicemail, and the telephone have adopted both a deterministic focus and a quantitative methodology. As illuminating as these studies have proved with respect to identifying when particular communication channels are most apt to be chosen, they have tended to produce inconsistent findings. Why? Because, as later studies showed, more than just technology itself shapes ICT use (Fulk, Schmitz, & Steinfield, 1990; Contractor & Eisenberg, 1990; Markus, 1990; Poole & DeSanctis, 1990; Sitkin, Sutcliffe, & Barrios-Choplin, 1992). So in the past decade scholars have moved away from controlled studies and consequently produced a wealth of qualitative research and recursive theorizing. In the process, many different theories have emerged to explain how the various elements work together to explain ICT use (Hollingshead and Contractor, 2002; Kling, 1996; Markus & Robey, 1988; Spears & Lea, 1994; Webster & Trevino, 2000). However, it is rare to find studies looking at multiple ICTs in combination, and those that exist have thus far used predominantly college students as their survey respondents (e.g., Flanigin & Metzger, 2001; Savolainen, 1999). We intend to capitalize on the need to study many ICTs in context. Sitkin et al. (1992) claim that much of the ICT literature facilely assumes that users employ a single ICT for a given task. They argue—rightly, we believe—that studies of multiple channels and communicators offer a solid place for future researchers to tread.

Our approach follows this recent trend and uses an inductive process to empirically extend these recent theoretical models. We extend existing empirical research by collecting diverse data that involves the use of multiple ICTs in 10 industries, 30 organizations, multiple levels of management, and different job roles.

The qualitative approach we use—a grounded theory methodology (Charmaz, 2000; Glaser & Strauss, 1967)—compels us to actually go into the

field and gather our data first before hypothesizing about the relationships. We interview the agents, we allow them to put forth the ICTs they themselves use, we listen to them explain their interactions with what or whom, and then we move from details to abstractions in the production of theory. There is some previous work using grounded theory to examine ICT's (Orlikowski, 1993; Scott, 1998). Scott (1998), for instance, analyzed ICT use by assessing secondary sources. She searched the Internet for case studies of Internet use, examined websites provided by vendors such as Netscape and Sun, and she reviewed articles by consultants and academics. Her work with secondary sources foreshadows this research, since we extend her analysis and rely on primary sources by conducting interviews with active ICT users.

While grounded theory provides us our methodological framework to generate our theory, we rely on existing theory to help us make sense of our data and add reliability to our findings. We use Giddens' structuration theory (1979, 1984, 1987, 1990), and in particular one of his primary tenets, the duality of structure, to explain the relationship between action and structure in a complex information environment. In particular, we build on Adaptive Structuration Theory (AST) (Poole & DeSanctis, 1990) to show how individuals appropriate ICTs for their own use, which is at the heart of the grounded model presented later in this paper.

Because the literature on ICT use and its sister terms is substantial (for reviews, see Fulk & Boyd, 1991; Garton & Wellman, 1995; Flanagin & Metzger, 2001; Hollingshead & Contractor, 2002), we will restrict our review of it to those studies that have shaped our guiding research question and that situate our reflexive model. We will then explain in greater detail the methods we've employed. Next, we present the theoretical perspectives of structuration theory to form a framework for interpreting the findings. Then, the findings

are presented and are organized around the four central nodes in our model (see Figure 1). Finally, we end with a summary and conclusions.

## **Literature Review**

To best situate current research on ICT use, we begin with a brief review of the theoretical and empirical literature. Much of the previous work treats technology as a firmly imbedded structure that itself determines how a particular channel will be used (i.e., media richness theory; Daft & Lengel, 1984; Trevino, Daft & Lengel, 1990; Daft, Lengel & Trevino, 1987; social presence theory; Short, Williams & Christie, 1976; and the cues-filtered-out perspective theory; Sproull & Kiesler, 1986).

More recently, theorists have challenged the notion of technological determinism by suggesting that channels are best studied through a lens of social influence (Fulk, Schmitz, & Steinfield, 1990), a process capable of carrying task data and symbolic meaning (Sitkin et al., 1992), and a socially constructed, or co-determinant perspective (Contractor & Eisenberg, 1990; Fulk, Schmitz & Steinfield, 1990; Markus, 1990; Markus & Robey, 1988; Poole & DeSanctis, 1990; Zack & Mckenney, 1995). Social construction attempts to move beyond the deterministic views to recognize that features of technology are enacted and emergent, not embodied, in a given channel. Specifically, adaptive structuration theory (AST) examines how the structures that are imposed by technology recursively shape and in turn are shaped by interaction (Pool & Desanctis, 1990). Orlikowski (2000) attempts to move beyond the perspectives of AST and calls these features of technology “technologies in practice” (p. 407) and uses AST (Poole & DeSanctis, 1990) to argue that ongoing enactment of a technology in practice explains why users may need to use technology differently if they change jobs or have new communication responsibilities. This social construction perspective serves as the basis for our guiding research question

here, one that will provide additional empirical tests of this perspective and expand the examination to include multiple organizations.

Research Question: In organizational contexts, what factors influence individuals' use when they select among the various ICTs?

## **Method**

Given the paucity of empirical research on the use of multiple ICTs in organizations, we chose a qualitative approach to answer the research question listed above. This is consistent with suggestions by Steinfield and Fulk (1990) that these phenomena should be explored in the field using a qualitative methodology. A qualitative method of inquiry is preferable wherever the topic of inquiry is emergent and ill-defined (Patton, 1990). Strauss and Corbin (1990) explain that qualitative research is useful for giving “intricate details of phenomena that are difficult to convey with quantitative methods” (p. 19). Also, grounded theory is particularly adept at registering variation because of the flexibility it gives researchers to modify their analyses as further data are gathered (Charmaz, 2000). Thus, by conducting field research, we are better able to capture how individuals use various ICTs.

## ***Research Sites and Participants***

The participants in our study were chosen by a theoretical sampling method whereby individual respondents were chosen based on their experiences, ability to reflect, and ability to articulate the information solicited (Glaser and Strauss, 1967). Apart from their uniformity in age (all but three of them were younger than 40), participants consisted of a cross-section of users representing different functional areas (i.e. managers, salespeople, marketers, programmers, web-designers), ethnicities, professional and organizational tenure, and gender. We had two particularly relevant criteria for selecting participants: (a) all of them

used ICTs extensively in their daily work, and (b) they frequently communicated with either internal or external customers. This last feature becomes important in our data set because few studies make an effort to collect data from sales and marketing (externally focused communication) as well as production (internally focused communication). The sample consisted of people working for organizations based in the U.S. and Norway who represented diverse industries, including e-learning, entertainment, software-production, semiconductor, oil and gas, and government agencies.

### ***Data Collection Procedures***

Data was collected using semi-structured, in-depth interviews—a method that is flexible and that favors adaptation to each context and individual. Moreover, it's important to note that we did not enter the field as blank slates with respect to our understanding of the phenomena of interest (Strauss & Corbin, 1990). We researched the literature to provide a manageable direction to the study.

An interview guide was created based on Spradley's (1979) "grand tour type" design that seeks to relax participants during the interview process and that encourages detailed responses from them. Interviewees were encouraged to tell the "story" of their technology use to ensure the inclusion of outlying details (Polster, 1987). To further ensure this richness, participants were first informed about the study, and then asked to think of one or more specific projects that they were currently working on or had completed. The interview guide began with a set of pre-defined questions focusing on how participants use ICTs in their daily work as well as more general inquiries about collaborative processes with both internal and external customers.

Over the course of five months, four researchers conducted a total of 42 individual interviews, including 21 in the US and 21 in Norway. Each interview lasted 45–90 minutes and was audio-recorded. The recordings were



then transcribed, resulting in some 1,100 pages of double spaced text. To facilitate subsequent data analysis, the Norwegian data set was translated into English by the primary Norwegian interviewer. The other Norwegian research team member checked these translations for semantic and contextual accuracy. Simultaneously with the observations and interviews, we followed the standard recommendation to review the existing literature and thus validate our theoretical perspectives (Charmaz, 2000; Glaser & Strauss, 1967).

### Qualitative data analysis

In analyzing the data, we used constant comparative analysis (Charmaz, 2000; Glaser & Strauss, 1967). This research is aligned with the constructivist approach to grounded theory because we assume that “categories, concepts, and theoretical level of analysis emerge from researchers’ interactions with the field and questions about the data” (Charmaz, 2000, p. 522). The strength of this method is its inductive progression from detail to abstraction (Browning, 1978). We started by identifying individual units of data—called “incidents”—ranging from single sentences to short paragraphs (i.e. “I prefer to meet new customer face-to-face, and from there I can follow up with an email”). We used topic change as the demarcation for establishing incidents. This initial process of labeling incidents is helpful for synthesizing the many observations and for providing insight into our research questions. Three of four researchers labeled the incidents; these were consequently combined, and duplicates were removed. The process resulted in 2376 individual incidents. The second step involved focused coding (Glaser, 1978), where we sorted incidents into a category system in order to generate a smaller, more manageable representation of the data. This procedure is what Glaser (1978) labels “constant comparative analysis,” in which bits of data are compared and confronted with new data for the purpose of verification. At the next level of abstraction, these incidents were then sorted into a category system Glaser (1978). Once again, three of the four researchers participated in this focused coding (Glaser, 1978). Since the three categorizers

didn't always agree, a final categorization was undertaken. In this process, two of the four researchers independently categorized the entire data set. Then, by working together to resolve any disagreements, a doubly categorized data set that resulted in 49 categories. One of the categories on general information was dropped from our analysis because it did not address a person's contemporary practices. Thus, this left a set of 48 categories to further analyze (see Table 1).

Table 1: Total Category Listing

1. What the Web Adds to the Sales Process	25. Video Conferencing
2. E-mail Norms	26. How a Web Site Establishes Culture
3. Reliability of Sources	27. Just-In-Time Learning
4. Face-to-Face (FtF) Communication	28. Physical Work Environment
5. How the Web Affects Organizational Process (Other Than Sales)	29. Internet Search Skills
6. The Value of Traditional Sales Practices	30. Rules of Internet Use
7. Collaborative Innovation	31. Receiver Communication Preference
8. Competitive Intelligence	32. Work/Fun/Flow
9. Desire for Future Technology	33. Complexity & Uncertainty
10. Selecting the Right ICT Channel for the Task	34. Technical Issues
11. Sequence of Media Choice	35. Technology Adoption
12. Telephone Norms	36. Communication in General
13. Internal Digital Knowledgebase	37. Anonymity
14. Role of PowerPoint®	38. Cooperative Analysis
15. Preponderance of the Web	39. E-commerce
16. Customer Relationship Management (CRM)	40. Portability of ICTs
17. E-Learning & General Training	41. Combinatorial and Iterative Process
18. Information Organization	42. Learning by Failure
19. Time Considerations	43. The Web's Role in Decision-Making
20. Information Overload	44. Hierarchy
21. Generation Gap of Users	45. Value of the Internet
22. Control	46. Information Obsolescence
23. Use of Paper	47. Limited Search
24. Palm Pilot	48. The Demise of Fax

Glaser and Strauss (1967) refer to this reduction process as one of the vital procedures in discovering what they term core categories. Since this is a more conceptual treatment of the data, we examined each category to determine if it signified an event, a relationship, or a process, and also if it possibly connected with other categories. This reduced our total number of

coded categories from 48 to four core categories, which we will call “nodes.” These four nodes are a comprehensive representation of the 48 categories. For example, categories such as email norms, telephone norms, face-to-face, use of paper, Palm pilot, and videoconference all collapsed into the “node” labeled channel (see figure 1). While our data is suited for making a cross-cultural comparison between Norway the US, the purpose of this paper was to generate theory from a highly diversified sample. Thus, a more detailed analysis of this data in the future is warranted to reveal possible similarities and differences between the two countries.

After the reduction process, where our four core categories emerged, we sampled and integrated the literature to further develop the emerging theory (Browning & Folger, 1994; Glaser & Strauss, 1967). Integration involves searching for underlying uniformities in the nodes that represent the theory derived from the qualitative data (Browning & Folger, 1994). This step elaborates upon the category system by writing abstractly about it. In this phase, the nodes were renamed and tied to existing theoretical literature to widen the findings’ application (Browning & Folger, 1994). Comparing our core categories to the existing literature, such as structuration theory and adaptive structuration theory, helped us define them more accurately and link them to one another. It is important to emphasize that these theoretical frameworks were not used to guide our data collection or initial analysis of our data. The final four nodes were then mapped into a theoretical model (see Figure 1) to depict more graphically their relationships.

### **Using AST as a Theoretical Framework to Interpret our Findings**

To develop the theoretical scaffolding for the findings generated from the grounded theory analysis, we link it to Adaptive Structuration Theory (AST). We will assert that AST help explain our data, for it captures how systems evolve as action and structure emerge reflexively—in other words, as

an action creates structure that in turn becomes the basis for further action (Taylor, 2001). After reviewing this theoretical perspective, we introduce the model and elaborate on the four major parts. Finally, we conclude with some directions for future research.

### Adaptive Structuration Theory

Structuration theory extends a set of ideas organized around the writing of Anthony Giddens (1979, 1984, 1987, 1990), who focuses on how designed arrangements, like technology and processes, both constrain and sanction individual action in organizations (Poole et al., 1985). Structuration theory is attractive to researchers because it helps answer the question of how different types of communication compose the structures in which actors participate (Taylor, 2001; Ranson, Hinings, & Greenwood, 1980).

Thus far, structuration theory has been applied to the study of organizational communication for myriad purposes. For example, it has been used to account for the effects of power on organizational arrangements (Riley, 1983); to analyze the interpretive schemes that lead individuals to construct meaning (Poole et al., 1985); to show how the same technology can produce similar structuring and divergent outcomes and hierarchies (Barley, 1986); to assess how organizational climates change over time (Bastien, McPhee, & Bolton, 1995); to examine dialectical processes in organizational change (Howard & Geist, 1995); and to understand structuring processes in a research consortium (Browning, Beyer, & Shetler, 1995; Browning & Beyer, 1998; Browning & Shetler, 2000).

In addition, scholars have built on structuration theory and expanded its usefulness to communication and group-level analysis through the development of AST. It is this extension of structuration theory by Poole and DeSanctis and others' work (Poole & DeSanctis, 1989; Poole & DeSanctis,

1990; Poole, & DeSanctis, 1992; Poole, DeSanctis, Kirsch, & Jackson, 1994; DeSanctis, Poole, Dickson, & Jackson, 1993; DeSanctis, Snyder, & Poole, 1994; DeSanctis & Poole, 1994; Contractor & Seibold, 1993; Chin, Gopal, & Salisbury, 1997; and Scott, Quinn, Timmerman, & Garrett, 1998) that applies most directly to this research. Previously, most AST research has focused on the performance of group-decision support systems (GDSS) and related technologies. Our research extends the reach of AST by offering a perspective on how individuals appropriate technology when they have many ICT options. AST lets researchers study how ICTs change organizations by focusing not only on the various structures that technology provides, but also on those structures that emerge when people interact with technology (DeSanctis & Poole, 1994). Following are five tenets of AST as they specifically apply to the major findings in the current study.

First, structuration is the process by which groups maintain a system through applying structures that are the rules and resources provided by sources such as the organization, the task, the organizational culture, the group norms, and the knowledge represented by the participants (Chin et al., 1997). Our interviewees used rules and resources such as the technology provided by the organization and culture to create guiding structures. They also accepted the norms, and acknowledged that their own understanding of the technology affected their practices. While these interviewees are not technology boosters, they represent themselves as competent and active technology users.

Second, the potential of any technology is open-ended. Although it isn't difficult to list a tool's intended functions, its actual uses prove as varied as the goals it supports (DeSanctis et al., 1993). While our interviewees talk frequently about how they use technology to achieve their goals, no two interviews offer a particular pattern of likeness. Instead, the interviewees vary

sharply in the strategies they report using—especially the sequence in which they use them.

Third, users have agency in that they constitute, give meaning, and add value to technologies (Taylor, 1986). Until applied by a user in a specific context, technology is “simply dead matter” (Poole and DeSanctis, 1990, p. 178). Probably because our sampling of interviewees called for active users, we don’t have “dead matter” in these reports of practice. All our interviewees reported high use. This report from one interviewee demonstrates this: “If the computer is down and you can’t use the email, you might as well go home.”

Fourth, the recursive interplay among actors, goals, and technologies in an emergent system must account for how specific user groups assimilate technologies within their own streams of work activity (Contractor & Seibold, 1993). Our model represents the recursive interplay throughout the data, and even though these people varied in their use of ICT technology, they all had rationales for the actions they took.

Fifth, appropriation is the process of bringing structures into practice via interaction. It has three aspects: (a) the amount of appropriation, or the extent to which the group uses the methodology to complete tasks; (b) the distribution of appropriation, which is the degree to which members are equally likely to use the method in problem-solving; and (c) appropriation moves, which concerns whether members use procedures in the prescribed way or whether they combine them with other methods or otherwise change them to fit the task (DeSanctis et al., 1993). All the components of appropriation are present here; therefore, we will elaborate on each of the three aspects.

As noted earlier in this paper, the amount of appropriation is high here in that these interviewees use ICTs with little or no resistance and talk about their use with pride and ownership. Also, they use ICTs at both work and play—indeed, almost interchangeably. Like Boulding’s “squirrel’s law” (Boulding, 1989, p. 673), it’s often difficult to distinguish between work and play. Using ICTs for both purposes clearly tends to minimize any stress associated with their use. Only one person mentioned worrying about the stress resulting from spending too much time on ICTs.

The distribution of appropriation, meanwhile, is wide in that interviewees report very different approaches to media choice. Appropriation moves are also included in our analysis in that while people use most of their ICTs in routine ways, they also talk of distinctions. Individuals use ICTs in ways that are uniquely individualistic in addition to adapting the technology to their own purposes and changing situations.

### **The Theoretical Explanation of the Model**

The model presented below depicts the relations among major nodes, including categories within and across nodes, and are considered to be interdependent and mutually causal. Any single category, including a minor one composed of only three examples, has the potential to influence and act causally on other categories and nodes—just as three drops of Tabasco sauce can change a bowl of soup.

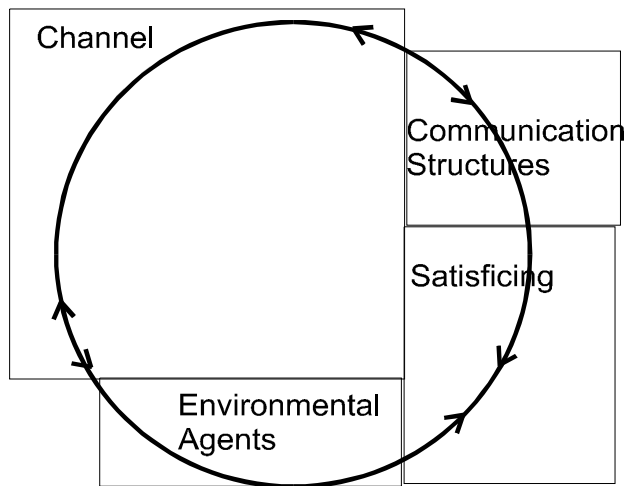


Figure 1: The Reflexive Model of ICT Use

As explained earlier, the four core categories uncovered in our grounded theory analysis represent a grand synthesis of the 48 original categories. They make up the different nodes on the reflexive ICT use model. The bi-directional arrows within the model represent the potentially dynamic relationships among the four major nodes. Unlike proponents of media richness and social influence theories, which often assume the use of a single channel for any given task, we argue that individuals may, in fact, consider and even reconsider using multiple channels.

In response to our research question regarding the factors that affect channel choice, four nodes emerged from the data: (1) channel options, (2) communication structures, (3) satisficing, and (4) environmental agents (see Table 2). These are the four nodes that reflexively interact. We now discuss each of the nodes and provide narrative examples of the more relevant categories.

<b>TABLE 2: Nodes Within the Model and Prevalent Category Descriptions</b>
<b>1. Channels</b>
<b>-What the Web Adds to Sales Process</b>



*Discusses how the Web has changed the sales process. For example, prospecting has been sped up, as has the information flow between people involved in the sale.*

**-Face to Face Communication**

*Discusses FtF's role in the computer-mediated environment. Also discusses FtF's appropriateness, quality, and frequency of use.*

**-Selecting the right channel**

*Discusses how different media and channels are chosen to carry out a task (e.g., contacts), including the most efficient way of communicating with internal and external customers.*

**-E-mail Norms**

*Describes how interviewees use email as their chief medium of communication. Discusses issues such as appropriateness, email use for information-sharing, and CYA (self-protective) tendencies.*

**2. Communication Structures**

**-Collaborative Innovation**

*Includes formal and informal information-seeking and information-sharing behaviors from channels such as discussion boards, people (colleagues, customers, suppliers, competitors), corporate Intranets, and the Internet.*

**-Information Organization**

*Discusses the importance of being able to store, organize, and easily access lots of information. Includes a desire expressed for a software product to provide that organization.*

**-Generation Gap of Users**

*Discusses how older people are generally more skeptical and old-fashioned in dealing with technology.*

**3. Satisficing**

**-Reliability of Sources**

*Credibility & Trust - Includes the need for credible information sources, how source credibility is assessed, and the expressed common characteristics of credible sources. Also includes information on trust building and the importance of trust.*

**-Value of traditional sales practices**

*Shows how many elements of the traditional sales process remain both valid and useful, even with ICTs. Examples include gaining access to decision-makers, relying on customer referrals, and determining demo appropriateness.*

**-Role of PowerPoint**

*Besides being a presentation tool, PowerPoint is widely used for consolidating and organizing information.*

**-Information Overload**

*Discusses problems with—and recommendations for managing lots of information in light of ICT's*

**4. Environmental Agents**

**-Desire for Future Technology**

**Discusses desires for new technology such as streaming processes and personal- productivity enhancements. There are several interesting contradictions in this category.**

**-E-learning and Training**

*Discusses how formal learning occurs in organizations.*

**-Preponderance of the Web**

*Shows that many people feel helpless if the Internet is down. Also discusses problems with the Web such as narrow bandwidth and inflexibility.*

**-Time Considerations**

*Discusses how people differ in the way they define real-time data and bandwidth needs*

Channel

The 22 categories that compose this node of the model illustrate the reflexivity involved in channel choice. Choosing a channel proves complex

and reflexive in that it is also influenced by channel norms as well as by channels used in combination. We will expand on both of these in this section describing the model. Then we'll conclude with an explanation of how the non-computer-mediated channel of FtF has become the very consciously chosen exception to the routinized computer-mediated channels that dominate organizational communication.

We cannot simply view channel choice as a linear process where people know exactly what their task is and rationally select the most appropriate channel for it. Actually, the data from this study suggests that tasks are rarely explicit and tend to be in a state of constant flux. Furthermore, it is difficult for people to explain the norms surrounding a channel without sometimes contradicting themselves. For example, several interviewees explained that they always used email to communicate with colleagues, but later in the same interviews, one added, "Well, of course, if it is important, then I will have to see the colleague FtF to discuss the issue." We suspect that contradictions like these may partially explain many of the inconsistent findings from previous deterministic empirical studies. However, even with the contradictions, some norms emerged concerning channels.

The data that compose our category called email norms appear in all 42 interviews. The empirical findings in this study confirm many of the theoretical tenets of media richness and social presence theory. For example: "When the phone rings you pretty much have to answer it, but with email, I can read the newspaper or go to the bathroom first." And "I keep email to facts, not opinions. Opinions have to be delivered, if at all possible, FtF or over the phone, so that the emotion goes with the message."

In addition to email norms, our categories also include telephone norms, video conferencing, use of paper, Palm Pilot, fax, Internal digital

knowledge bases. While the findings surrounding these channel norms tend to also confirm media richness theory, several points are especially worth noting. It appears that using email to send attached documents has virtually eliminated the need for a fax machine; but paper still has its place, especially when formal documents require signatures. Also, internal organizational Intranets have allowed people to create, though not necessarily use effectively, internal digital knowledge bases, such as Intranets or servers.

Three categories in the data set elaborated on the Webs impact on channel selection. The category called What the Web adds to the sales process suggests that it is now possible to research potential clients, competitors, and potential strategic partners by accessing public or purchased information from the Web. This can speed up the sales prospecting and qualifying processes considerably. One interviewee commented, “I can probably accommodate 10 times the amount of customers now than compared to 10 years ago because of the possibilities technology has provided.” But it works the other way, too. The Web has “made customers more knowledgeable,” and allows them to bypass middle-market players by going straight to a supplier. The structure of the provider/buyer relationship is a key example of AST. The Web changes the structure of the relationship since it has costs and benefits for both. While it lets the customer-service person manage more accounts, it reduces the chance that these accounts will exist at all because of the added choice that the Web gives a customer.

Not only has the Web changed the sales process, but the category we call what the Web adds to organizational processes other than sales contains data on how major changes have occurred in areas such as internal human-relations management, customer-relationship management, competitive intelligence, coordination for manufacturing, electronic commerce, and the identification of cooperators.

In the data, the Web is rarely discussed alone. It is normally mentioned as an information or communication channel that works with other channels to create a more complete communication picture. This category called sequence of media choice is the other major category area that rounds out the channel node. Since our interviewing prompts did not limit people to discussing single channels, they could discuss them however they wished. What regularly happened is that they chose to talk about them in combination. For example, when asked to explain how they find answers for a given task, interviewees often mention “going to a useful colleague first to save time,” or going to the Web and using their search skills so “I’ll appear more knowledgeable in front of colleagues.” Another consideration was the receiver communication preference since they also mention calling or emailing knowledgeable friends. Inherent in these examples is the fact that one channel per task is the exception, not the rule.

While channel norms and the use of channels in combination provide insight into why channels justify a position on the node of the model, another key finding concerning FtF communication emerged in this category. We label this finding “the FtF exception to the routinization of computer-mediated communication.” The data suggests that the computer-mediated channels used for communication are becoming routinized. While their routinization does not necessarily take the form of a fixed mediated channel per task, people often seek a computer-mediated channel at some point during the information and communication process. But because “the search can miss the big picture,” the universal, notable exception in this data set occurs when a communication event appears critically important. The most prominent example is when the sale involves a key client or when the dollar value of the business is considered high. These interviewees always view FtF communication as the best channel for that task.

Communication structure. The communication structure node refers to those categories that shape the forces affecting a communicator. These factors vary greatly. At one extreme is little structure, which occurs under conditions of anonymity, as when a person consciously communicates (either seeking information or giving it) without disclosing their identity or assuming responsibility for what they're communicating (Scott, 1998). In one of our interviews, for example, a financial-services professional makes analyses available to potential clients on his Website because he wants to draw them to his service, but his strategy assumes they are carefully avoiding identification early in the sales process in order to forego marketing pitches. Later, he hopes, they will be enticed to give up their anonymity and approach him directly. Another example of limiting structure is seen in the practice of several of our interviewees who have different email accounts for different purposes, such as a dedicated "Spam" email account, which is not to be confused with their "real one." The capacity to create, control, and abandon these electronic identities suggests a loose structure. Work, fun, flow is a low structure category in that people play using ICTs and do not view the activity as controlled behavior.

At the other extreme is maximal structure, where the category of control lies. Here, people ensure that all parties in the communication acknowledge who they are and understand that a record of their interaction exists in an ICT like email. Our data suggests that many individuals, far from feeling constrained by this accountability, actually feel liberated, knowing that agreements can't later be blithely disavowed. The structure empowers them to collaboratively innovate, reach agreements, and make concessions with a creative flair anchored in the security of their communication. This finding is central in our data because it serves as an example of AST. It illustrates AST in that the rule to "keep agreements" becomes a resource inasmuch as an

electronic audit trail—including date of communication—is left on everyone’s computer to enforce it.

Four other items in this node concern structure. Hierarchy refers to the consciousness a person has when communicating with superiors. While our interviewees say little about hierarchy, when the topic does surface, they make a point of the translation strategies they use in order to adapt to higher-ups, who they assume are less skilled with ICTs and thus will prefer standard tools such as PowerPoint. One interviewee says, “If the prospect is over 45, don’t just send email.” After emailing, they follow up with an additional communication channel such as the telephone or FtF.

The generation gap of users and the value of the Web, meanwhile, highlight the facility that younger people think they have with technology, the common identity they share as a result, and the way they view technology as critical to their work. It must be remembered, however, that in this study of active technology users, all but three of our interviewees were under age 40, which may naturally skew their point of view.

The fourth category—information organization—shows how people select their own structure based on how readily they can store, organize, and access their data. “A piece of information becomes more valuable as it is organized, synthesized, and judged” (Repo, 1989, p. 73). Furthermore, they use these same organizing structures to judge other people’s information. One interviewee, for example, says he can interpret an organization’s very culture by the quality of its Website. Another interviewee says he can go into a company’s Website and assesses its capabilities by examining the kind of people it has hired.

Satisficing. One assumption of decision-making in organizational science is that it is created by bounded rationality—a limited ability to control information and a struggle for interpretation in a complex environment

(Anderson, 1999). Both information overload and information obsolescence contribute to this node because both conditions spur a continuing search for information (Feldman & March, 1981). The categories in the satisficing node have in common that they are adaptations to an environment that is moving quickly, thus people have an action bias (Patt & Zeckhauser, 2000; Browning & Johnson, 1988). Actors sub-optimize rather than hold out for perfect decisions.

Action rationality is in keeping with the organization theory's suggested response to uncertainty. To paraphrase Weick's use of the law of requisite variety, the response to uncertainty is an uncertain structure in kind (1979). The learning by failure items exemplify this; people act quickly and make mistakes and move on as a result of the learning produced by their mis-trials (Sitkin, 1992). People also use FtF communication because it allows for learning without a lot of risk, especially when a person turns to a friend to ask, what for others, might look like a silly or inappropriate question. Testing one's beliefs with close associates allows for gauging the commonality of ideas in a relatively safe manner (Levinthal & Warglien, 1999).

The case for action is strong in the satisficing node. The interviews show that they follow and track information constantly. Many of these agents spend four hours or more a day using ICTs and one reported spending ten hours a day on ICTs. These are examples of just-in-time learning. Changing data or multiple interpretations of what is going on drives much of the speed. When there is a fixed data point—like an exchange rate between the dollar and the yen—their work revolves around individuals actively monitoring the details surrounding their work. Satisficing is based on the assumption that more “rigorous rational-analytic models are relaxed to permit decision makers to deal with the more realistic information processing and decision making



demands” (Weinberg, 1996). This illustrates the Web’s role in decision-making.

March and Simon (1993) created the term satisficing to account for conditions where: “Action is goal-oriented and adaptive. But because of it’s approximating and fragmented character, only a few elements of the system are adaptive at any given time; the remainder are, at least in the short run, ‘givens’” (p. 191). The reliability of sources, credibility and trust category, is a good example of this adaptation. Our interviews show that people are very conscious of the need for credibility and consistently use a three-check rule for accepting data as trustworthy. This rule means that they search for information from three sources and if it agrees, it is deemed credible. People are apparently safe using this rule, as one interviewee said, “why would any one put something on the Web that isn’t true?”

The value of traditional sales practices is a satisficing item in that, despite the presence of novel ICTs, people rely on things that have worked in the past. Since people have a limited capacity for assimilating new information, “they purposefully construct meaning by selectively attending to that which connects with what they already know” (Kuhlthau, 1991, p. 362).

The role of PowerPoint and the portability of ICTs are in the satisficing node in that both of them are quick and reliable ways to meet the requirements of a receiver. While PowerPoint has been criticized for homogenizing presentations (Zuckerman, 1999) and for consuming computer memory (Parker, 2001), it is a dominant organizing tool in these interviews. The combined influence of PowerPoint and FtF is captured in the following interviewee comment about the dominant communication choice: “It’s still a laptop of a PowerPoint presentation, with maybe some supporting documents, with a guy traveling on a plane.”

Environmental Agents. Organizational theory typically characterizes organizations and their environments as complex systems consisting of interrelated; interacting parts (Anderson, 1999; Daft & Lewin, 1990; Simon, 1962). Given their complexity, these systems interact nonlinearly by way of feedback loops through which meanings derived in one system inform or predict activity in another system (Anderson, 1999). Our model suggests that there are various environmental factors that either enable or constrain individuals' technology use. As such, we use the term "environmental agents" to depict the active and structuring role these elements play. Although agency is often understood in terms of human action, we continue to rely on reflexivity as a way of extending our understanding of "agent" to include the power of the environment itself. As in the previous node descriptions, we have drawn upon principles of structuration (Giddens, 1984) as well as AST (DeSanctis & Poole, 1994) to explicate the complexity of the environment and its role as a structuring property.

"Agency" refers to events that occur as a result of some agent's action. Even when the action is not intentional, it still reflects the capability of the agent to affect and to enact. Thus, agency implies power. Without its inertia, any given sequence of events would not take place (Cassell, 1993). Although traditional notions of agent often refer to the power of the individual to create action, we discovered that the organizational environment acts as an agent through its various enabling and constraining features. For example, while ICTs like the Web inherently provide users with more access, resources, and message transmission, they can also limit users in terms of time. When discussing email, one interviewee commented on the enabling and constraining aspect of time by stating:

The downside with email is that it not very useful when you need an immediate answer—then the telephone is a much better channel. However,

email is superior when this urgency is not present, and you can do other things while waiting for an answer. I also like to use mail when I need to explain concepts or problems or ask complicated questions.

Individuals also may have extensive experience in using the Web to search for information, but the preponderance of the web and technical issues like the instability and inflexibility of the structure (e.g., narrow bandwidth), can preclude individuals from using this channel effectively. These factors and one's desire for future technology were noted by one interviewee:

The speed—and bandwidth—is definitely an issue when using the Web at work. A person cannot afford to sit around and wait. By having greater bandwidth, a person will adopt new ways of using the Web—listen to the radio, play video, etc. This will then change the way people use the Web. As another interviewee said, “By the time the ink dries, its stale information.”

Although, individual experience and the training offered to people learning about new technologies like the Web creates an enabling environment, it can also constrain them if the training is inadequate or if they devalue it. For example, one interviewee discussed the relative import that members' previous experience can have in determining how they use certain technologies:

Well, it can be hard—for people who aren't used to searching on the Web, I think it'd be really difficult to get results that are useful to you. It's hard to figure out the right keywords to use, the right combinations of keywords, in order to get a return that has some valuable information in it.

We can see here the power of environmental agents to both enable and limit technology use in the way they affect people's future interactions with other users as well as their future choice of technology. Choice affects technology,

which then affects how the technology is adopted and received, so that what is ultimately constructed is an iterative interplay between agent and agency, between structure and action, or, more specifically, between technology and use. This dynamic interplay between technology and use further reflects the “duality of structure” central to the structuralist point of view, which is that structures are both the medium and outcome of social practices.

AST extends traditional notions of duality to include the interaction between innate structures within advanced technologies and the structures that emerge from human action as the two interact (DeSanctis & Poole, 1994; Orlikowski, 1992). The introduction of new technologies shapes and reconstructs work practices in often unanticipated ways (Coombs, Knights, & Willmott, 1992). As stated, the structural features of a particular technology, such as bandwidth and flexibility, consist of different capabilities, rules, and resources that ultimately govern how individuals collect, use, and make sense of information (DeSanctis & Poole, 1994). But, as we also discovered, other environmental agents, such as the physical work environment, technology adoption and company rules and policies regarding members’ channel and media use, may emerge that affect how much these rules and resources are applied; so they may produce more complexity and uncertainty for knowing which channels and sources to seek in the information-gathering process. For instance, one interviewee made reference to time and how it influences his use of technology:

However, the ability to communicate asynchronously has been a revolution—being able to access and retrieve information then and there. A few years ago we had to call the manufacturer or supplier, ask them to send information about the product, etc. That obviously took more time, and while waiting for the information, we had to do other things. The work was structured differently to fit the time-delay. Now I

can go out and get the information right away and start the design process.

Another individual made reference to the complexity of information received and how its degree of equivocality further affects one's choice of technology:

It really comes down to the complexity of the problem: the more complicated [it is], the more likely I am to search the Web, frankly, because I don't think my colleague would know. Information is too complex for employees. Other times, the Web is not suited to find any information because I am not able to narrow my search enough.

Here, complexity and uncertainty act as unintended consequences compelling people to find new rules and resources to organize and construct action. The reflexivity between the application of emerging rules and resources from the environment, unintended consequences, and the new rules and resources further contributes to the iterative process between environmental agents and technology use. Thus, our model lends fresh support for the duality of structure, since ICTs like the Web appear to be mediated by, and contribute to, the construction of organizational reality (Coombs et al., 1992).

## **Summary and Conclusion**

Let us return to the themes of our research by selecting two nuggets that exemplify what we have learned and where we need to go from here. Our research question dealt with the factors that influence individuals' use when they select among the various ICTs. The findings suggest contradictions in how ICTs are perceived with respect to credibility. Our findings suggest that people will perceive the utility of ICTs differently depending on the nature of the task and the meta-message that using these sources may convey to others. For example, one interviewee indicated that he stopped using his Palm Pilot upon entering the sales field because he felt that it put distance between himself and his customers.

For him, such distance further communicates a lack of credibility that, in turn, could disrupt the development and maintenance of client relationships. This finding offers additional support for the dual-capacity theory of media choice (Sitkin et al., 1992), which claims that people will often choose a channel based on its fit with the task as well as on the symbolic meanings that it conveys to others. In this case, the ICT was no longer considered a valuable tool because the user felt that it symbolically conveyed a lack of credibility. Future research would be well served by examining the specific features of a given ICT and determining the symbolic meaning inherent in those features.

We also found that there are certain factors influencing the sequence in which individuals use different ICTs during a given communication effort. Not only did we find that sequence of ICT use varies, but studying temporal issues is well worth pursuing. For example, with respect to environmental agents, we found additional support for the tensions that the environment brings to the organization. Our findings also offer credence to social-influence models as well as reflexive processes in organizations. Rather than treat the environment as an external force imposed on the organization, the environment is the doer—it becomes the agent, the structuring property that affects members' choice and use of technology. But what is also prevalent in the data is how people talk about time and how it acts as a structuring agent in channel use. Although time enables, it certainly constrains as well, and it is this tension that serves to restructure people's reality about technology. Time serves as the determinant for how we communicate and depending on the speed of the technology (its structures and capabilities), the communication attempt either saves or wastes time. Given the apparent significance of time in structuring organizational reality, future research should examine more thoroughly the temporal elements that affect members' sensemaking, their communication with one another.

Although the aim of this study was not to compare ICT use between Norway and the US, our initial reaction was that people talk about ICT use in similar ways. Although there are many cultural influences that can shape how individuals perceive and use ICTs, and visa versa, how ICT may shape or influence how a culture communicates (e.g. El-Shinnaway & Vinze, 1997; Reeves-Ellington, 1998; Rice, D’Ambra, & More, 1998; D’Ambra et al., 1994; Straub, 1994; Maitland, 1999; Cronin, 1996; Goodman, Press, Ruth, and Rutkowski, 1994; Dutton, Rogers & Jun, 1987; Caron, Giroux & Deuzou, 1989), our descriptive data hint that this may not be the case. To further explore these initial assumptions, we aim to conduct a more rigorous analysis of the discourse of ICT use between these two cultures. Perhaps technology acts as a universal language—an encouraging thought for more global practices that require extensive coordination of technology in order to effectively communicate. Future research on ICT use would certainly benefit by looking at how culture conditions members’ talk and perceptions of technology use.

While these future directions represent priorities for research, additional testing of the model developed here is another suggested direction. Wilson (1999) explains that models may aid other researchers in designing new studies and in proposing and testing hypotheses. Thus, one contribution of this model is that it can provide scholars with a conceptual framework for testing variables and reflexive processes under more controlled conditions. Moreover, it is interesting to note the relative contribution that each node made to the overall model. As Figure 1 above indicates, “channels” was the primary discursive node in our reflexive model. One explanation for its dominance found in this study is that when people are asked about ICT use, it is often less equivocal to talk about technology in terms of channels. On the contrary, most people are not aware of the influence that external factors, such as time and training, have on their own use. As such, these issues are much

more difficult to articulate and express retroactively in interviews. Yet, even with the contribution that “channels” makes in this case, it is important to reiterate that any one of the nodes within the model can preempt the dominant node to create changes in ICT use; hence its reflexive nature. Future research might delve more deeply into the model to determine the various patterns by which these nodes shift and stabilize over time.

## References

- Anderson, P. (1999), "Complexity Theory and Organization Science," *Organization Science*, 10, pp 216-232.
- Anonymous [Author is Scott, C. R.] (1998), "To Reveal or Not to Reveal: A Theoretical Model of Anonymous Communication," *Communication Theory*, 8, pp 381-407.
- Barley, S. R. (1986), "Technology as an Occasion for Structuring: Evidence from Observations of CT Scanners and the Social Order of Radiology Departments," *Administration Science Quarterly*, 31, pp 78-108.
- Bastien, D.T., R.D. McPhee and K.A. Bolton (1995), "A Study and Extended Theory of the Structuration of Climate," *Communication Monographs*, 62, pp 87-109.
- Boulding, K. (1989), "Social Indicators of One-Way Transfers in Organizations," In J. Anderson, (Ed.), *Communication Yearbook*, 12, (pp. 670-674), Santa Barbara, CA: Sage Publications.
- Browning, L.D. (1978), "A Grounded Organizational Communication Theory Derived From Qualitative Data," *Communication Monographs*, 45, pp 93-109.
- Browning, L. D. and B. Johnson (1988), "Technology and Culture: Action Bias Effects in Implementation of Word Processing," In G. Goldhaber (Ed.), *Handbook of Organizational Communication*, (pp. 453-471), Ablex, Pub. Co.
- Browning, L.D. and R. Folger (1994), "Communication Under Conditions of Litigation Risk: A Grounded Theory of Plausible Deniability in the Iran-Contra Affair," In S.B. Sitkin and R.J. Bies (Eds.), *The Legalistic Organization* (pp. 251-280), Thousand Oaks, CA: Sage Publications.



Browning, L. D., J.M. Beyer and J.C. Shetler (1995), "Building Cooperation in a Competitive Industry: SEMATECH and the Semiconductor Industry," *Academy of Management Journal*, 38, 1, pp 113-151.

Browning, L. D. and J.M. Beyer (1998), "The Structuring of Shared Voluntary Standards in the U.S. Semiconductor Industry: Communicating to Reach Agreement," *Communication Monographs*, 220-243.

Browning, L. D. and J.C. Shetler (2000), *Sematech: Saving the U.S. Semiconductor Industry*, College Station, TX: Texas A&M University Press.

Cassell, P. (1993), *The Giddens Reader*, Palo Alto, CA: Stanford University Press.

Charmaz, K. (2000), "Grounded Theory: Objectivist and Constructivist Methods," In N. K. Denzin and Y. S. Lincoln (Eds.), *Handbook of Qualitative Research*. (2<sup>nd</sup> Ed.), (pp. 509-535), Thousand Oaks, CA: Sage Publications.

Chin, W. W., A. Gopal and W.D. Salisbury (1997), "Advancing the Theory of Adaptive Structuration: The Development of a Scale to Measure Faithfulness of Appropriation," *Information Systems Research*, 8, pp 342-367.

Contractor, N. S., and E.M. Eisenberg (1990), "Communication Networks and New Media in Organizations," In J. Fulk and C. W. Steinfield (Eds.), *Organizations and Communication Technology* (pp. 143-172), Newbury Park, CA: Sage.

Coombs, R., D. Knight and H.C. Willmott (1992), "Culture, Control and Competition; Towards a Conceptual Framework for the Study of Information Technology in Organizations," *Organization Studies*, 13, 1, pp 51-72.

Contractor, N.S. and D.R. Seibold (1993), "Theoretical Frameworks for the Study of Structuring Processes in Group Decision Support Systems: Adaptive Structuration Theory and Self-Organizing Systems Theory," *Human Communication Research*, 19, pp 528-563.

D'Ambra, J., R.E. Rice and M. O'Connor (1998), "Computer-Mediated Communication and Media Preference: An Investigation of the Dimensionality of Perceived Task Equivocality and Media Richness," *Behaviour & Information Technology*, 17, pp 164-174.

Daft, R.L. and R.H. Lengel (1984), "Information Richness: A New Approach to Managerial Behavior and Organization Design," In B.M. Staw and L.L. Cummings (Eds.), *Research in Organizational Behavior*, 6, ( pp. 191-233), Greenwich, CT: JAI Press.

Daft, R.L., R.H. Lengel and L.K. Trevino (1987), "Message Equivocality, Media Selection, and Manager Performance: Implications for Information Systems," *MIS Quarterly*, 11, pp 355-366.

Daft, R.L. and A.Y. Lewin (1990), "Can Organization Studies Begin to Break Out of the Normal Science Straitjacket: An Editorial Essay," *Organization Science*, 1, 1,

DeSanctis, G., M.S. Poole, G.W. Dickson and B.M. Jackson (1993), "An Interpretive Analysis of Team Use of Group Technologies," *Journal of Organizational Computing*, 3, 1, pp 1-29.

DeSanctis, G. and M.S. Poole (1994), "Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory," *Organization Science*, 5, 2, pp 121-147.

DeSanctis, G., J.R. Snyder and M.S. Poole (1994), "The Meaning of the Interface: A Functional and Holistic Evaluation of a Meeting Software System," *Decision Support Systems: The International Journal*, 11, pp 319-335.

El-Shinnawy, M., and A.S. Vinze (1997), "Technology, Culture and Persuasiveness: A Study of Choice-Shifts in Group Settings," *International Journal of Human-Computer Studies*, 47, pp 473-496.

Feldman, M. S. and J.G. March (1981), "Information in Organizations as Signal and Symbol," *Administrative Science Quarterly*, 26, pp 171-186.

Flanagin, A.J. and M.J. Metzger (2001), "Internet Use in the Contemporary Media Environment," *Human Communication Research*, 27, pp 153-181.

Fulk, J., J. Schmitz and C.W. Steinfield (1990), "A Social Influence Model of Technology Use," In J. Fulk and C. Steinfield's (Eds.) *Organizations and Communication Technology*. Newbury Park: CA: Sage.

Fulk, J. and B. Boyd (1991), "Emerging Theories of Communication in Organizations," *Journal of Management*, 17, pp 407-446.

Garton, L. and B. Wellman, B. (1995), "Social Impacts of Electronic Mail in Organizations: A Review of the Research Literature," In B.R. Burleson (Ed.), *Communication Yearbook 18*, (pp. 434-453), Thousand Oaks, CA: Sage.

Giddens, A. (1979), *Central Problems in Social Theory*, Berkeley, CA: University of California Press.

Giddens, A. (1984), *The Constitution of Society*, Berkeley, CA: University of California Press.

Giddens, A. (1987), *Social Theory and Modern Sociology*, Stanford CA: Stanford University Press.

Giddens, A. (1990), *The Consequences of Modernity*, Stanford CA: Stanford University Press.

Glaser, B. and A. Strauss (1967), *The Discovery of Grounded Theory*, Chicago, IL: Aldine.

Glaser, B. (1978), *Theoretical Sensitivity*, Mill Valley, CA: The Sociology Press.

Goldstein, J. (1999), "Emergence as a Construct: History and Issues," *Emergence*, 1, 1, pp 40-72.

Goodwin, B. (1994), *How the Leopard Changed its Spots*, London: Weidenfeld & Nicholson.

Howard, L.A. and P. Geist (1995), "Ideological Positioning in Organizational Change: The Dialectic of Control in a Merging Organization," *Communication Monographs*, 62, pp 110-131.

Kuhlthau, C. C. (1996), "The Concept of a Zone of Intervention for Identifying the Role of Intermediaries in the Information Search Process," *ASIS 1996 Annual Conference Proceedings*.

Leckie, G.J., K.E. Pettigrew and C. Sylvain (1996), "Modeling the Information Seeking for Professionals: A General Model Derived from Research on Engineers, Health Care Professionals, and Lawyers," *Library Quarterly*, 66, pp 161-193.

Levinthal, D. A. and M. Warglien (1999), "Landscape Design: Designing for Local Action in Complex Worlds," *Organization Science*, 10, pp 342-357.

March, J. G. and H.A. Simon (1993), *Organizations*, Second Edition. Cambridge, MA: Blackwell Publishers.

Markus, L. and D. Robey (1988), "Information Technology and Organizational Change: Causal Structure in Theory and Research," *Management Science*, Vol. pp 583- 598.

Markus, M. L. (1990), "Toward a 'Critical Mass' Theory of Interactive Media," In J. Fulk and C. Steinfield (Eds.), *Organizations and Communications Technology*, (pp. 194-218), Newbury Park, CA: Sage Publications.

Markus, M.L., T.K. Bikson, M. El-Shinnawy and L.L. Soe (1992), "Fragments of Your Communication: E-mail, Vmail, and Fax," *Information Society*, 8, pp 207-226.

Monge, P., and J. Fulk (1999), "Communication Technology for Global Network Organizations," In G. DeSanctis and J. Fulk (Eds.), *Shaping Organization Form: Communication, Connectivity and Community*, (pp. 327-367), Thousand Oaks, CA: Sage.

Orlikowski, W.J. (2000), "Using Technology and Constituting Structures: A Practice Lens for Studying Technology in Organizations," *Organization Science*, 11, pp 404-428.

Palmer, J.W. (1998), "The Use of Information Technology in Virtual Organizations," In M. Igarria and M. Tan (Eds.), *The Virtual Workplace*, (pp. 71-85), Hershey, PA: Idea Group.

Parker, I. (2001, May, 28), "Absolute PowerPoint," *The New Yorker*, pp 76-87.

Patton, M.Q. (1990), *Qualitative Evaluations and Research Methods*, Second Edition. London: Sage.

Polster, E. (1987), *Every Person's Life is Worth a Novel*, New York: Norton.

Poole, M.S., D. Seibold and R.D. McPhee (1985), "Group Decision-Making as a Structural Process," *Quarterly Journal of Speech*, 71, pp 74 -102.

Poole, M. S., and G. DeSanctis (1989), "Use of Group Decision Support Systems as an Appropriation Process," *Proceedings of the Twenty-Second Annual Hawaii International Conference on System Sciences, Vol. IV*, pp 149-157.

Poole, M. S., and G. DeSanctis (1990), "Understanding the Use of Group Decision Support Systems: The Theory of Adaptive Structuration," In J. Fulk and C. Steinfield (Eds.), *Organizations and Communication Technology*, (pp. 173-193), Newbury Park, CA: Sage.

Poole, M. S., and G. DeSanctis (1992), "Microlevel structuration in Computer-Supported Group Decision-Making." *Human Communication Research*, 19, 1, pp 5-49.

Poole, M. S., G. DeSanctis, L. Kirsch and M. Jackson (1994), "Group Decision Support Systems as Facilitators of Quality Team Efforts," In L. R. Frey's (Ed.), *Innovations in Group Facilitation Techniques: Case Studies of Applications in Naturalistic Settings*, (pp. 299-322), Creskill, NJ: Hampton.

Ranson, S., B. Hinings and R. Greenwood (1980), "The Structuring of Organizational Structures," *Administrative Science Quarterly*, 25, pp 1-17.

Reeves-Ellington, R. (1998), "A Mix of Cultures, Values, and People: An Organizational Case Study," *Human Organization*. 56.

Repo, A. J. (1989), "The Value of Information: Approaches in Economics, Accounting, and Management Science," *Journal Of the American Society For Information Science*, 40, pp 68-85.

Rice, R.E., J. D'Ambra, J. and E. More (1998), "Cross-Cultural Comparison of Organizational Media Evaluation and Choice," *Journal of Communication*, 48, pp 3-26.

Riley, P.A. (1983), "A Structurationist Account of Political Culture," *Administrative Science Quarterly*, 28, pp 414-437.

Savolainen, R. (1999), "The Role of the Internet in Information Seeking: Putting the Networked Services in Context," *Information Processing and Management*, 35, pp 765-782.

Scott, C. R, L. Quinn, E. Timmerman and D.M. Garrett (1998), "Ironic Uses of Group Communication Technology: Evidence from Meeting Transcripts and Interviews with Group Decision Support System Users," *Communication Quarterly*, 46, 3, pp 353-374.

Scott, J. E. (1998), "Organizational Knowledge and the Internet," *Decision Support Systems*, 23, pp 3-17.

Short, J., E. Williams and B. Christie (1976), *The Social Psychology of Telecommunications*, London: Wiley.

Sitkin, S. B. (1992), "Learning Through Failure: The Strategy of Small Losses," In B. M. Staw and L. L. Cummings (Eds.), *Research in Organizational Behavior*, (Vol. 14, pp. 231-266), Greenwich, CT: JAI Press.

Sitkin, S.B., K.M. Sutcliff and J.R. Barrios-Choplin (1992), "A Dual-Capacity Model of Communication Media Choice in Organizations," *Human Communication Research*, 18, pp 563-598.

Spradley, J. P. (1979), *The Ethnographic Interview*, New York: Holt Reinhart & Winston.

Sproull, L. and S. Kiesler (1986), "Reducing Social Context Cues: Electronic Mail in Organizational Communication," *Management Science*, 32, pp 1492-1512.

Steinfeld, C.W. and J. Fulk (1990), "The Theory Imperative," In J. Fulk and C. Steinfield's (Eds.) *Organizations and Communication Technology*. Newbury Park, CA: Sage.

Straub, D.W. (1994), "The Effect of Culture on IT Diffusion: E-mail and Fax in Japan and the U.S," *The Institute of Management Sciences*, 5, pp 23-47.

Strauss, A. and J. Corbin (1990), *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*, Newbury Park, CA: Sage.

Taylor, R. S. (1986), *Value-Added Processes in Information Systems*, Norwood, NJ: Ablex Publishing.

Taylor, J. R. (2001), "The "Rational" Organization Reconsidered: An Exploration of Some of the Organizational Implications of Self-Organizing," *Communication Theory*, 11, pp 137-177.

Trevino, L.K., R.L. Daft and R.H. Lengel (1990), "Understanding Managers' Media Choices: A Symbolic Interactionist Perspective," In J. Fulk and C. Steinfield's (Eds.) *Organizations and Communication Technology*, (pp. 71-94), Newbury Park, CA: Sage.

Trevino, L. K., J. Webster and E. Stein (2000), "Making Connections: Complementary Influences on Media Choices, Attitudes, and Use," *Organization Science*, 11, 2, pp 163-182.

Webster, J. and L.K. Trevino (1995), "Rational and Social Theories as Complementary Explanations of Communication Media Choice: Two Policy-Capturing Studies," *Academy of Management Journal*, 38,6, pp 1544-1572.

Weick, K. E. (1979), *The Social Psychology of Organizing*, Reading, MA: Addison Wesley.

Weinberg, B. H. (1996), Complexity In Indexing Systems—Abandonment And Failure: Implications For Organizing The Internet. ASIS, 1996, Annual Conference Proceedings.

Westmyer, S.A., R.L. DiCioccio and R.B. Rubin (1998), "Appropriateness and Effectiveness of Communication Channels in Competent Interpersonal Communication," *Journal of Communication*, 48, pp 27-48.

Wilson, T.D. (1999), "Models in Information Behavior Research," *Journal of Documentation*, 54, pp 249-270.

Zuckerman, L. (1999, April 17), "Words Go Right to the Brain, But Can They Stir the Heart?" *New York Times*, A17-A19.

## **Paper Four**



# **The Study of Sequence: A Narrative Analysis of ICT Practices**

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### **Abstract**

This study examines how—and why—Information and Communication Technology (ICT) sequences vary. Building on an earlier, 48-category, four-node, context-based model of ICT use, we analyze interviews with experienced users to learn the reasons for their sequences. The paper extends these individual strategies and the ICT model by displaying 24 different sequences possible from the four nodes of the model. The effect of examining these different possible sequences is their equi-finality. That is, all iterations of sequence all lead to ideal and equally successful outcomes.

## The Study of Sequence: A Narrative Analysis of ICT Practices

People in organizations have many different strategies for communicating. One such strategy is how they best sequence their messages—that is, how they order different parts of a message in order to increase its persuasiveness. This ordering of choices is often called “manipulation” in political and planning theory (Riker, 1982; Sager, 2001). But in theories of communication, as long as it is a good person speaking well, *all* the available means of persuasion are legitimate, including ordering the plot of a particular interaction.

One example of making communication choices is when people select among various information and communication technologies (ICTs). To best understand the nature of these ICT choices, we will rely on the original conceptual work by Kenneth Arrow that establishes the importance of sequence for decision-making and for which he won the 1972 Nobel Prize in economics for his contribution to general economic equilibrium theory and welfare theory. In his work The limits of organization (1974), Arrow articulates the concept of social choice this way: “In classical maximizing theory it is implicit that the values of all relevant variables are at all moments under consideration” (p. 47). Choice becomes a part of decision-making not only from what variables may be present at a given “moment” but also from their order of placement. Choosing that order proves to be a key decision for ICT selection, especially when ICT options are sharply limited. For example, if an organization requires its people to use voicemail for all internal communications, then they obviously don’t get to choose that particular ICT; but they still have control over how they combine other elements in their environment to accomplish their communication objectives.

This makes the sequence in which one selects particular ICT options an agenda that orders and affects all kinds of decisions, including group decision-making (Davis, 1992; Endersby, 1993; Weingart, Bennett & Brett, 1993), voting (Riker,

1982; Holt & Anderson, 1999), innovation (Arrow, 1974), interpersonal communication (Street & Capella, 1985), corporate governance (Bainbridge, 2002), selling strategies (Wagner, Klein & Keith, 2001), what appears in the newspaper (Protest, & McCombs, 1991), planning (Sager, 2001), business ventures (West & Meyer, 1998), legal arguments (Chapman, 1998), and group negotiation (Thompson, Mannix & Bazerman, 1988; Weingart, Bennett & Brett, 1993).

In this study, we analyze the ICT sequences found in an interview data set consisting of 40 individuals representing 10 broad industry categories. In our first data section below, we list and analyze the codes from our data that show how interviewees report sequence strategy. This data answers our first research question:

*RQ 1. What do interviewees report about ICT sequence strategies?*

For our second question, we build on an earlier interpretation of this data set and extend it by analyzing the narratives concerning sequence in a larger contextual model of ICT use. Previously, this data set was analyzed using grounded theory analysis and resulted in a model of ICT use (Stephens, Browning, Sørnes, & Sætre, 2003). This model, which is presented in a new light here, consisted of four broad categories, or connecting points, which we call “nodes”—Channel considerations, Environmental Agents, Communication Structures, and Satisficing. Using these four categories as a structuring mechanism, our study focuses on the potential sequences of ICT use. Thus our second research question:

*RQ 2. How does a contextual model of ICT use change when the four nodes of the model become dynamic?*

Our discussion section concludes this work by explaining the theoretical contributions and avenues for future research.

### **Why Study Sequences of ICT Practices?**

In 1992, Sitkin, Sutcliffe, and Barrios-Choplin identified the influence of multiple Channels and communicators as an area for future research. They pointed out that most of the traditional theories and models of media choice assume the use of a single channel and user at any given time. Sadly, such oversimplification remains the norm even today. Although research in this area has occasionally compared two or three communication channels (D'Ambra, Rice, & O'Connor, 1998; Markus, Bikson, El-Shinnawy, & Soe, 1992; Palmer, 1998; and Westmyer, DiCioccio, & Rubin, 1998), most studies have thus far used college students, not organization members, as their survey respondents (e.g., Flanigan & Metzger, 2001; and Savolainen, 1999). The few channel-comparison studies that are reported in the literature seem to assume that there is only one channel required per task and that individuals are quite conscious of how they select that channel (D'Ambra et al., 1998; Markus et al., 1992).

In addition, studies assume that ICT choices are freely made by individuals rather than being influenced by organizational constraints. Garton and Wellman (1995), for example, in their literature review of the social impact of email use on organizations, showed that many media-choice studies artificially assume that email use is purely an individual's choice. Actually, interorganizational pressures are more and more influencing that choice, be it of email or any other ICT. As Monge and Fulk (1999) show, global-networked organizations are increasingly linking themselves through communication systems such as proprietary database-linking systems and the Internet.

## **Method**

### *Data Collection and Analysis*

*Research sites and participants.* The data for this study was collected in the U.S. and Norway over a six-month period from Fall 2000 through Spring 2001. The participants in our study were selected based on their position within their organization, the size of their organization, the nature of their work tasks, and their experience in using ICTs. Special effort was placed on identifying ICT users from a wide range of professions including farming, banking, the legal profession, university teachers, and a range of government and for-profit organizations, including high-tech firms. Apart from their uniformity in age (75% were under age 40), participants consisted of a cross-section of users representing different functional areas, ethnicity, professional and organizational tenure, and gender. Two particularly relevant criteria for selecting participants were these: (a) all of them extensively used ICTs in their daily work, and (b) they frequently communicated with either internal or external customers. This final feature becomes important in our model, because few studies make an effort to collect data from both sales (externally focused communication) and production (internally focused communication).

Data was collected using semi-structured, in-depth interviews—a flexible method that can be readily adapted to each context and individual. An interview guide was created based on Spradley's (1979) "grand tour type" design that seeks to relax participants during the interview process and that encourages detailed responses from them. Interviewees were encouraged to tell the "story" of their technology use to ensure the inclusion of outlying details (Polster, 1987). To further ensure this richness, participants were first informed about the study, and then asked to think of one or more specific projects that they were currently working on or had completed. The interview guide began with three pre-defined questions focusing on how participants use ICTs in their daily work as well as more general inquiries about collaborative processes with both internal and

external customers. The interview questions and probes progressed along the following path: (1) “Walk me through a typical day with your job.” (2) “When building or sustaining customer relationships, what communication channels and technologies do you use?” (3) “When building or sustaining relationships with others in your organization, what communication channels and technologies do you use?”

Over the course of six months, four researchers—two American, two Norwegian—conducted a total of 42 individual interviews, including 21 in the U.S. and 21 in Norway. Each interview lasted 45–90 minutes and was audio-recorded. The recordings were then transcribed, resulting in approximately 2,000 pages of double-spaced text. To facilitate subsequent data analysis, the Norwegian data set was translated into English by one of the Norwegian interviewers and checked for semantic and contextual accuracy by the other, who has special knowledge of English idioms. For analysis, the Norwegian interviews were printed with Norwegian and English translations side-by-side.

*Data analysis.* To organize and interpret the interview data in our earlier study (Stephens et al., 2003), we employed grounded theory, a method originally constructed by Barney Glaser and Anselm Strauss (1967). Given these two authors’ distinctive uses of the method (see Charmaz, 2000, for a review of these differences), we followed Glaser’s version (2002) of the method because it gives particular guidance for developing concepts and models from data. He places particular importance on generating concepts directly out of the field data rather than simply accepting the “received” concepts of previous researchers (p. 2). Glaser recommends focusing on the emergent conceptualizations of the data and generating integrated patterns that lead to abstractions. Abstracting, in turn, allows for conceptualizing a meta-picture of the data of which even the original participants may be “empirically unaware” (p. 5). Of particular value for this study is Glaser’s advice to generate a concept from elements that are “seemingly

disparate” and to unite them through an underlying concept that taps the “latent structure” that drives and organizes behavior (p. 8). We follow Glaser’s protocol by generating categories from data (the 48 categories from 1,490 incidents exemplifies this) and then generating properties from the categories.

## **Results**

To answer RQ 1, we selected all the codes in the data that showed individual reports of ICT sequencing. To answer RQ 2, we developed a 24-item map of sequence to show potential effects of different sequence order. We begin with the first question in the next section.

### Individual Reports of ICT Sequence

For this report of individual sequences, two examples will concretize the discussion. One of our interviewees, who coordinates microchip production among U.S. and Japanese customers and suppliers, reports having a standard sequence for communicating a request. He first sends an email. Then, finding that he hasn’t heard from them because they’re probably overloaded with messages, he phones them to follow up on his request. A second interviewee, a sales person, says that he always conducts customer research on the Internet before contacting prospects in person. He thinks he’s more likely to be successful with them face to face if he has first gained some background information on them.

Sequence examples like these punctuate our data set (see Table 1 for a listing of examples). These 35 data points are significant in that they account for ordering sequence by referring to the same ICTs, yet the preferred sequences among interviewees show no particular pattern. Some think it’s preferable to make a phone call first; others believe in knowing as much as possible ahead of time



about the prospective customer. If these reports are accurate, the sequence for achieving narrative goals is quite varied.

Table 1 - Individual reports of ICT sequence

1) Phone for follow-up after face-to-face	2) If exploratory, Internet first for info. seeking
3) Phone or email for first contact	4) Email to initiate sales call (80-90%)
5) Leads may start from visit to web page, and end up with face-to-face	6) Customer or the info in database as a primary info source
7) Phone calls not as rich as face-to-face	8) Colleagues first - by email or telephone
9) Individual telephone calls with prospect customer	10) First face-to-face, then homework, then meet again and present solution
11) News and books second	12) Internet first, colleagues second
13) Easier to send email after having talked to person on the phone.	14) Colleagues first, Intranet, and then Internet in that order for consultation
15) Combine several mediums for internal communication	16) Searching process from general to specific, and finally using internal Intranet sources
17) Bad website, call	18) Search first, then person, search again
19) Revisit web site after phone call, new info, reconfirm	20) Colleague preferred over searching the Internet
21) First contact with customer usually not face-to-face	22) Multi-modes for searching - Internet search, personal knowledge, and colleagues
23) Internet for initial phases, face-to-face for closing	24) Internet first; colleagues second, when searching
25) Email for follow-up after initial face-to-face	26) Journalists as information sources
27) More phone conversation after face-to-face with person	28) First step in problem solving—what are our internal resources?
29) Internet first for info, Colleague second	30) Book and web for info gathering
31) Go to electronic help first, then a colleague, then application web page last	32) Email to send info/follow-up as agreed with external customer – something that is already talked about.
33) Urgent need - telephone richer than email	
34) Multiple communication Channels used at different points in the sales process	35) Colleagues used first for information. seeking, then textbooks and then Internet

One possible explanation for this variation is that when people choose the sequence, they'll often do so in an unmindful or intuitive manner. People facing a communication decision normally already have a routine, or "script," retained from experience, and they automatically select it without conscious thought or

analysis. Drawing from cognitive science, Gioia (1986) defines scripts as “dynamic event-sequence-oriented webs of structured knowledge held in memory.” Thus, people may be offering these sequences out of pure recall. Barley (1986, p. 83) has a similar view on scripts which he defines as “standard plots of types of encounters whose repetition constitutes the setting’s interaction order.” In other words, the person has previously been in this situation, or one similar to it, and has already made sense of the situation and the communicative decisions it seems to require. Mindfulness, on the other hand, results from a person’s being thrown out of his routine by feeling ignorant of something and having to update his existing knowledge (Weick & Sutcliffe, 2001). Support for this pattern in our data comes from one of our 48 categories that we call “Learning from failure.”

Here a skeptic might ask, “How do you know when they are actually making mindful decisions as opposed to making retrospective sense of their communication choices during the interview itself?” That’s a fair question. But since the interviewees can make sense out of their choices in hindsight, we can at least say that mindfulness has taken place then. When invoking scripts solves unique incidents, learning occurs, mindful or unmindful. Though these changes or differences are small, minute learning does occur, even if it results not in a different sequence of events but only in the content of one of the elements in the sequence. For example, several interviewees recounted incidents where they have learned to simply substitute one ICT for another because the receiver had expressed a preference for it.

Another explanation of these sequence differences in Table 1 is that they are meant to achieve different goals. Because our interviewees come from such different populations and organizations, their strategies are oriented toward different outcomes. That is, they take the form they do because they achieve an outcome or because they create a complete cycle. Straub & Karahanna (1998)

suggest that one driving factor in ICT choice, where numerous media are available, is the desire to obtain “task closure.” They argue that the initiators’ main concern is the recipient, but their own motivation is to bring closure to the task or complete a communication sequence. When the initiator chooses an asynchronous technology, the closure is normally fulfilled when the messages are sent. Yet when a synchronous technology is chosen, the availability and social presence of the recipient is critical. So while face-to-face may be most effective for the initiator and the recipient in a given situation, the drive for task closure may force the use of another ICT. Straub and Karahanna (1998) suggest that there are many factors such as this that may influence ICT choice.

Because of the wide variety of sequences reported in Table 1, it makes sense to simulate all possible sequences. And that brings us to RQ 2. The point of connection to understanding our data in this study is to select a “generative mechanism” (Poole et al., p. 5) to account for how people choose ICTs. We have selected the narrative as this mechanism because of its pliability and adaptability to different circumstances. It also allows for a varying complexity that suggests that a narrative can remain intact yet fit quite different sequence-development scenarios.

### Narrative and Sequence

Another reason to consider sequences is found in Organizational change and innovation processes by Poole, Van de Ven, Dooley & Holmes (2000), which contains a description of process research that helps to frame our study. Poole et al. lay out a research paradigm for studying the process of change at a macro level in organizations. Our own attention to sequence is consistent with their view of process that “the world is made up of entities which participate in events” and that “these events change over time as a result” (p. 39). This assumption fits the sample of ICT use sequences referred to in Table 1. While their book focuses many of its examples on broader issues of organizational

change, their suggestions for analysis also include individual and organizational actions such as “communication frequencies and work flows” (p. 17), which is of course precisely what we collected. As such, our study of ICT practices is contained within their framework.

Several of their ideas are isomorphic with the assumptions and understanding we have about our data from analyzing it for the 48-category system listed in Table 2. To begin with, their approach assumes that it is possible to collect enough information to propose plausible causality for outcomes in the narratives we composed from our interviews. While these data weren’t collected with a traditional methodology that allows for scientific proof of causality, they were collected in sufficient depth to allow us to construct accurate sequences.

Table 1: Total Category Listing

<b>Categories</b>	
1. What the Web Adds to the Sales Process	25. Video Conferencing
2. E-mail Norms	26. How a Web Site Establishes Culture
3. Reliability of Sources	27. Just-In-Time Learning
4. Face-to-Face (FtF) Communication	28. Physical Work Environment
5. How the Web Affects Organizational Process (Other Than Sales)	29. Internet Search Skills
6. The Value of Traditional Sales Practices	30. Rules of Internet Use
7. Collaborative Innovation	31. Receiver Communication Preference
8. Competitive Intelligence	32. Work/Fun/Flow
9. Desire for Future Technology	33. Complexity & Uncertainty
10. Selecting the Right ICT Channel for the Task	34. Technical Issues
11. Sequence of Media Choice	35. Technology Adoption
12. Telephone Norms	36. Communication in General
13. Internal Digital Knowledgebase	37. Anonymity
14. Role of PowerPoint®	38. Cooperative Analysis
15. Preponderance of the Web	39. E-commerce
16. Customer Relationship Management (CRM)	40. Portability of ICTs
17. E-Learning & General Training	41. Combinatorial and Iterative Process
18. Information Organization	42. Learning by Failure
19. Time Considerations	43. The Web’s Role in Decision-Making
20. Information Overload	44. Hierarchy
21. Generation Gap of Users	45. Value of the Internet
22. Control	46. Information Obsolescence

23. Use of Paper	47. Limited Search
24. Palm Pilot	48. The Demise of Fax

Poole et al.’s process approach allows one to study both continuous and discontinuous causation. For example, in our discussion section, we observe that some ICTs, like email, are virtually continuous—that is, they go on all the time—while others, like face-to-face communication, are selective and thus discontinuous. Process research is accomplished by gathering data on how a particular process unfolds over time. Poole et al. recommend the study of event sequences—that is, studying variation among cases. Since we ourselves have 40 cases, our generous data set puts us in a position to simulate the effects of different sequences.

What makes narratives challenging for understanding ICT use is that one must fill in missing premises and information in a story by drawing one’s own conclusions from it about what’s causing what (McBurney, 1936; Weick and Browning, 1986). Important for understanding narratives, rather than as straightforward stories where the conclusion and key points are well telegraphed, an interesting narrative reveals its meanings in layers that gradually unfold, often surprisingly, as the story progresses. This kind of development is a specific literary form, the mise en abyme Chambers, (1984, pp. 32-35) that O’Conner (2000) calls the “embedded narrative.” This form is particularly useful in linking the text to the context. Dallenbach, sees the mise en abyme as a text that looks back on itself, and appears to be a kind of “reflection” (1989, p. 8). Since this device can be used in all kinds of texts; a familiar example is the animal characters in the corner of Pat Oliphant’s cartoon who comment on the larger story in the middle of the drawing (cartoon <http://www.ucomics.com/patoliphant/>). In our own interviews, there were frequent instances where a side comment made in the corner, sometimes after the tape recorder was turned off, reframed our understanding of the situation. By

closely studying such instances, one may better see the more encompassing narratives in which a sub-theme is embedded (O’Conner, 2000).

These dramatic conditions make the narrative useful for sense-making under complex conditions because any single event can change a story’s progress in significant ways—some with smoke and mirrors, others with substantial effects, even though these effects may not be apparent at the time they happen (Tsoukas & Hatch, 2001). If the formidable task of living a life is sense-making, or, as Eisenberg says, “developing a workable narrative about the self and the world for use in dealing with existential/ontological uncertainty,” it is crucial to ask where people find both their motivation and the needed resources to construct such a narrative (Eisenberg, 2001). One part of this question surely takes place as our interviewees searched for a “workable narrative” about ICT use.

A good working definition for narrative is provided by Luhman and Boje (2001), who uses White (1987) to delimit it as “the act of an individual, a group, or a society, who construct their understanding by changing ‘knowing into telling,’ and, in doing so, “endow experiences with meaning,” and subsequently send messages “about the nature of a shared reality” (Luhman & Boje, p. 158). People who use narratives share a fundamental interest in making experiences sensible, and in constructing and communicating meaning (Chase, 1995). And by using language to tell stories, people bestow their action (and the lack of it) with meaning (Czarniawska-Joerges, 1994).

In recent years, the social sciences have placed more value on interpretative story telling (Reed, 1989). This has occurred in part because of the awareness that stories have powerful pedagogical effects. Teachers are perceived as more attractive, and students remember more about their presentations, when they explain conflicting positions on an issue using stories rather than arguments (Colesante & Biggs, 1999). Narrative development is particularly useful for our

work because our interviewees exhibit the goals and intentions of human actors and in doing so make disparate data into comprehensible wholes (Richards, & Singer, 2001).

Narrative is useful for studying sequence because it gives time a human form and it allows for understanding and changing the effects of our actions and subsequently to alter the direction of our practices (Richards, & Singer, 2001). Stories focus on action, agency, and consciousness that develop through a story structure (Maines, 1993). Also important to understanding stories is punctuating them (Polster, 1987) by giving them a beginning and an end and a particular, repetitive pattern of interaction (Stacey, 2000).

### Story Beginnings as Powerful Drivers

The beginning of a story is important because such a position shows what drives a particular incident and gives it power (Fisher, 1985). Origin stories are a distinctive form of narrative in that they account for how something “began to be” (Engel, 1993, p. 785). The sequence of stories connects one’s past to the present and marks important events while affirming beliefs and values about cause-and-effect relationships. Analyzing narrative sequence is useful for interpreting the meaning of events because the best way to gain an understanding of people’s personal understandings of the outcomes of human experience (i.e., why something happened) is through narrative accounting (Hirokawa, DeGooyer & Valde, 2000).

The study of sequence is bolstered by the commonplace notion that communication is a process. Most of the communication events that people experience seem to unfold over time. “Stories have beginnings, middles, and endings. Decisions begin with uncertainty and ambiguity, move toward the exploration of one or more choices, and eventually lead to resolution” (Monge & Kalman, 1996, p. 72). Many narrative events are organized with respect to the characters’ attempts to overcome a series of obstacles. There is considerable

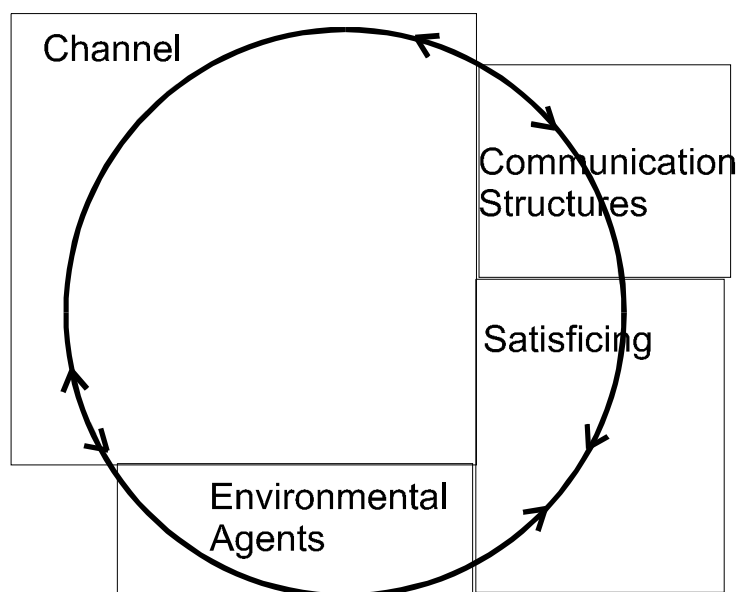
evidence that readers are sensitive to the relations between narrative actions and the goals they serve (Richards & Singer, 2001). Often narratives are not straightforward and tellers sometimes fail to establish their own identity in relation to a story (Temple, 2001).

## Findings

### A Model of ICT Use

The ICT model is presented here to provide background understanding for the analysis of sequence presented at a later point in this paper. Essentially, the original analysis took raw interview data and structured it into four nodes: (1) Channel options, (2) Communication Structures, (3) Satisficing, and (4) Environmental Agents (see figure 1). We now discuss each of the nodes and provide examples of the most frequently occurring categories. Once we elaborate on the model, we will expand it back out and discuss sequence narratively. The goal of this analysis is to reduce narratives into structure and then re-expand it again to illustrate the sequences at play in the data.

Figure 1 - The Reflexive Model of ICT Use





*Channel selection.* Choosing a channel is a complex process that is influenced by norms as well as by how individuals use channels such as the Web, email, phone, and FtF in combination. What the Web Adds to the Sales Process (177 examples, 1<sup>st</sup> in overall ranking)—shows how the Web has changed the commercial processes of selling relationships over ICTs. For example, prospecting for clients has been sped up, as has the information flow between people involved in the sale. Email Norms (130 examples, 2<sup>nd</sup> in ranking) — describes how interviewees use email as their chief medium of communication. Included here are issues such as appropriateness, email use for information sharing, and CYA (self-protective) tendencies. Face-to-Face (FtF) Communication (104 examples, 4<sup>th</sup> in ranking)—covers FtF's role in the computer-mediated environment. Also discussed are FtF's appropriateness, quality, and frequency of use. How the Web Affects Organizational Process (Other Than Sales) (96 examples; 5<sup>th</sup> in ranking)—shows how the Internet improves organizational work by speeding up information searches, enhancing customer support, facilitating information-sharing, and streamlining operations. Also included in this category are the Internet's downsides—e.g., loneliness and eyestrain. Collaborative Innovation (81 examples, 7<sup>th</sup> in ranking)—includes formal and informal information seeking and information-sharing behaviors from channels such as NEWS (discussion boards), people (colleagues, customers, suppliers, competitors), corporate Intranets, and the Internet.

*Communication structure.* The communication structure node refers to those categories that shape the forces affecting a communicator—from technology to attitudes. Information Organization (24 examples 18<sup>th</sup> [tie]) refers to the importance of having lots of information stored and organized for easy retrieval and use. Included here are bookmarks, filters, storing CRM automatically in software, losing one's place and purpose in searches, and well-organized and noiseless Websites. Control (18 examples 23<sup>rd</sup> ranking). The category of Control identifies how ICTs help control information and relationships by such means as

leaving a paper trail, emphasizing security, and being consciously redundant. Our best example of control is an interviewee dealing with several sub-contractors and levels in his operation, which requires him to be very careful about whom gets what information and when. This is important as partners or subcontractors vary, and that many of them are actually competitors. Generation Gap of Users (16 examples 22<sup>nd</sup> in ranking). This category captures distinct discrepancies in technology practices among people of different ages—as seen by interviewees. Included here are such items as showing young customers data because they like transparency, top management not being computer savvy and preferring old fashioned methods, computers being common sense to kids, and a common strategy that if the user is over 45, don't just send email, but use redundant messages. Work, Fun, Flow (7 examples 33<sup>rd</sup> ranking [tie]) refers to the joy of fast work and also enjoying the leisure it produces. Also included are personal uses of the Web, such as checking the horoscope or completing a credit check on one's self, that the job is a hobby, and the opposite—that work is not a hobby and the guilt felt when the computer the firm has provided at home is used for fun.

*Satisficing.* One assumption of complexity theory in organizational science is that it is created by bounded rationality—a limited ability to control information and a struggle for interpretation in a complex environment (Anderson, 1999). The categories in the Satisficing node have in common that they are adaptations to an environment that is moving quickly, thus people have an action bias (Browning & Johnson, 1988). Actors sub-optimize rather than hold out for perfect decisions. This node is composed of the following categories: Reliability of Sources (121 examples 3<sup>rd</sup> in ranking) is a large category (in number of examples) because our data shows the issue of credibility is a constant in ICT interactions. Included in it are estimates of the trust of Home Pages, the requirement to be “public” with customers, the need to double-check sources, the need for three sources, and the reliability of large or well-known suppliers. The

reliability of traditional sales practices refers to the use of FtF visits for maximal effects. The Value of Traditional Sales Practices (92 examples, 6<sup>th</sup> in ranking). The Value of Traditional Sales Practices shows how many elements of the traditional sales process remain both valid and useful, even with ICTs. Examples include gaining access to decision-makers, relying on customer referrals, and determining demo appropriateness.

The Role of PowerPoint (29 examples, 14<sup>th</sup> in ranking) refers to how much this presentation software is used for exchanging all kinds of information, especially across distant boundaries and hierarchies—within and without the firm.

Information Overload (23 examples 20<sup>th</sup> in ranking) refers to incoming information of such volume that it is difficult to keep a one-to-one relationship with it.

*Environmental agents.* Our model suggests that there are various environmental factors that either enable or constrain individuals' technology use. As such, we use the term "Environmental Agents" to depict the active and structuring role these elements play. "Agency" refers to events that occur as a result of some agent's action. Even when the action is not intentional, it still reflects the capability of the agent to affect and to enact. Thus, agency implies power. Without its inertia, any given sequence of events would not take place (Cassell, 1993). Although traditional notions of agent often refer to the power of the individual to create action, we discovered that the organizational environment acts as an agent through its various enabling and constraining features.

The categories that make up this node are: The Desire for Future Technology (64 examples, 9<sup>th</sup> in ranking) refers to interviewees' preferences for technology advancements they do not presently have, including the need for more capacity, a bigger monitor, useful information in a few clicks, an Internet cell phone, more wireless solutions, and the desire for an office with walls and doors.

Preponderance of the Web (26 examples 15<sup>th</sup> in ranking) refers to interviewee

comments on the role of the Internet in their daily life and routine, such as checking one's email the first thing in the morning and throughout the day, constantly checking the Web for news and information, and finally references to Web dependency such as feeling helpless without the Web, and that life without the Internet is "not good for my ulcer." Time Considerations (24 examples, 18<sup>th</sup> [tie] in ranking) covers different perceptions of time such as "real time," the limited time of customers for conversation, the "World Wide Wait," and the time required to establish an information culture. E-Learning and Training (25 examples, 16<sup>th</sup> [tie] in ranking) refers to the way formal classes are held on the computer. Included here are the savings from E-learning and training, the speed and ease of getting material out, and the difficulties of finding ways of using the Internet for training.

Now that we have reviewed the four-part model of ICT use, we will elaborate on the possible unique sequences that contain each of the four categories. Drawing upon Fisher's (1985) work, we find that the beginning point of each sequence provides unique direction for the possible outcomes. Much like stories, the beginnings—or drivers—of the sequences give them power and direction.

#### *The Channel as the Driver of the Sequence*

When the Channel node is placed as the driver of the sequence of the other three nodes in the model, the following six sequences are possible:

Channel, Communication Structures, Satisficing, Environmental Agents

Channel, Communication Structures, Environmental Agents, Satisficing

Channel, Satisficing, Environmental Agents, Communication Structures

Channel, Satisficing, Communication Structures, Environmental Agents

Channel, Environmental Agents, Communication Structures, Satisficing

Channel, Environmental Agents, Satisficing, Communication Structures

An example of one of these sequences chained out into a narrative is demonstrated in the following scheme: Face to face (Channel) communication is used to evaluate the reliability of a source (Communication Structure). This yields more accurate information thereby avoiding information overload (Satisficing), which has the effect of saving time (Environmental Agents). This sequence can be understood when it is considered as a brief instance that contains all four categories of media choice. Like Fisher's classic work (1970) on the communicative indicator of the four phases of group development, which found that all four phases (orientation, conflict, emergence, and reinforcement) of group decision making could be as long as many months and as brief as thirteen seconds, we suggest that a complete cycle through a four category structure of ICTs could occur in a matter of seconds. To capture how such a brief encounter might transpire, let's say two professionals meet face-to-face for introductions and find themselves in rapport during the first few seconds of their meeting. They then phone their home office to report the success of their encounter and are encouraged to email pricing particulars on an agreement. Their instant affinity leads to commitment, which extinguishes the consideration of alternatives (this reduces overload). This saves time and places slack resources into the environmental agent node because slack is an environmental condition (March & Simon, 1993).

#### *Communication Structures as the Driver of the Sequence*

When the Communication Structure node is placed as the driver of the sequence of the other three nodes in the model, the following six sequences are possible:

Communication Structures, Channel, Satisficing, Environmental Agents  
Communication Structures, Channel, Environmental Agents, Satisficing  
Communication Structures, Satisficing, Environmental Agents, Channel  
Communication Structures, Satisficing, Channel, Environmental Agents  
Communication Structures, Environmental Agents, Channel, Satisficing  
Communication Structures, Environmental Agents, Satisficing, Channel

For example: The way information is organized (Communication Structures) can lead to collaborative innovation (Channel) in new and efficient ways that avoids information overload (Satisficing). The effect of this is to perpetuate the preponderance of the web (Environmental Agents). Our interview data shows the ability of the email to combine a brief message with an attachment is the core value of the web and document sharing, for all kinds of purposes, is the quick and efficient use of the Web. Both these examples are Communication Structures.

The resource of the communication structure places a person in a position to participate in and manage a large number of interactions. Such events can occur simply by a person creating a nickname on their email program and dropping all the addresses into it that are relevant to a particular task and then forwarding a document to them. But the ability to reduce overload and to have membership in a group is created by an individual's technological skill. If a person can't keep up with the technology that a particular sub-group is using (unless, as our category on Generation Gap of Users suggests, one is given the privilege of special importance and thus deserving of a special favor to send and receive messages in a simple and familiar way), one's ability to organize is a structural component that easily drives the other three nodes in different sequences. Our category on preferences for the future fits here because the specific visions of the future in these data, even though people prefer quite different features, aggregates them in particular groups.

#### *Satisficing as the Driver of the Sequence*

When the Communication Structure node is placed as the driver of the sequence of the other three nodes in the model, the following six sequences are possible:

Satisficing, Channel, Communication Structures, Environmental Agents

Satisficing, Channel, Environmental Agents, Communication Structures

Satisficing, Communication Structures, Environmental Agents, Channel  
Satisficing, Communication Structures, Channel, Environmental Agents  
Satisficing, Environmental Agents, Channel, Communication Structures  
Satisficing, Environmental Agents, Communication Structures, Channel

For example, when Reliability of sources (Satisficing) allows one to decide quickly about the desire for future technology (Environmental Agents), it leads to collaborative innovation (Channel), which results in work-fun-flow (low organizational structure). The structure of this narrative provides a potential answer to the question of where the narrative gets its force, or energy. It is plausible to explain here because the action in deciding quickly is a form of learning (Sitkin, 1994), or of gaining synthetic knowledge (Kant, 1990). The energy for the sequence is generated by the action itself. One of the values of action is that its reflexive power creates meaning for the actor.

The desire for future technology, and the clarity of our interviewees of what that means for them, is evidence for a view toward progress that has the strength of a paradigm. Using advanced ICTs successfully is, as in the previous section, a part of the membership and identity of participating in a wired community. When people are satisfied that others have the same ability and technical language, they can move toward and work together because the technology, and the rules for using it, is held in common. So even though people had vastly different approaches to what kind of technology, phone, email, face-to-face, etc., are preferred for particular strategies, there do not seem to be severe judgments made about other's ways or routines. People may have strategies, but they are preferences rather than hard and fast rules. Proof of this is the way people have inconsistencies in within their own reports (this is common in narratives in that, narrative revision, such as changing reports of practice) are common in individual reports of attitudes and behaviors. The work/fun/flow is a likely outcome because it accounts for the entrepreneur who finds that the increase use

of technology, and its attendant costs, is worth it. “What I give up in costs, I gain in sanity.” (U.S.)

### *Environmental Agents as the Driver of the Sequence*

When the Environmental Agents node is placed as the driver of the sequence of the other three nodes in the model, the following six sequences are possible:

Environmental Agents, Channel, Communication Structures, Satisficing  
Environmental Agents, Channel, Satisficing, Communication Structures  
Environmental Agents, Communication Structures, Satisficing, Channel  
Environmental Agents, Communication Structures, Channel, Satisficing  
Environmental Agents, Satisficing, Channel, Communication Structures  
Environmental Agents, Satisficing, Communication Structures, Channel

For example: Time considerations (Environmental Agents) leads one to choose WWW (Channel) to gather information and organize information (Communication Structure) using PowerPoint to present the information. (Satisficing). This sequence is important because it was a frequent one in the interviews. People talked about time and efficiency by referring frequently to how many more interactions can be managed with the help of the web.

They also talked about the WWW as a site for research and results from the web are often preferable to traditional hard bound library information because it is easy to verify sources with one’s own efforts. The sequence in this example also reflects a traditional Dewey problem-solving model as it starts with a problem, (the need for speed) which drives the selection of a media (Channel). This allows for the organization of information by selecting resources (some costly and some free). But the difference is that this Dewey example doesn’t start with a content of a problem, but with a process that is to be used to assure a quick outcome. The need to operate in a particular way, to follow an ICT paradigm



that suggests displaying proficiency with the technology, is the entry ticket to participate in the culture; in Cohen, March, and Olsen's words, to use the technology and look for extended uses is what it takes to be a person—because “they are decision makers looking for work” (1972, p. 2). The Satisficing phase of the narrative causes its completion to be, in part, a moral one—in that following rules of credibility, the rule of three, is a kind of moral behavior. Since the web is an information source, one of its moral features is its credibility.

### **Discussion**

The sequences analyzed in this research, from interviews and from the model, illustrate three key points. First, although in our earlier paper we treated ICT practices and the four categories of the model as distinct and discontinuous, it became clear that both of them are in fact often overlapping and non-discrete. For example, it is possible for a person, during a phone call, to have their conversation overheard by, and partly intended for, a colleague who has entered the caller's work space, thus combining the phone and FtF within a single message. In another example from our interviews, a person gave the example of answering his pager while talking during a meeting.

A second observation from reviewing these examples of sequence is that ICTs can vary in intensity. Even though the widespread use of email is barely a decade old, our interviewees report that, when at work, they are rarely far from the email on their computer and that they both start their day with and continue to monitor their email reception even when in a meeting with others. So email has become a near-continuous technology. Face-to-Face interaction, on the other hand, especially in the sales contexts that compose half of our data, is considered a desirable, expensive, and rarely available ICT. Thus it is often fairly discontinuous.

These two observations lead to a third point. The displays we used in this article to illustrate a sequence produce, or equi-final examples. When the four are reviewed, they look much alike. They have the appearance of a version of the problem-solving model in that some issue is faced, a choice is made, and a consequence, nearly always positive, follows. One possible conclusion to draw from the likeness of our category nodes is that when these nodes are placed in a dynamic flow, the differences that were clear when the model was static suddenly fall away and the nodes begin to look more alike. Could they be substituted for each other and the effects remain the same?

There is one point where the beginning sequence, what ever it is, has an effect. The category that begins the sequence—we call it a “driver”—dictates the outcome. For example, some individuals decide that they will use only email for the majority of their communication efforts. As a result of this decision, the category we call “information organization” (a communication structure) initially becomes less important because it’s already built into the structure of email. However, as a result of their over-reliance on email, they create what we call “information overload” (Satisficing), because the quantity of emails becomes extreme. Therefore, they mention what we call “the desire for future technology” (Environment Agents) to help them handle this overload. What we learn from this is that the driving decision, overuse of email, automatically creates a path through the model. Some subcategories become more important and some less important. Contrast this example with those individuals who decide to use face-to-face for most communication efforts. This actually increases the importance of “information organization” (communication structure) because it requires their taking extra “time” (environmental agent) to later electronically document their conversations for record-keeping purposes. Ultimately, this can lead to the “use of PowerPoint” (Satisficing) as a solution to help overcome this documentation predicament.

Although, as we've just seen, a given Channel will dictate the path through the model, the following examples show that the same situation results when other nodes are the initial driver. "Using the Web for sales" (Channel) has decreased the time (Environment Agent) needed to close a deal. But there still remains a need for the salesperson to rely on "traditional practices" (Satisficing) such as identifying key decision-makers. To get this information, the salesperson might need to "collaborate" with others inside and outside of their organization (Communication Structures). Contrast this narrative with the following one that begins by using Communication Structures as the driver. The "generation gap of users" (Communication Structures) directly influences an individual's decision to use the telephone over email (Channels). One reason for this is that older people are more comfortable assessing information "credibility" (Satisficing) using richer Channels. This leads them to "desire less future technology" (Environmental Agents).

Thus far, we have superimposed a linear, if discontinuous, structure on the way we are viewing sequence. Specifically, we have defined each sequence to contain just one category from each of the four major nodes. Besides these sequences, there are also simpler sequences that might contain only two of the major nodes. For example, the Web has added so much to the sales process (Channel) that the sales happen much faster now (Environment Agent). Also, there might be sequences where two or more categories within a major node occur. Suppose, for instance, that people use email to send a message but then, if it is very important, follow up with a telephone call. That is a type of double nodal contribution to a given sequence. While beyond the scope of this work, it surely provides a useful direction for future research.

## **Conclusion**

What do these findings on sequence tell us? The complexity of social science understanding is increased when sequence becomes part of the story because the

next step in a sequence, even if it is a small step, is unpredictable; it could cause or be caused by any other sequence. But more important is the merging of meaning that occurs under conditions of dynamism—to such an extent, in fact, that the nodes themselves become indistinguishable. This finding explains why framing (Fairhurst & Farr, 1996) draws our attention to the narrative as an interpretative device. We learn from the sequencing of narratives in this study that deciding what is the actual beginning and ending of a narrative is a sequencing skill itself (Polster, 1987). Properly interpreting an event presupposes our having an adequate history about it. Such knowledge gives meaning to what is going on because the possible sequences are numerous. The idea of a varying sequence gives support to the view that people continually revisit and edit their narratives, adjusting for what they've learned (Quinn, 2001).

## References

- Anderson, P. (1999). Complexity theory and organization science. *Organization Science*, 10, pp. 216-232.
- Arrow, K. J. 1974. *The limits of organization*. New York: Norton.
- Bainbridge, S. M. (2002). Why a board? Group decision-making in corporate governance. *Vanderbilt Law Review*, 55, 1-56.
- Bottom, W. P., Eavey, C. L. & Miller, G. J. (1996). Getting to the core: Coalitional integrity as a constraint on the power of agenda setters. *Journal of Conflict Resolution*, 40, 298-319.
- Browning, L. D. and B. Johnson (1988). Technology and culture: Action bias effects in implementation of word processing. In G. Goldhaber (Ed.), *Handbook of Organizational Communication*, (pp. 453-471), Ablex, Pub. Co.
- Cassell, P. (1993). *The giddens reader*, Palo Alto, CA: Stanford University Press.
- Chapman, B. (1994). The rational and the reasonable: Social choice theory and adjudication. *University of Chicago Law Review*, 61, 41-122.
- Chapman, B. (1998). Law, incommensurability, and conceptually sequenced argument, *University of Pennsylvania Law Review*, 146, 1487-1528.

Chase, S. E. (1995). Taking narrative seriously: Consequences for method and theory in Interview studies. In R. Josselson & A. Lieblich (Eds.), *The Narrative Study of Lives* (Vol. 3, pp. 1-26). Thousand Oaks, CA: Sage.

Cohen, M. J., March, J. G. & Olsen, J. P. (1972). A garbage can model of organizational choice. *Administrative Science Quarterly*, 17, 1-25.

Colesante, R. J. & Biggs, D. A. (1999). Teaching about tolerance with stories and arguments. *Journal of Moral Education*, 28 (2).

Czarniawska-Joerges, B. (1994). Narratives of individual and organizational identities. *Communication Yearbook*, 17, 93-221.

Davis, J. H. (1992). Some compelling intuitions about group consensus decisions, theoretical and empirical research, and interpersonal aggregation phenomena: Selected examples, 1950- 1990. *Organizational Behavior and Human Decision Processes*, 52, 3-38.

Eavey, C. L. & Miller, G. J. (1995). Subcommittee agenda control. *Journal of Theoretical Politics*, 7, 125-156.

Eisenberg, E. M. (2001). Building a mystery: Toward a new theory of communication and identity. *Journal of Communication*, 51, 534-552.

Endersby, J. W. (1993). Rules of method and rules of conduct: An experimental study of two types of procedure and committee behavior. *Journal of Politics*, 55, 218-236.

Engel, D. M. (1993). Origin myths: narratives of authority, resistance, disability, and the law. *Law and Society Review*, 2, pp

Fairhurst, G. T. & Sarr, R. A. (1996). *The art of framing : managing the language of leadership*. San Francisco : Jossey-Bass Publishers.

Feldman, M. & March, J. G. (1981). Information in organizations as signal and symbol, *Administrative Science Quarterly*, 26, 171-186.

Fisher, W. R. (1984). Narration as a human communication paradigm: The case of public moral argument. *Communication Monographs*, 51, 1-22.

Fisher, Walter R. (1985). The narrative paradigm: In the beginning. *Journal of Communication* 35, 74-89.

Gee, J. P. (1985). The narrativization of experience in the oral style. *Boston University Journal of Education*, 167.

Glaser, B. (2002). Conceptualization: On theory and theorizing using grounded theory. *International Journal of Qualitative Methods*, 1, 1-30.

- Glaser, B. and A. Strauss (1967). *The discovery of grounded theory*. Chicago, IL: Aldine.
- Hirokawa, R. Y., DeGooyer, D., & Valde, K. (2000). Using narratives to study task group efficacy. *Small Group Research*, 31, 573-591
- Holt, C. A. & Anderson, L. R. (1999). Agendas and strategic voting. *Southern Economic Journal*, 65, 622-629.
- Kant, I. (1990). *Critique of pure reason*. (Trans. J. M. D. Meiklejohn). Amherst New York: Prometheus Books.
- Kelly, C. & Zak, M. (1999). Narrativity and professional communication: Folktales and community meaning. *Journal of Business and Technical Communication*, 13,
- Luhman, J. T. & Boje, D. M. (2001). What is complexity science? A possible answer from narrative research. *Emergence*, 3, 158-68.
- Maines, D. R. (1993). Narrative's moment and sociology's phenomena: Toward a narrative sociology. *Sociological Quarterly*, 34, 17-38.
- March, J. G. & Shapira, Z. (1982). Behavioral decision theory and organizational decision theory. In G. R. Ungson and D. N. Braunstein (Eds.), *Decision making: An inter-disciplinary inquiry*. Boston: Kent.
- March, J. G & Simon, H. (1993). *Organizations*. (2<sup>nd</sup> ed.), Cambridge, MA: Blackwell Publishers.
- McBurney, J. H. (1936). The place of the enthymeme in rhetorical theory. *Speech Monographs*, 3, 49-74.
- Protest, D. L. & McCombs, M. (eds.) (1991). *Agenda setting : readings on media, public opinion, and policymaking*. Hillsdale, N.J.: Erlbaum.
- McKelvey, R. D. (1981). A theory of optimal agenda design. *Management Science*, 27, 303-321.
- Monge, P. R., & Kalman, M. (1996). Sequentiality, simultaneity, and synchronicity in human communication. In J. Watt and A. Van Lear (Eds.), *Cycles and dynamic patterns in communication processes*. (pp. 71 - 92). New York, NY: Ablex.
- O'Conner, E. S. (2000). Plotting the organization: The embedded narrative as a construct for studying change. *Journal of Applied Behavioral Science*, 36, 174-192.
- O'Connor, E. S. (1997). Telling decisions: The role of narrative in organizational decision making. In Z. Shapira (Ed.), *Organizational decision making* (pp. 304-323). Cambridge: Cambridge University Press.

- Polster, E. (1987). *Every person's life is worth a novel*. New York: W. W. Norton.
- Poole, M. S., Van de Ven, A., Dooley, K. & Holmes, M. E. (2000). *Organizational change and innovation processes: Theory and methods for research*. New York: Oxford University Press.
- Quinn, E. M. (2001). Entextualizing famine, reconstituting self: Testimonial narratives from Ireland. *Anthropological Quarterly*, 74, 72-87
- Reed, J. S. (1989). On narrative and sociology. *Social Forces*, 68, 1-14.
- Richards, E., Singer, M. (2001). Representation of Complex Goal Structures in Narrative Comprehension. *Discourse Processes*, 31, 111-135.
- Richhardson, L (2000). Narrative and sociology. *Journal of Contemporary Ethnography*, 19, 116-135.
- Riker, W. H. (1982). *Liberalism against populism: A confrontation between the theory of democracy and the theory of social choice*. San Francisco: W. H. Freeman.
- Sager, T. (2001). Manipulative features of planning styles. *Environment and Planning*, 33, 765-781.
- Sitkin, S. B. ((1992). Learning through failure: The strategy of small losses. In L. L. Cummings and B. M. Staw (eds.), *Research in Organizational Behavior*, 14, 231-266. Greenwich, CT: JAI Press.
- Spradley, J. P. (1979), *The ethnographic interview*, New York: Holt Reinhart & Winston.
- Stacey, R. (2000). Reflexivity, self-organization and emergence in the group matrix. *Group Analysis*, 33, 501-514.
- Stanfield, G. G. (1976). Technology and organizational structures as theoretical categories. *Administrative Science Quarterly*, 21, 489-492.
- Stearns, M. L. (1994). The misguided renaissance of social choice, *Yale Law Journal*, 103, 1219-1293.
- Stein, H. F. (1999). A Bombing in April: Culture and Disaster in the Oklahoma City Bombing, *Crisis & Loss*, 7, 17-36.
- Straub, D. & Karahanna, E. (1998). Knowledge worker communication and recipient availability: Toward a task closure explanation of media choice. *Organization Science*, 9.
- Street, R. L. & Capella, J. N. (Eds.) (1985). *Sequence and pattern in communicative behaviour*. London: Arnold.

Stephens, K. K., Browning, L. D., Sørnes, J. O., & Sætre, A. S. Using adaptive structuration and self-organizing theories to understand ICT practices in Norway and the US: A grounded model. Manuscript submitted for publication.

Strauss, A. and J. Corbin (1990). *Basics of qualitative research: Grounded theory procedures and techniques*, Newbury Park, CA: Sage.

Temple, B. (2001). Polish families: A narrative approach, *Journal of Family Issues*, 22, 386-399.

Thompson, L. L. Mannix, E. A., & Bazerman, M. H. (1988). Group negotiation: Effects of decision rule, agenda, and aspiration. *Journal of Personality and Social Psychology*, 54, 86-95.

Tsoukas, H. & Hatch, M. J. (2001). Complex thinking, complex practice: The case for a narrative approach to organizational complexity. *Human Relations*, 54, 979-1013.

Wagner, J. A., Klein, N. M. & Keith, J. E. (2001). Selling strategies: The effects of suggesting a decision structure to novice and expert buyers. *Journal of the Academy of Marketing Science*, 29, 287-306.

Weick, K.E. (1995). *Sensemaking in organizations*. Thousand Oaks, CA: Sage Publications.

Weick, K. E. & Browning, L. D. (1986). Argument and narration in organizational communication. *Journal of Management*, 12, 243-259.

Weingart, L. R., Bennett, R. J. & Brett, J. M. (1993). The impact of consideration of issues and motivational orientation on group negotiation process and outcome. *Journal of Applied Psychology*, 78, 504-517

West, G. P. & Meyer, G. D. (1998). To agree or not to agree? Consensus and performance in new ventures. *Journal of Business Venturing*, 13, 395-422.

White, H. (1987). *The content of the form*. Baltimore: Johns Hopkins University Press.



## **6 Key Contributions and Future Directions**

This chapter addresses the key contributions of our research to theory and practice. I will focus primarily on the specific findings laid out in each paper in Chapter Five, but will also present more “general” contributions based on our analysis of the entire dataset of 72 in-depth interviews. The overarching research question guiding our inquiry was:

*How do workers use ICTs to meet business objectives when a full array of ICTs is available to them?*

Qualitative data on actual work practices of 72 professionals from a broad range of industries identified several characteristics of the nature of ICT use in Norway and the United States.

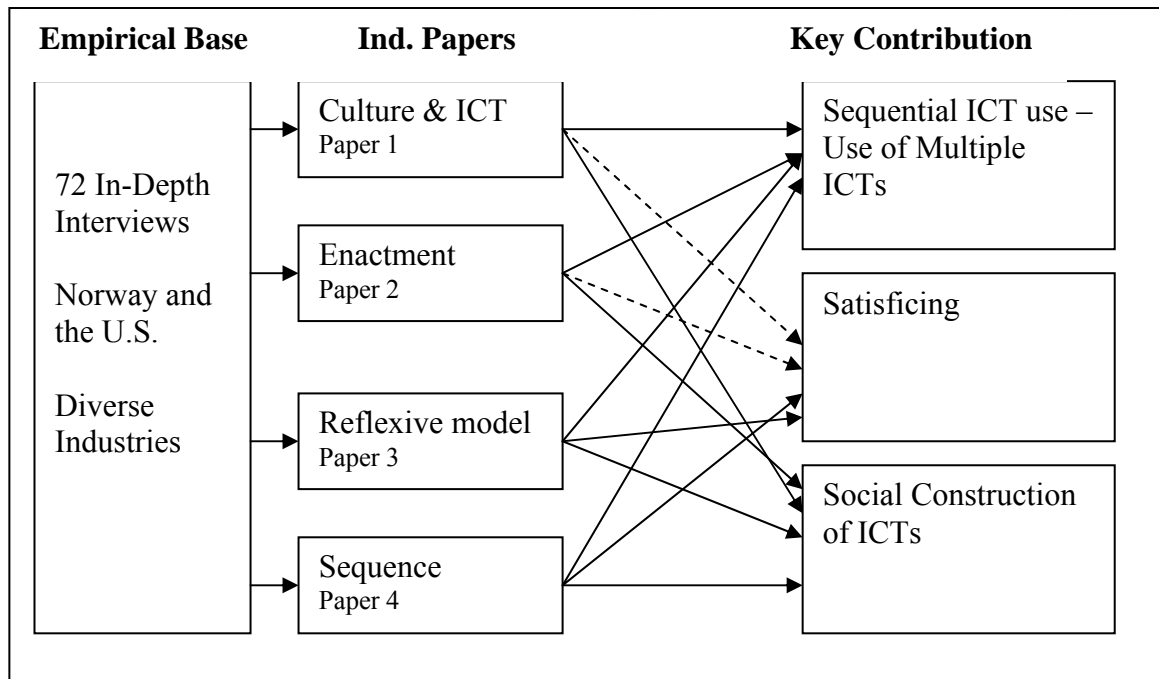
### **6.1 Theoretical Contribution**

Figure 7 gives a visual representation of the relationship between the empirical base of 72 in-depth interviews, the four individual papers, and the theoretical contributions in this dissertation. While the relationship between the empirical base and the four papers has been explained previously, a further explanation of the relationship between those papers and the three areas of theoretical contributions is warranted. It would make sense to address the theoretical contributions by following the structure of the four “problem” areas identified in Chapter One. This “step back” gives us a vantage point on the findings of all four papers that facilitates our identifying the overarching themes they have in common.

The lines in Figure 7 between the four individual papers and the key contributions are either solid or dotted. If solid, the particular paper offers significant contribution, and if dotted, the contribution is identifiable but less predominant. In the following sections I will explicate the link between

individual papers and the three areas of theoretical contribution. The goal is to identify and describe the most predominant contribution; thus, not every arrow will be equally tended to. For clarity's sake, I will refer to the papers as the (1) Culture paper, (2) Enactment paper, (3) Reflexive Paper, and (4) Sequence paper. Figure 7 serves as a “roadmap” of this chapter.

Fig. 7. Key Theoretical Contributions<sup>46</sup>



### Why target the workplace?

An empirical and/or theoretical void that this research sought to address was that most empirical work in this area relies heavily on experiments in controlled settings, usually involving college students, where single ICTs are compared. Seldom do we see organizational members in naturalistic settings, such as the workplace where multiple ICTs are available, used as the empirical base. By targeting this setting we have been able to capture, based on interview reports, ongoing and situated work practices involving ICT use. Given this focus, it's not surprising that the data display numerous examples of how the individuals use ICTs as their raw materials and rearrange ICTs to respond to different situations.

<sup>46</sup> Paper Three and Four are based on 42 in-depth interviews.

As the goal of this study was to help clarify and explain how ICTs are used in the workplace, the findings from all individual papers provide examples of theoretical contributions about socially constructed ICT use. As noted by Rheingold (2002):

The relationship between work, organization, and technology cannot be addressed without taking account of how individual workers interpret, adopt, use, and appropriate a specific technology to a particular work situation. Therefore, for practical discussions, it is crucial to direct our attention not solely to a discrete technology and/or strategic solution at hand but to workers' actual practices that link them together and afford a specific meaning in their lived work experiences.

Consequently, this research has captured “thick” descriptions—and thus a deeper understanding of the meaning attached to how, why, and when people use ICTs in the workplace.

### **6.1.1 Sequential ICT use – Use of Multiple ICTs**

Over a decade ago, Sitkin, Sutcliffe, and Barrios-Choplin (1992) identified several avenues to follow for future research on ICT use. They documented that existing theories fail to recognize the influence of multiple ICTs for a given communication effort. Today, researchers are still making the same hypothesis. Recently, Walther and Parks (2002) theorized that “communication efficiency may rest on sequences or combinations of media rather than on isolated choices about a single medium” (p. 534). Thus, there is still a deficiency of research focusing on how ICTs are used in sequence and in combination to solve problems. Although much of the communication technology research tends to focus on a single technology at a time, use of any one technology should be considered in light of the repertoire of other channels available to fully understand when, why, how, and with what outcomes any single channel is used.

Our findings in the Enactment paper<sup>47</sup>, Reflexive papers<sup>48</sup>, and the Sequence paper<sup>49</sup> specifically address these issues, and are summarized below.

- Email and FtF as the basis for sequences of media usage

The use and applicability of ICTs vary in intensity from person to person and across contexts. Even though the widespread use of email is barely a decade old, our interviewees report that, when at work, they are rarely far from the email on their computer and that they usually start their day with, and continue to monitor, their email reception, even when in meetings. So email has become a near-continuous technology, which is often used in combination with other ICT throughout the day. Face-to-Face interaction, on the other hand, especially in the sales contexts that compose half of our data, is considered a desirable, expensive, and rarely available ICT. Thus it is often fairly discontinuous. Still, it is often used to initiate relationships, and also used when a contract is considered “valuable” enough to justify FtF —regardless of cost.

- Satisficing as the “driver” of sequential ICT use

In the Sequence paper we propose possible explanations for how sequences of ICT use are produced, based on the theoretical model of ICT use proposed in the Reflexive paper. As we suggest in the explanation of the model, there is no definite intro or exit point, and possible sequences look much alike. The various possible sequences have the appearance of a version of the problem-solving model in that some issue is faced, a choice

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<sup>47</sup> Sætre, A. S., Sørnes, J-O., Browning, L. D., & Stephens, K. K. (2003). Social Actors' Enactment of Media Use and Organizational Environments. *Informing Science and Information Technology Education Joint Conference, June 24-27*, Pori, Finland.

<sup>48</sup> Stephens, K. K., Browning, L. D., Sørnes, J-O., & Sætre, A. S. (2002, July 16-20). A Reflexive Model of ICT Practices in Norway and the United States. *52<sup>nd</sup> Annual Conference of the International Communication Association*, Seoul, Korea.

<sup>49</sup> Browning, L. D., Sørnes, J-O., Stephens, K. K., & Sætre, A. S. (2003, May 23-27). The Study of Sequence: A Narrative Analysis of ICT Practices. *53<sup>rd</sup> Annual Conference of the International Communication Association*, San Diego, USA.

is made, and a consequence, nearly always positive, follows. But there is one point where the beginning sequence, whatever it is, has an effect. Whatever initiates a sequential ICT use—called a “driver”—dictates the outcome. For example, some individuals decide that they will use only email for most of their communication efforts. As a result of this decision, external structures (e.g., the ability to provide an audit trail) initially becomes less important because it’s already built into the structure of email. However, that preference for email often leads to “satisficing” because the quantity of emails becomes extreme. These users often talk about the need for new and better ICT to help them handle the overload. What is learned from this is that the driving decision, such as overuse of email, automatically creates a path through the model. Hence, some variables become more important, some less important. Contrast this example with those individuals who decide to use FtF for most communication efforts. This actually increases the importance of structures because it often requires extra time to later electronically document (e.g., via email or a memo) their conversations for record-keeping purposes.

- Scripts of sequence

The first two bulletpoints superimposed a linear structure of viewing how sequences are produced. Specifically, each sequence is defined to contain just one category from the model proposed in the Reflexive paper.

Besides these sequences, there are also simpler sequences that might contain only parts of the model. For example, the Web has added so much to the sales process that sales happen much faster now. Also, there might be sequences where two or more categories within one of the four major “nodes” occur. Some of our interviewees, especially in sales, said they used email to send a message to a customer. If it was very important, they would follow up with a telephone call. That is a type of within-category

contribution to a given sequence, but also an example of a script. People facing a communication decision normally already have a routine, or “script,” retained from experience, and they automatically select it without conscious thought or analysis. Drawing from cognitive science, Gioia (1986) defines scripts as “dynamic event-sequence-oriented webs of structured knowledge held in memory.” Thus, people may be offering these sequences out of pure recall. Barley (1986, p. 83) has a similar view on scripts, which he defines as “standard plots of types of encounters whose repetition constitutes the setting’s interaction order.” In other words, the person has previously been in this situation or one similar to it, and has already made sense of the situation and the communicative decisions it seems to require.

Our interviewees frequently talk about how they use ICT to achieve their goals, but no two interviewees offer an identical pattern. Instead, they vary sharply in the strategies they report using—especially the sequence in which they use them. Since our interviewing prompts did not limit people to discussing single channels, they could discuss them however they wished. What regularly happened was that they chose to talk about them in combination. For example, when asked to explain how they find answers for a given problem, interviewees often mention searching the WWW for information about a given topic to appear more knowledgeable before approaching a colleague.

What the findings on sequence illustrate is that the complexity of social science understanding of ICT use is increased when sequence becomes part of the story because the next step in a sequence, even if a small step, is often unpredictable. But more important is the merging of meaning that occurs under conditions of dynamism. Variables often become indistinguishable. What can be learned from our findings on sequencing in this project is that deciding what is the actual beginning and ending of a narrative is a sequencing skill itself (Polster, 1987).

Properly interpreting an event presupposes having an adequate history about it. Such knowledge gives meaning to what is going on because the possible sequences are numerous. The idea of a varying sequence gives support to the view that people continually revisit and edit their narratives, adjusting for what they've learned (Quinn, 2001).

Furthermore, our research extends the reach of AST by offering a perspective on how individuals appropriate technology when they have many ICT options. AST lets researchers study how ICTs change organizations by focusing not only on the various structures that technology provides, but also on those structures that emerge when people interact with technology (DeSanctis & Poole, 1994).

One of our contributions from this section illustrated how satisficing can be a driver of sequence. In the next section I'll talk more about satisficing and how the concept helps explain our findings.

### **6.1.2 Satisficing**

Individuals often cope with uncertainty by developing *satisficing*<sup>50</sup> routines, and these are adapted as individuals collect new information, learn from experience and imitate others (Nelson and Winter, 1982). Theories on satisficing behavior are useful in the area of ICT use because they offer important insight concerning why, when, and how individuals choose to terminate an information search or ICT use for communication. Satisficing behavior implies that individuals operate within time and cognitive limitations that prevent exhaustive evaluation of all possible alternatives. Thus, satisficing is a simplification mechanism that results in our making choices that are deemed good enough for our purposes but not necessarily optimal.

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<sup>50</sup> One assumption of decision-making, pertinent to ICT use, in organizational science is that choice is limited by *bounded rationality*. That term means that users have limited ability to control information and make in-depth interpretations in a complex environment; as a consequence they are forced to *satisfice*. Satisficing takes place where individuals have to make choices based on incomplete information, from a limited number of alternatives, and where they are unable to attach accurate values to outcomes (March and Simon, 1958).

Classical decision-making theory argues that information search processes are not terminated until all possible information has been obtained and evaluated. Herbert Simon (1958) challenged this notion as unrealistic. He suggested, instead, that in practice information satisfaction triggers the termination of information processes long before all possible information has been obtained. According to Simon, individuals use heuristics, or “rules of thumb,” to achieve “satisficing”—that is, a decision process is terminated when a minimum level of acceptance, contrary to optimizing, is reached (Simon, 1979). Simon suggested that satisficing acts as a “stop rule” (1979, p. 4); decision-makers take the first acceptable option that arises, or the first option that meets their aspiration levels, and then conclude the decision-making process.

Historically, satisficing behavior has been very unpredictable because it is rarely observed in pure form (Agosto, 2002; March, 1994). This project enables us to empirically understand when, and under what conditions, individuals are likely to satisfice when choosing an ICT for communication or searching for information. Explanations of how, when, and why individuals makes decisions about what ICT to use cannot be limited to an analysis of single options in isolation. Rather, they require a greater understanding of how different patterns of multiple ICTs interact and how varying capabilities among those ICTs affect communication satisfaction. A combination of several ICTs (either simultaneously or in sequence) is often needed when communicating. Thus, the continuing interaction and use of multiple ICT contribute to the overall complexity of each source as a variable affecting ICT choice (Leckie, Pettigrew, & Sylvain, 1996). The following examples give further illustrations of satisficing behavior:

- Satisficing as a “stop rule”

Our findings shows that a satisficing outcome was not the only “stop rule” on which the participants relied. Data analysis showed that finding one



satisficing outcome was not the only stop rule on which the participants relied. Instead, the participants used multiple termination signals as stop rules. As for our interviews, we were very conscious of the need for credibility, so we consistently used a *three-check rule* for accepting data as trustworthy. This rule means that we searched for information from three sources, and if it agreed, it was deemed credible. A similar theoretical contribution from this project deals with how adults judge the credibility of Webpages. While previous research indicates that young people tend to dismiss sites with large percentages of textual content (Agosto, 2002), our findings, involving adults in the workplace, show just the opposite. Our respondents reported skepticism toward Webpages with garish color and flashing letters.

- Multidimensional satisficing

Our data has multiple examples of satisficing decisions displaying users adjusting “aspirations upward or downward in the face of benign or harsh circumstances, respectively” (Simon, 1979, p. 3) as they work through the decision-making process. Our respondents often talk about how certain ICTs, such as email, are the preferred technology when they want to reach large audiences with unambiguous information. Still, special arrangements are often made in order to reach individuals who don’t have Internet access or for other reasons are not able or willing to read email. Thus, satisficing involving ICT use is often multidimensional<sup>51</sup>, and is seldom limited to just one deciding factor (Agosto, 2002).

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<sup>51</sup> As noted by Simon: “When the criterion of problem solution or action has more than one dimension, there is the matter of calculating the relative merits of several alternatives, one of which may be preferred along one dimension, another along another . . . The satisficing rule . . . stipulates that search stops when a solution has been found that is good enough along *all* dimensions” (1979, p. 3)

- Task closure

Since our interviewees come from different populations and organizations, their strategies are oriented toward different outcomes. Our data analysis suggests that one driving factor in ICT use is the desire to obtain “task closure.” While users are often concerned about the communication partner, their own motivation is to bring closure to the task or complete a communication sequence. When they choose an asynchronous ICT, the closure is normally fulfilled when the messages are sent. Yet when a synchronous technology is chosen, the availability and social presence of the recipient is critical. So while FtF may be most effective for the initiator and the recipient in a given situation, the drive for task closure (satisficing) may force the use of another ICT.

- Action

The case for action is strong in the entire dataset. The interviews show that individuals track information constantly. Many of these individuals spend four hours or more a day using ICTs, and one reported spending ten hours a day on ICTs for learning purposes. Changing data or multiple interpretations of what is going on drives much of the speed of decision-making. When there is a fixed data point—like an exchange rate between the dollar and the yen—individuals will actively monitor the details surrounding their work. Satisficing is based on the assumption that more “rigorous rational-analytic models are relaxed to permit decision makers to deal with the more realistic information processing and decision making demands” (Weinberg, 1996). For example, individuals often use PowerPoint and portable ICTs such as laptops and PDAs to satisfice, since both of them are quick and reliable ways to meet the requirement of customer of other communication partners. While PowerPoint has been criticized for homogenizing presentations (Zuckerman, 1999) and for

consuming computer memory (Parker, 2001), it is a dominant organizing tool in these interviews.

- Satisficing not involving ICTs

Our data has numerous accounts of current business practices not involving the use of ICT. For instance, the value of "traditional" sales practices is a satisficing item in that, despite the presence of novel ICTs, people rely on what's worked in the past. Examples from our data include gaining access to decision-makers, relying on customer referrals, use of FtF for maximal effects, and determining demo appropriateness. Since people have a limited capacity for assimilating new information, they often construct meaning by selectively attending to whatever connects with what they already know or can depend on.

The ability to empirically describe ICT preferences of individuals improves our ability to understand how, why, and possibly when individuals satisfice. The research presented here has contributed to a better understanding of ICT use because our findings represent users' knowledge and how they actively chose between the plethora of available ICTs.

Building upon the work of Herbert Simon and colleagues, the findings here represent a move towards an empirical understanding of the factors surrounding satisficing behavior related to ICT choice. Our findings indicate that satisficing is a prevalent decision-making strategy, as users often have limited ability to control information and the struggle for interpretation in a complex environment (Anderson, 1999). Similarly, satisficing was coined to account for conditions where "Action is goal-oriented and adaptive. But because of its approximating and fragmented character, only a few elements of the system are adaptive at any given time; the remainder are, at least in the short run, 'givens'" (March & Simon, 1993, p. 191). Our respondents frequently talk about how they adapt to

an environment that is moving quickly; thus they are goal-oriented. Adapting to environmental structures such as ICTs leads us to the next section, which focuses on the social construction of ICT use.

### **6.1.3 Social Construction of ICT use**

When work-related practices depend on new ICTs for carrying out communication and business tasks, these technologies will invariably have some impact on an organization. But the role of technology is not entirely deterministic, as both organizations and their workers will have a say in how they are implemented and used. In other words, the interactions between ICTs and organizations are recursive. The research reported here goes beyond the deterministic focus of much previous research where ICTs are thought to have embedded features capable of influencing both organizations and the people using them. Thus, as described in Chapter Two, this research relies on social constructionist and emergent explanations of the complex nature of ICT use. In addition, our findings have demonstrated that the relationship between ICTs and organizations is highly unpredictable, and more like an emergent process due to rapid development of new ICT and they are appropriated. In the following, a more detailed description of the theoretical contributions is outlined.

- Focus on task and credibility issues

Our findings illustrate that individuals perceive the utility of ICTs differently, depending on the nature of the task and the meta-message (e.g., symbolism) that using these sources may convey to others. For example, our findings show contradictions in how ICTs are perceived with respect to credibility. Some of our respondents indicated that they stopped using certain ICTs (e.g., Palm Pilot) upon entering the sales field because they felt that it put distance between them and their customers. For these users, such distance further communicates a lack of credibility that, in turn, could disrupt the development and maintenance of client relationships. This finding offers support for the

dual-capacity theory of media choice (Sitkin et al., 1992), which claims that people will often choose a channel based on its fit with the task as well as on the symbolic meanings that it conveys to others. In this case, the ICT was no longer considered a valuable tool because the user felt that it symbolically conveyed a lack of credibility.

- Social construction of time and space

A prevalent feature in our research is how people talk about time and how it acts as a structuring agent in ICT use. Although time enables, it certainly constrains as well, and it is this tension that serves to restructure people's reality about ICTs and how they are used. The faster the communication and the more efficient the ICTs at our disposal, the less time we apparently have to think about our reactions, replies, and answers. Time serves as the determinant for how we communicate, and depending on the speed of the technology (its structures and capabilities), the communication attempt either saves or wastes time. Our findings offer support for social-influence models of ICT use by referencing reflexive processes in organizations. Rather than treat the environment as an external force imposed on the organization, the environment is a doer—it becomes an agent, the structuring property that affects members' choice and use of technology. Giddens (1991), who has written extensively about the separation of time and space, argues that social relations could cross wide spans of time—space, including global systems when technology is involved. He argues that that early media, like newspapers, contributed to complete the separation of space from time. Thus, while communication and mediation through ICTs can be seen as independent of time-space, individual communicators are inevitably bound to time and place, but not necessarily uniform with the recipients.

- Enactment of ICT use

Enactment is a “supercategory” permeating the entire data set, due to the dynamic and complex relationship and interaction between actors and structures (internal and external). These complex interactions create opportunities for enactment as well as sense-making to take place. For example, interviewees who are sales representatives discuss how they adjust their own personal ICT-use scripts to accommodate the needs of their customers. Similarly, respondents involved in teaching and learning often talk about using different ICTs to accommodate different user-levels and capabilities represented by their students. Hence, without an external agent driving their script formation or execution, ICT use would be different. Essentially, ICT practices do not happen in a vacuum; they are consciously and unconsciously influenced by the environment. This suggests that organizational boundaries are often ambiguous and that the environment is a powerful agent affecting ICT use.

- ICTs and Culture

In the Culture paper we address the dynamic and socially constructed relationship between ICTs and culture, and use Hofstede’s (1980) dimensional framework for proposing similarities and differences between the U.S. and Norway. Thus, our findings can be interpreted from the stance of how they are capable of potentially changing the way national culture appears in local circumstances. Due to the ubiquitous and pervasive nature of modern ICTs, they are problematic for Hofstede’s methodology. We interpret this by explaining that the posited variation might be leveled through the reflexive relationship between culture and ICT. Our findings clearly illustrate a lessening of the extremes (based on existing differences from Hofstede), resulting in a change for both cultures. Even though we acknowledge and see evidence in the data for how national culture might affect ICT use, and conversely, how ICTs

affect national culture, we argue that the relationship between culture and ICTs is reflexive and socially constructed. In other words, the findings demonstrate that there is no dominant force—such as ICT impacting culture, and not the other way around. The major contribution that can be drawn from the Culture paper is that findings not only counter Hofstede's (1980), but they suggest that ICTs blur the concept of individualism vs. collectivism and masculinity vs. femininity. While Hofstede uses oppositional terms in both of these dimensions, our claim is that ICTs have the potential to enable and enhance both ends of the scale. In our data, ICTs enable users to take advantage of the larger community of expertise, for instance through Newsgroups, when trying to solve a problem. The Newsgroup, as an ICT, then serves to enhance the individual in achieving work tasks and goals. Similarly, ICTs are powerful for both work and play, and therefore are capable of blurring the boundaries between feminine and masculine behavior.

In this research we have challenged the strand of research that produces findings that imply simple causality or what is also called a “binary distinction” (Slack & Wise, 2002; Winner, 1977). Following the arguments of Slack and Wise (2002), and based on our own findings, we claim, first, that a binary (causal) distinction cannot adequately explain the complex nature of everyday discourse and ICT use, and second, that the binary is not capable of explaining the theoretically acknowledged reflexivity between structures, agents, and ICTs. Thus, our findings show that features of technology are enacted and emergent, not embodied, in a given channel. In the Reflexive paper, for instance, we use adaptive structuration theory (AST) as a framework to understand how the structures that are imposed by technology recursively shape and in turn are shaped by interaction. Similarly, the “practice-lens” perspective (Orlikowski, 2000) allows us to interpret ICT use, as displayed in our findings, as a process of ongoing enactment in practice, and helps us explain why users use ICTs quite

differently if they change jobs or have new communication responsibilities. Similarly, we have showed that users of different communities, such as organizations and national cultures, construct their own unique ways of ICT use. Hence, our findings demonstrate that ICTs serve as general-purpose tools and facilitate a range of tasks and functions across different contexts. Weick (1990) labels this “equivokes,” indicating the open-endedness and many plausible interpretations of ICTs.

What has been provided in this section are just snapshots of the inventory that describes the nature of contemporary work and how it is being transformed as a result of the dynamic interplay between the rapid diffusion of ICTs in workplaces and workers’ intensive utilization of them in everyday work practices. While traditional practices are still observed, work is increasingly unleashed from the traditional organizational structures and business processes and mobilized through dynamic interaction among diverse actors. While these themes would not be comprehensive in terms of representation of the lived experiences of ICT use in all naturalistic settings, they present important aspects of how individual use ICTs in their job, and thus provide answers to the overall research question in this project.

## **6.2 Contributions to Practice**

While this research was primarily aimed to fertilize the theoretical discussions on ICT use, it also provided insight for practitioners and designers of new ICTs. In general, this research is of value for managers because it provides them with in-depth qualitative data about how professionals get their jobs done in a naturalistic setting. Building on Minzberg’s (1983) concept of “direct research,” Sætre (1998) argues that the interaction between the researcher and organizational members (informants) enables the researcher to gain knowledge about real-life practices, which subsequently is valuable for organizational members. Below are some examples:



- Dependence on and pervasiveness of ICTs

Our findings indicate that work practices are being transformed as a consequence of the dynamic interplay between new ICTs, and the increased use and dependence of them by individuals in the workplace. The dependence on ICT takes many forms, ranging from total stand-still if the computer network is down, to greatly improved efficiency when dealing with customers via ICT channels. Using the Internet as a tool for learning is frequently mentioned in the interviews, and activities range from downloading tutorial documents to direct contact with individuals (many of them strangers) through email or various discussion forums. A common response is that many individuals depend on the Web for their own learning, and thus they don't see the need to attend formalized learning activities such as courses. Others talk about how ICTs have given them a competitive edge over their co-workers. The focus on what the individual gets from ICT clearly demonstrates individualism (i.e., efficiency, and looking out for oneself). However, the collective nature of the WWW and other ICTs, and the dependence on others, is equally apparent. Thus, the implications of ICTs on work practices are that while they allow us great flexibility and efficient ways of doing business, they can also paralyze us by leaving us with minimal alternatives when they malfunction or break down altogether.

- Unintended consequences

But many of our interviewees also talk about negative or unintended consequences of ICTs on current work practices. One respondent, in particular, gave a direct example of how email can actually be a straitjacket: "I think that people are governed by their fucking in-boxes, pardon the expression. Every time the inbox says 'pling,' even if they are not expecting anything, they have to check in and see who they got mail

from. I think that is a bit sick.” Despite our comfort with ICT, implications can also be tied to the many negatives that often are associated with them. ICTs are so commonplace these days that most of us barely think about them. We just use them. But we pay a price for our mindlessness. Far from simply using them, in many insidious ways we are run by them. Our cellphone rings? We grab it, even in a fine restaurant. Our email plings us? We turn to check the new message, even during a conversation. In fact, we will often answer it, even if we really don’t have the time to do so. So in many ways they are tyrannically taking control of our lives.

- Importance of FtF

While we expected our respondents to talk about the pervasiveness of ICT in their work, we didn’t expect, nor did we specifically ask about, the frequency and importance of FtF communication. Surprisingly, we found that FtF is often used, even internationally, where one would think that ICT would be preferred for both convenience and cost saving arguments. Several respondents talked about the importance of FtF when closing a sale, in particular when contracts are significant. Yet other interviewees view decisions, in general, as very emotional and place a premium on FtF communication. These respondents will use every opportunity to meet FTF, even for only five minutes, if they have the chance. Given the pervasiveness of ICT, one of our respondents in an international consulting company dropped a bombshell. In her company, networked ICTs are rarely used by the top consultants in the company. Instead, the old-fashioned telephone and FtF are the communication medias of choice for giving advice to the CEOs about their client corporations. She stressed that the Internet and email documents have a very low priority in how consultants communicate their advice to CEOs. One implication to consider from this is that it would serve designers of office spaces and

ICTs well to consider the preeminence and importance of FtF communication when designing modern office spaces and new ICT. A general implication drawn from this research is to not underestimate the role of FtF communication while doing business, especially considering that most “killer-applications” on the market promise to replace it.

- Theoretical and practical cultural sensitivity

As indicated in Chapter One, most existing theorizing and empirical work on ICT use stems from U.S.-based researchers and empirical contexts. While this is not a criticism of those researchers or their efforts, it is a wake-up call to others to extend current theories, and propose new ones which are grounded internationally or which compare ICT use across cultures. In this project we have extended current theory by comparing ICT use between Norway and the United States, using Hofstede’s framework of national-culture differences. Hence, we have responded to demands for theorizing that extends our current understanding of ICT use beyond a predominant U.S. context. Our findings have implications for organizations expanding into global markets. It is critical to know how ICTs facilitate communication interorganizationally and across national borders. Furthermore, embedding ICTs in organizations requires careful consideration of the implementing organization’s culture and the cultures of the organizations and countries that will communicate with that organization. The practical implications of this study will hopefully benefit organizations which are, or are contemplating, bringing their business into the global arena. Although the findings cannot be generalized outside the U.S. and Norway, the implications of the study will hopefully create a fresh awareness of the relationship between culture and ICTs applicable outside these two countries.

### Implications for managers

Given that many of the respondents have managerial duties, several implications relevant to this function can be drawn from our research. Blake and Mouton (1985) proposed that managers who exhibit concern for both people and management (thus combining the interests of *classical management*—the concern for production—and *human relations*—the concern for people) are most effective. They proposed a *managerial grid* where they “placed” five prototypical management styles. While the purpose is not to provide an exhaustive review of the various leadership styles, the focus here is to explicate the leadership style that Blake and Mouton label *team management*, in relation to the findings on ICT use in this dissertation. Based on the findings in the four individual papers in this dissertation, I propose that Blake and Mouton’s *managerial grid*, and specifically the ideals implicit in the *team management* style of leadership, are enhanced by ICT use.

As shown in the Culture paper, ICTs allow people to accomplish both *individualistic* and *collectivistic* activities. ICTs allow managers to be highly participative, and findings from our papers confirm that they don’t accept that these concerns are incompatible. ICTs enable managers to integrate workers around production (e.g., coordinate activities and frequent communication). As illustrated in Paper One, Hofstede conceptualizes equality between superiors and subordinates as a trait of low power distance, and we found numerous accounts of close working relationships between these organizational groups—i.e., where subordinates and bosses work together and equally depend on each other. This mutual dependency between boss and subordinates is often described as a strategy for speedy decision-making. This “closeness” is a central component of the *team management* style, as managers focus on heightening morale and managerial inspiration by being task-oriented, and thus attempt to achieve the most appropriate and most effective solutions to a given problem. Furthermore, “team” managers assume that employees can be trusted, as they know what the

stakes are for them, and thus need less managerial direction and control. Findings in Paper One, specifically on PDI and UAI, illustrate this managerial trait. Unlike cultures with high UAI, where managers are expected to be experts in the field they manage, thus giving them control, our data shows that tasks are often delegated to subordinates. This illustrates both trust and reliance on subordinates, thus stimulating improved performance in the entire organization as well as the personal growth of all those involved.

### **6.3 Future Research**

One possible reason for the lack of a firm theoretical base for ICT-use studies, as pointed out in the introductory chapter, is the scarcity of efforts to gain original empirical data of real-world cases and to draw implications for theory-building from it. While this work is limited, based on cultural, organizational, and individual biases, in our sample of high-end users, it enabled us to develop a theoretical foundation for understanding the nature of contemporary ICT use in the workplace.

Due to the exploratory nature of this dissertation, and the contextual limitations associated with our work (see further detail in the individual papers, and in Chapter Three), future studies may seek to verify and further develop our findings. Many of the issues identified in the four individual papers need to be explored further and elaborated in future research. Still, more explorative and theory-building studies are needed to address the shortage of research identified and described in the four “problem” areas in Chapter One. Explorative endeavors targeting different nationalities, organizations, subcultures, work-roles, and age-groups will add “thick” contextual findings from which variables can be drawn for further testing.

Another possible direction that will extend our findings is to design studies that seek to investigate ICT use beyond the individual level of analysis. By looking closely at individuals’ work practices, we were able to capture how they use ICTs

in naturalistic and situated work practices. Thus, as illustrated in our papers, the deliberate focus on individuals is premised on the belief that meso- and macro-level phenomena in organizational contexts originate from individuals' work practices that, combined, bring forth collective behavioral features (Kakihara & Sørensen, 2002). Still, research on ICT use should be expanded towards more collective levels, enabling us to study them at the team, organizational, inter-organizational, and national levels of analysis. The role of organizational culture, for example, in relation to individuals' ICT use represents one fruitful avenue for further research.

Finally, due to the dynamic interplay between ICTs and organizations, it is equally important to keep studying both "new" and "traditional" ICTs because the need to fully understand how they are perceived and used within various social and organizational contexts is not addressed sufficiently.

#### **6.4 Concluding Remarks**

This research has focused on the relationship between work, organization, and technology in an international context, though only involving two countries. We have sought to interpret how individuals interpret, adopt, use, and appropriate ICTs when carrying out their daily tasks. In conducting this research it was crucial for us to direct our attention not solely to the capabilities of ICTs, but to workers' interpretations and actual practices that link them together and give meaning in their actual work experiences.

The issues and questions raised in this dissertation augment our understanding of how individuals come to perceive, use, and socially construct ICTs in the workplace. The role of ICTs has been, is, and will continue to be important as organizations are constantly looking for better ways of meeting increasing demands. While "new" ICTs, such as the WWW and wireless technologies, enable organizations to conduct their business in more innovative ways, the role

and importance of more “traditional” ICTs, such as the telephone and email, are still prominent.

## **6.5 Postscript**

Permit me some last reflections about this project.

The last four years have been a great learning experience, and the work presented here, which spans almost that entire period, reflects it. While the introductory chapters were written during a one-year time span, the four individual papers were produced over the past three years. As such, my goal in this introduction has been to demonstrate how the four individual papers are connected both theoretically and empirically within a larger framework.

Given the limitations associated with this work, as laid out in the previous chapters, there are certainly things I would have changed if I now had the chance to go back. Yet even the mishaps had their value. They all added to the pool of experiences that will make me a better researcher.

This project has proved enormous fun for me, and I am proud of the way it turned out.

## References

- Adler, P.A. & Adler, P. (1998). Observational techniques, in Denzin, N.K., and Lincoln, Y.S (eds.). *Strategies of qualitative inquiry*. Thousand Oaks: Sage
- Adler, P. S. & Winograd, T. A. (1992). *Usability – turning technologies into tools*, Oxford University Press.
- Agosto, D. (2002). Bounded rationality and satisficing in young people's Web-based decision making, *J. Am. Soc. Info. Soc. and Tech*, 53, 16-27.
- Altheide, D.L. & Johnson, J.M. (1994). Criteria for assessing interpretive validity in qualitative research. In N.K. Denzin and Y.S. Lincoln (Eds.), *Handbook of qualitative research*. London: Sage Publications.
- Alvesson, M. & Sköldbberg, K. (2000). *Reflexive Methodology: New Vistas for Qualitative Research*, London: Sage.
- Anderson, P. (1999). Complexity Theory and Organization Science, *Organization Science*, 10, 216-232.
- Badham, R. (1995). Managing sociotechnical change: A configuration approach to technology implementation. In J. Benders, J. de Haan, & D. Bennett (Eds.), *Symbiosis of work and technology*, (pp. 77-93). London: Taylor and Francis.
- Barley, S. R. (1986). Technology as an occasion for structuring: Evidence from observation of CT scanners and the social order of radiology departments. *Administrative Science Quarterly*, 31, 78-108.
- Baym, N. (1995). The emergence of community in computer-mediated communication. In S. Jones (Ed.), *Cybersociety: Computer-mediated community and communication* (pp. 138-163). Thousand Oaks, CA: Sage.
- Benbunan-Fich, R. (2002). Improving education and training with Information Technology. *Communications of the ACM*, 45(6), June, 94-99.
- Berger, P. L. & Luckmann, T. (1967). *The Social Construction of Reality - A Treatise in the Sociology of Knowledge*. London, Penguin.
- Bijker W.E., Hughes, T. P., & Pinch, T. J. (1987). *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*. Cambridge: MIT Press.
- Blake, R. R. & Mouton, J. S. (1985). *The Managerial Grid* (3<sup>rd</sup> ed.): The Key to Leadership Excellence, Gulf Publishing Company
- Blumer, H. (1969). *Symbolic Interactionism: Perspective and Method*. Englewood Cliffs, N. J., Prentice Hall.



- Brown, J. & Duguid, P. (1991). Organizational learning and communities-of-practice: Toward a unified view of working, learning, and innovation. *Organization Science*, 2(1), 40-57
- Brown, S. L. & Eisenhardt, K. M. (1997). The art of continuous change: Linking complexity theory and time-paced evolution in relentlessly shifting organizations. *Administrative Science Quarterly*, 42(1), 1-34.
- Browning, L. D. (1978). A grounded organizational communication theory derived from qualitative data. *Communication Monographs*, 45, 93-109.
- Burgelman, R.A. (1994). Fading memories: A process theory of strategic business exit in dynamic environments. *Administrative Science Quarterly*, 39, 24-56
- Burrell, G. & Morgan, G. (1979). *Sociological Paradigms and Organizational Analysis*. London: Heinemann.
- Carlson, J.R. & Zmud, R.W. (1999). Channel expansion theory and the experiential nature of media richness perceptions. *Academy of Management Journal*, 42(2), 53-170
- Charmaz, K. (2000). Grounded theory: Objectivist and constructivist methods. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research* (2<sup>nd</sup> ed., pp. 509-535). Thousand Oaks, CA: Sage Publications.
- Clegg, S. (1989). *Frameworks of Power*, Sage, Newbury Park.
- Clegg, S. (1994). Psychology and information technology: the study of cognition in organizations. *British Journal of Psychology*, 85, 449-477.
- Conrad, C. & Poole, M. S. (2002). *Strategic organizational communication in a global economy*, Fifth Edition, Wadsworth Publishing.
- Contractor, N.S. & Eisenberg, E.M. (1990). Communication networks and new media in organizations. In J. Fulk and C.W. Steinfield (Eds.), *Organizations and communication technology*, Newbury Park, CA: Sage.
- Contractor, N. S. & Seibold, D. R. (1993). Theoretical frameworks for the study of structuring processes in group decision support systems: Adaptive structuration theory and self-organising systems theory. *Human Communication Research*, 19, 528-563.
- Cooper, C. D. (2001). Not just a numbers thing: Tactics for improving reliability and validity in qualitative research. *Research Methods Forum*, 6, 1-23.
- Culnan, M.J. & Markus, M.L. (1987). Information technologies: Electronic media and interorganizational communication. In F.M. Jablin, L.L. Putnam, K.H. Roberts & L.W. Porter (eds.), *Handbook of Organisational Communication: An*

*Interdisciplinary Perspective*, pp. 420-433. Newbury Park, CA: Sage Publications

- Cutcliffe J.R. (2000). Methodological issues in grounded theory. *Journal of Advanced Nursing*, 31, 1476-1484
- Daft, R.L. & Lengel, R. H.. (1984). Information Richness: A New Approach to Managerial Behavior and Organizational Design. In L. L. Comings and B. M. Staw (Eds.), *Research in Organizational Behavior*, 6, pp. 191-233. Homewood, IL: JAI Press.
- Daft, R. L. & Lewin, A. Y. (1993). Where are the theories for the “new” organizational forms? An editorial essay. *Organization Science*, 4(4), i-vi.
- Daft, R. L. & Macintosh, N. B. (1981). A Tentative Explanation into the Amount and Equivocality of Information Processing in Organizational Work Units. *Administrative Science Quarterly*, 26, 207-224
- Daft, R. L. & Lengel, R. H. (1986). Organizational information requirements, media richness and structural design. *Management Science*, 32(5), 554-571.
- D'Ambra, J. Rice, R.E., & O'Connor, M. (1998). Computer-mediated communication and media preference: An investigation of the dimensionality of perceived task equivocality and media richness. *Behaviour & Information Technology*, 17, 164-174.
- Dennis, A.R. & Kinney, S.T. (1998). Testing media-richness theory in the new media: The effects of cues, feedback, and task equivocality. *Information Systems Research*, 9, 256-274.
- DeSanctis, G., Poole, M.S., Dickson, G.W., & Jackson, B.M. (1993). Interpretive Analysis of Team Use of Group Technologies. *Journal of Organizational Computing*, 3(1), 1-29.
- DeSanctis, G. & Fulk, J. (1999). Research issues and directions. In G. DeSanctis & J. Fulk (Eds.), *Shaping organizational form: Communication, connection, and community*, (pp. 497-502). Thousand Oaks, CA: Sage.
- DeSanctis, G. & Poole, M. S. (1994). Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory. *Organization Science*, 5(2), 121-147.
- Dewett, T. & Jones, G. R. (2001). The role of information technology in the organization: a review, model and assessment. *Journal of Management*, 27, 313-346.
- DeSanctis, G., Snyder, J.R., & Poole, M. S. (1994). The meaning of the interface: A functional and holistic evaluation of a meeting software system. *Decision Support Systems: The International Journal*, 11, 319-335.

- Poole, M. S. & DeSanctis, G. (2004). Structuration theory in information systems research: Methods and controversies. In M. E. Whitman & A. B. Woszczyński (Eds.), *The handbook of information systems research* (pp. 206-249). Idea Group.
- Doherty-Sneedon, G., Anderson, A., O'Malley, C., Langton, S., Garrod, S., & Bruce, V. (1997). Face-to-Face and video mediated communication: A comparison of dialog structure and task performance. *Journal of Experimental Psychology: Applied*, 3, 2, 105-125
- Dutton, W. H. (1996). *Information and Communication Technologies - Visions and Realities*, Oxford and New York, Oxford University Press.
- Dutton, W. H. (1999). The virtual organization: Tele-access in business and industry. In G. DeSanctis & J. Fulk (Eds.), *Shaping Organization Form: Communication, Connection, and Community* (pp. 473-495). Thousand Oaks, CA: Sage.
- Eisenhardt, K. M. & Bourgeois III, L. J. (1988). Politics of strategic decision making in high-velocity environments: Toward a midrange theory. *Academy of Management Journal*, 31, 737-770.
- Eisenhardt, K. M. (1989). Agency Theory: An Assessment and Review. Academy Of Management. *The Academy Of Management Review*, 14(1), 57-75.
- Eisenhardt, K. & Brown, S. (1999). Patching: Restitching Business Portfolios in Dynamic Markets. *Harvard Business Review*, (May-June), 72-82.
- El Sawy, O. A. & Bowles, G. (1997). Redesigning the customer support process for the electronic economy: Insights from storage dimensions. *MIS Quarterly*, 21(4), 457-483.
- El-Shinnawy, M. & Markus, M. (1997). The Poverty of media richness theory: Explaining people's choice of electronic mail versus voice mail. *International Journal of Human Computer Studies*, 46, 443-467.
- Feldman, M. & March, J. (1981). Information and Organizations as Signal and Symbol. *Administrative Science Quarterly*, 26, 171-186.
- Fernandez, W. D. (2001). Metateams in IT Projects: A Proposal Paper, Presented at the *Doctoral Consortium for the International Conference on Information Systems*. 16-19 December, New Orleans.
- Fisher, C. S. (1992). *America Calling: A social History of the Telephone to 1940*. University of California Press, 1992.
- Flanagin, A. J. & Metzger, M. J. (2001). Internet use in the contemporary media environment. *Human Communication Research*, 27, 153-181.

- Flichy, P. (2002). New Media History. In S. Livingstone & L. Lievrouw (Eds.), *Handbook of New Media* (pp. 136-151). London: Sage.
- Fontana, A. & Frey, J. H., (1998). Interviewing. The art of science, in Denzin, N. K. and Lincoln, Y. S. (eds.), *Collecting and interpreting qualitative materials*, Thousand Oaks, California, Sage Publications
- Fulk, J. & DeSanctis, G. (1999). Articulation of communication technology and organizational form. In G. DeSanctis & J. Fulk (Eds.), *Shaping Organization Form: Communication, Connection, and Community* (pp. 5-32). Thousand Oaks, CA, Sage.
- Fulk, F. & Steinfield, S. (1990). *Organizations and Communication Technology*. Sage Publications. London.
- Fulk, J., Schmitz, J., & Steinfield, C. W. (1990). A social influence model of technology use. In J. Fulk & C. W. Steinfield (Eds), *Organizations and communication technology*. Newbury Park: Sage.
- Fulk, J., Schmitz J., & Ryu, D. (1995). Cognitive elements in the social construction of communication technology. *Management Communication Quarterly*, 8, 259-288.
- Fulk, J. (1993). Social construction of communication technology. *Academy of Management Journal*, 36, 5, 921-950.
- Fulk, J., Flanagan, A., Kalman, M., Monge, P.R., & Ryan, T. (1996). Connective and communal public goods in interactive communication systems. *Communication Theory*, 6, 60-87.
- Geertz, C. (1973). *The Interpretation of Cultures*. New York, Basic Books
- Giddens, A. (1979). *Central problems in social theory: action, structure and contradiction in social analysis*, London, Macmillan.
- Giddens, A. (1982). Power, the dialectic of control and class structuration. In A. Giddens and G. Mackensie (Eds.), *Social class and the division of labor; Essays in honor of Ilya Neustadt*. Cambridge: Cambridge University Press.
- Giddens, A. (1984). *The constitution of society: Outline of the theory of structure*. Berkeley: University of California Press.
- Giddens, A. (1987). Time and social organisation, in Giddens A., *Social theory and modern sociology*, Cambridge, Polity Press
- Giddens, A. (1990). *The Consequences of Modernity*. Cambridge: Polity Press
- Giddens, A. (1991). *Modernity and Self-identity*. Cambridge: Polity Press

- Giddens, A. (1994). Risk, trust, reflexivity, in Beck, U., Giddens, A. and Lash, S. (eds.) *Reflexive Modernization*, Cambridge: Polity Press, 184-197
- Gioia, D. A. (1986). Symbols, scripts and sensemaking: Creating meaning in the organizational experience. In H. P. Simms & D. A. Gioia & a. Associates (Eds.), *The thinking organizations* (pp. 49-74). San Francisco: Jossey-Bass.
- Glaser, B. (1978). *Theoretical sensitivity*. Mill Valley, CA, The Sociology Press.
- Glaser, B. & Strauss, A. (1967). *The discovery of grounded theory*. Chicago, IL: Aldine.
- Glaser, B. (1992). *Emergence vs. Forcing: Basics of Grounded Theory Analysis*. Mill Valley, CA: Sociology Press, 1992.
- Glaser, B. (1998). *Doing Grounded Theory. Issues and Discussions*, Mill Valley, Ca.: Sociology Press.
- Glaser, B. & Strauss, A. (1964). Awareness Contexts and Social Interaction. *American Sociological Review* 29, 669-79.
- Glaser, B. (2002). Constructivist Grounded Theory? *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 3(3). Available at: <http://www.qualitative-research.net/fqs-texte/3-02/3-02glaser-e.htm>
- Glaser, B. & Strauss, A. (1965). *Time for Dying*. Chicago: Aldine.
- Glaser, B. & Strauss, A. (1965b). Temporal aspects of dying as a non-scheduled status passage. *American Journal of Sociology*, 71, 48-59.
- Grint, K. (1991) *The Sociology of Work*, Cambridge, Polity Press
- Guba, E. G. & Lincoln, Y. S. (1989). *Fourth generation evaluation*. Newbury Park, CA: Sage.
- Hamelink, C.J. (1999). Language and the right to communicate. *Media Development*, XLVI (4). London: WACC.
- Hartmann, J. (2001). *Grundad teori: teorigenerering på empirisk grund*. Studentlitteratur. Lund.
- Haythornthwaite, C. & Wellman, B. (1998). Work, friendship, and media use for information exchange in a networked organization. *Journal of the American Society for Information Science*, 49(12), 1101-1114.
- Hiltz, S. R. & Turoff, M. (1978). *The network nation*. Reading, MA: Addison-Wesley
- Hiltz, S. R. 1984 *Online Communities: A Case Study of the Office of the Future*. Norwood NJ: ABLEX Publishing Corp., Human-Computer Interaction Series.
- Hirschheim, R. & Klein, H. (1989). Four paradigms of information systems development. *Communications of the ACM*, 32(10), 1199- 1216.
- Hofstede, G. (1980). *Culture's consequences: International differences in work related values*. Newbury Park, CA: Sage.

- Hollingshead, A. B. & Contractor, N. S. (2002). New media and organizing at the group level. In S. Livingstone & L. Lievrouw (Eds.), *Handbook of New Media* (pp. 221-235). London: Sage.
- Huber, G. P. (1990). A theory of the effects of advanced information technologies on organizational design, intelligence, and decision making. *Academy of Management Review*, 15(1), 47-71.
- Hudson, D. (1997). *Rewired. A Brief (and Opiniated) History of the Net*. Indianapolis (McMillan).
- Hutchinson, M. F. (1993). On Thin Plate Smoothing Splines and Kriging', *Computing and Science in Statistics*, 25, 55-62
- Hylmö, A. & Buzzanell, P. M. (2002). Telecommuting as viewed through cultural lenses: An empirical investigation of the discourses of utopia, identity, and mystery. *Communication Monographs*, 69, 329-356.
- Isabella, L.A. (1990). Evolving interpretations as a change unfolds: How managers construe key organizational events. *Academy of Management Journal*, 33(1), 7-41.
- Ives, B. & Learmonth, G.P. (1984). The information system as a competitive weapon. *Communications of the ACM*, 27(12), 1193-1201
- Jarvenpaa, S.L. & Leidner, D. E. (1999). Communication and Trust in Global Virtual Teams. *Organization Science*. 10(6), 791-815.
- Johansen, R. (1977). Social evaluations of teleconferencing. *Telecommunications Policy*, 1, 395-419.
- Johnson, E. B. (1997). Examining the Validity Structure of Qualitative Research, *Education*, 18(2), 282-292
- Kahai, S. S. & Cooper, R. R. (2003). Exploring the Core Concepts of Media Richness Theory: The Impact of Cue Multiplicity and Feedback Immediacy on Decision Quality. *Journal of Management Information Systems*. 20 (1), 263 – 299
- Kambil, A. (1997). Doing business in the wired world. *IEEE*, May, 56-61
- Kakihara, M. & Sørensen, C. (2002). 'Post-Modern' Professionals' Work and Mobile Technology. *IRIS 25*, Denmark, Copenhagen Business School
- Kaplan, B. & Maxwell, J.A. (1994). Qualitative Research Methods for Evaluating Computer Information Systems, *Evaluating Health Care Information Systems: Methods and Applications*, J.G. Anderson, C.E. Aydin and S.J. Jay (eds.), Sage, Thousand Oaks, CA.
- Kiesler, S. & Sproull, L. (1992). Group decision making and communication technology. *Organisational Behaviour and Human Decision Processes*, 52, 96-123.

- Kiesler, S., Zubrow, D., Moses, A.M., & Geller, V. (1985). Affect in computer-mediated communication: An experiment in synchronous terminal to terminal discussion. *Human Computer Interaction*, 1, 77-104.
- Kiesler, S., Siegel, J., & McGuire, T. (1984). Social psychological aspects of computer-mediated communications. *American Psychologist*, 39, 1123-1134.
- Kiesler, S. (1986). The hidden messages in computer networks. *Harvard Business Review*, 64, 46-60
- Kim, S. T. & Weaver, D. (2002). Communication research about the internet: a thematic meta-analysis, *New Media & Society*, 4(4), 518-539.
- King, R.C. & Xia, W. (1999). Media appropriateness: Effects of experience on communication media choice. In K.E. Kendall (Ed.), *Emerging information technologies: Improving decision, cooperation, and infrastructure* (pp. 143-175). Thousand Oaks, CA: Sage
- Kirk, J. & Miller, M. L. (1986). *Reliability and validity in qualitative research*. Beverly Hills, CA: Sage Publications
- Klein, H. K. & Myers, M. D. (1999). A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems. *MIS Quarterly* 23(1), 67-94.
- Kling, R. (1996). *Computerization and Controversy: Value Conflicts and Social Choices*. (2nd ed), San Diego, Academic Press.
- Kling, R. (2000). Learning about Information Technologies and Social Change: The Contribution of Social Informatics. *The Information Society*, 16(3), 217-232
- Kuhn T. S. (1970). *The Structure of Scientific Revolutions*. Chicago: Chicago University Press.
- Lakatos, I. (1970). Falsification and the Methodology of Scientific Research Programmes, in *Criticism and the Growth of Knowledge*, Lakatos and Musgrave (Eds), Cambridge University Press.
- Lea, M. (1991). Rationalist assumptions in cross-media comparisons of computer-mediated communication. *Behaviour & Information Technology*, 10, 153-172.
- Leckie, G. J., Pettigrew, K. E., & Sylvain, C. (1996). Modeling the Information Seeking for Professionals: A General Model Derived from Research on Engineers, Health Care Professionals, and Lawyers. *Library Quarterly*, 66, 161-193.
- Lee, A. S. (1994). Electronic mail as a medium for rich communication: An empirical investigation using hermeneutic interpretation. *MIS Quarterly*, 19, 143-157.
- Lievrouw, L A. (2002). Theorizing new media: A meta-theoretical approach. *Medien Journal*, 3, 4-13.

- Lincoln, Y. S. & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage Publications, Inc.
- Locke, K. (2001). *Grounded Theory in management research*, Sage, London
- MacMillan, S. J. (2002). Exploring Models of Interactivity from Multiple Research Traditions: Users, Documents and Systems. In S. Livingstone & L. Lievrouw (Eds.), *Handbook of New Media* (pp. 163-183). London: Sage.
- Mansell, R. & Silverstone R. (1997). *Communication by design: The politics of information and communication technologies*. Oxford: Oxford University Press.
- Markus, M.L., Bikson, T.K., El-Shinnawy, M., & Soe, L.L. (1992). Fragments of your communication: Email, Vmail, and Fax. *Information Society*, 8, 207-226.
- March, J. & Simon, H. (1958). *Organizations*. New York: McGraw-Hill.
- Markus, M. L. & Robey, D. (1988). Information Technology and Organizational Change: Causal Structure in Theory and Research. *Management Science*, 34(5), 583-598.
- Martin, P.Y. & Turner, B. A. (1986). Grounded Theory and Organizational Research. *The Journal of Applied Behavioral Science*, 22(2), 141-157.
- Maznevski, M. L. & Chudoba, K. M. (2000) Bridging Space Over Time: Global Virtual Team Dynamics and Effectiveness, *Organization Science*. 11(5), p473-492.
- McLeod, R., Jr. (1990). *Management Information Systems*. 6<sup>th</sup> ed. New York, Macmillan.
- McGrath, J. E. & Hollingshead, A. B. (1993). Putting the "group" back in group support systems: Some theoretical issues about dynamic processes in groups with technological enhancements. In L. M. Jessup & J. S. Valacich (Eds.), *Group Support Systems* (pp. 78-96). NY: Macmillan.
- Miles, M.B. & Huberman, A.M. (1994). *Qualitative data analysis*. Thousand oaks, CA: Sage.
- Miller, K. (2003). *Organizational Communication: Approaches and Processes* (3rd edition). Belmont, CA: Wadsworth Publishing.
- Mintzberg, H. (1983). *An emergent strategy of "direct" research*. In J. Van Maanen (Ed.), *Qualitative Methodology* (pp. 105-116). Beverly Hills, CA: Sage.
- Monge, P. & Fulk, J. (1999). Communication technology for global network organizations. In G. DeSanctis & J. Fulk (Eds.), *Shaping organization form. Communication, connection, and community*. Thousand Oaks, CA: Sage.



- Morgan, G. (1980). Paradigms, Metaphors and Puzzle Solving in Organization Theory. *Administrative Science Quarterly* 25, 605-622.
- Morgan, G. (1983). More on Metaphor: Why We Cannot Control Tropes in Administrative Science. *Administrative Science Quarterly* 28, 601-607.
- Morgan, G. (1997). *Images of Organizations*. Sage, Newbury Hill.
- Morse, J. M. (1991). Strategies for sampling. In Morse J.M. (Ed.), *Qualitative Nursing Research: A Contemporary Dialogue* (pp. 126-145). London: Sage.
- Morse, J. M. (1998). Designing Funded Qualitative Research in Denzin, N K and Lincoln, Y S (Editors). *Strategies of Qualitative Inquiry*. Sage, Thousand Oaks.
- Mumby, D. K. & Stohl, C. (1996). Disciplining Organizational Communication Studies, *Management Communication Quarterly*, 10(1), 50-72.
- Munkvold, B.E. (1998). *Implementation of Information Technology for Supporting Collaboration in Distributed Organizations*. Dr.ing. thesis 1998:40, The Norwegian University of Science and Technology, Department of Industrial Economics and Technology Management, Trondheim, Norway.
- Nandhakumar, J. & Baskerville, R. (2001). Trusting Online: Trust in Virtual Teams, in *Proceedings of the 9<sup>th</sup> European Conference on Information Systems*. 27-29 June, Bled, Slovenia.
- Nardi, B. & Whittaker, S. (2001). The place of face-to-face communication in distributed work. In *Distributed Work*, P. Hinds and S. Kiesler, Eds. MIT Press, Cambridge, MA, 2001.
- Nardi, B, A., Whittaker, S., & Bradner, E. (2000) Interaction and Outeraction: Instant Messaging in Action. In *Proceedings of ACM Conference on Computer-Supported Cooperative Work (CSCW)*. Philadelphia, PA, USA, pp. 79-88
- Negroponte N. (1995). *Being Digital*. New Riders.
- Nelson, R. R. & Winter, S. G. (1982). *An evolutionary theory of economic change*. Belknap press of Harvard University press, Cambridge, Ma.
- Nonaka I. & Takeuchi, H. (1995). *The knowledge creating company*. Oxford University Press, Oxford.
- Olson, G. M. & Olson, J. S. (2001). Distance Matters. In J. M. Carroll (Ed.), *Human-Computer Interaction in the New Millennium* (pp. 397-417). New York: ACM Press
- Orlikowski, W. J. (1992). The duality of technology: Rethinking the concept of technology in organizations, *Organization Science*, 3(3), 398-427.

- Orlikowski, W. J. (1993). CASE tools are organizational change: Investigating Incremental and Radical Changes in Systems Development, *MIS Quarterly*, 17(3), 309-340.
- Orlikowski, W. J. (2000). Using technology and constituting structures: A practice lens for studying technology in organizations. *Organization Science*, 11, 404-428.
- Orlikowski, W. J. (2002). Knowing in practice: Enacting a collective capability in distributed organizing. *Organization Science*, 13(3), 249-273.
- Orlikowski, W. J., Yates, J., Okamura, K., & Fujimoto, M. (1995). Shaping Electronic Communication - the Metastructuring of Technology in the Context of Use. *Organisation Science*, 6, 423-444.
- Orlikowski, W. J. & Barley, S.R. (2001). Technology and Institutions: What Can Research on Information Technology and Research on Organizations Learn from Each Other? *MIS Quarterly*, 25, 145-165.
- Orlikowski, W. J. & Baroudi, J.J. (1991). Studying Information Technology in Organizations: Research Approaches and Assumptions. *Information Systems Research* (2), 1-28.
- Orlikowski, W. J. & Icono, S. C. (2001). Research Commentary: Desperately Seeking the "IT" Artifact in IT research - A call to Theorizing the IT Artifact. *Information Systems Research*, 12(2), 121-134.
- Orlikowski, W. J. & Robey, D. (1991). Information technology and the structuring of organizations. *Information Systems Research* 2(2), 143-169.
- O'Sullivan, P. (2000). What you don't know won't hurt me: Impression management functions of communication channels in relationships. *Human Communication Research*, 26, 403-431.
- Parker, I. (2001, May, 28). Absolute PowerPoint. *The New Yorker*, 76-87.
- Parsons, G. L. (1983). Information technology: A new competitive weapon. *Sloan Management Review*, 25, 3-15.
- Partington, D. (2000). Building grounded theories of management action. *British Journal of Management*, 11(2), 91-102
- Patton, M. Q. (1990). *Qualitative evaluation and research methods* (2nd edition) Sage Publications, London.
- Pettigrew, A.M. (1990). Longitudinal Field Research on Change: Theory and Practice. *Organization Science*, 1(3), 267-292.
- Pinch, T. J. & Bijker, W. E. (2001). The social construction of facts and artifacts: Or how the sociology of science and the sociology of technology might benefit each other. *Social Studies of Science*, 14, 399-441.

- Polster, E. (1987), *Every Person's Life is Worth a Novel*, New York: Norton.
- Poole, M. S. & DeSanctis, G. (1990). Understanding the Use of Group Decision Support Systems: The Theory of Adaptive Structuration. In J. Fulk and C. Steinfield (Eds.), *Organizations and Communication Technology*, (pp. 173-193), Newbury Park, CA: Sage.
- Porter, M. & Millar, V. (1985) How information gives you competitive advantage. *Harvard Business Review*, July-August, 49-160
- Postmes, T., Spears, R., & Lea, M. (2000). The formation of group norms in computer-mediated communication. *Human Communication Research*, 26, 341-371.
- Quinn, E. M. (2001). Entextualizing famine, reconstituting self: Testimonial narratives from Ireland. *Anthropological Quarterly*, 74, 72-87
- Rheingold, H. (2002). *Smart Mobs: The Next Social Revolution*. Perseus Publishing, Cambridge, MA.
- Rice, R. E. (1984). *The New Media: Communication, Research and Technology*. Beverly Hills: Sage.
- Rice, R. E. & Aydin, C. (1991). Attitudes towards new organisational technology: Network proximity as a mechanism for social information processing. *Administrative Science Quarterly*, 36, 219-244.
- Rice, R. E., Grant, A. E., Schmitz, J., & Torobin, J. (1990). Individual and Network Influences on the Adoption and Perceived Outcomes of Electronic Messaging. *Social Networks*, 12, 27-55.
- Rice, R. & Shook, D. (1990). Relationships of Job Categories and Organizational Levels to Use of Communication Channels, including Electronic Mail: A Meta-Analysis and Extension, *Journal of Management Studies*, 27, 195-229.
- Rice, R. E. & Love, G. (1987). Electronic emotion: Socio-emotional content in a computer-mediated communication network. *Communication Research*, 14, 85-108.
- Rice, R. E. (1992). Talk analyzability, use of new media, and effectiveness: A multi-site exploration of media richness. *Organization Science*, 3, 475-500.
- Rice, R. E., Kraut, R. E., Cool, C., & Fish, R. S. (1994). Individual, Structural and Social Influences on Use of a New Communication Medium, *Academy of Management (Best Paper) Proceedings*, 285-289.
- Rice, R. E. (1993). Media appropriateness: Using social presence theory to compare traditional and new organizational media. *Human Communication Research*, 19, 451-484.

- Rice, R. E., D'Ambra, J., & More, E. (1998). Cross-cultural comparison of organizational media evaluation and choice. *Journal of Communication*, 48, 3-26.
- Robey, D. & Sahay, S. (1996). Transforming Work Through Information Technology: A Comparative Case Study of Geographic Information Systems in County Government. *Information Systems Research*, 7(1), 93-110
- Robey, D. & Boudreau, M. (1999). Accounting for the Contradictory Organizational Consequences of Information Technology: Theoretical Directions and Methodological Implications. *Information Systems Research*, 10(2), 167-185
- Russ, G S, Daft, R L, & Lengel, R H. (1990). Media Selection and Managerial Characteristics in Organisational Communications. *Management Communication Quarterly*, 4(2), 151-175.
- Sahay, A. (1997). Cybermaterialism' and the Invention of the Cybercultural Everyday, *New Literary History*, 28, 543-567.
- Sarbaugh-Thompson, M. & Feldman, M.S. (1998). Electronic mail and organizational communication: Does saying "Hi" really matter? *Organization Science*, 9(6), 685-698.
- Savolainen, R. (1999). The role of the Internet in information seeking. Putting the networked services in context. *Information Processing and Management*, 35, 765-782.
- Schultze, U. & Orlikowski, W. J. (2001). Metaphors of virtuality: shaping an emergent reality. *Information and Organization*, 11(1), 45-77.
- Schumpeter, J. (1964). *Business Cycles*. New York: McGraw Hill.
- Scott-Morton, M. (1991). *The corporation of the 1990's: Information technology and organizational transformation*. Oxford: University Press.
- Scott, C. R., Quinn, L., Timmerman, C. E., & Garrett, D. M. (1998). Ironic uses of group communication technology: Evidence from meeting transcripts and interviews with group decision support system users. *Communication Quarterly*, 46(3), 353-374
- Searle, J. (1995). *The Construction of Social Reality*. New York: The Free Press, 1995
- Sellen, A.J. (1995). Remote conversations – the effects of mediating talk with technology. *Human-Computer Interaction*, 10, 410-444.
- Senge, P. (1990). *The Fifth Discipline*. Century Business Press, London.

- Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications*. London: John Wiley.
- Siegel, J., Dubrovsky, V., Kiesler, S., & McGuire, T. (1986). Group processes in computer-mediated communication. *Organisational Behaviour and Human Decision Processes*, 37, 157-187.
- Silverman, D. (1997). The Logics of Qualitative Research. In *Context & Method in Qualitative Research*. Edited by Gale Miller & Robert Dingwall. SAGE Publications, Thousand Oak-London New Delhi.S
- Simon, H. A. (1979). Rational decision making in business organizations. *American Economic Review*, 69, 493-513
- Sitkin, S. B., Sutcliff, K. M., & Barrios-Choplin, J. R. (1992). A Dual-Capacity Model of Communication Media Choice in Organizations. *Human Communication Research*, 18, 563-598.
- Smeltzer, L. R. (1992). Supervisory-subordinate communication when mediated by audio- graphics teleconferencing. *Journal of Business Communication*, 29, 161-178.
- Schmitz, J. (1987). Electronic Messaging: System use in local governments. *Paper presented at the International Communication Association*, Montreal, Canada.
- Shook, D. E. (1988). *A structural equivalence and contingency theory perspective on media usage and communication performance: The case of voice messaging*. Unpublished doctoral dissertation, University of Southern California, Los Angeles
- Spears, R., Lea, M., Corneliussen, R. A., Postmes, T., & Harr, W. T. (2002). Computer-mediated communication as a channel for social resistance. *Small Group Research*, 33(5), 555-573.
- Spear, R. & Lea, M. (1994). Panacea or Panopticon? The hidden power in computer-mediated communication, *Communication Research*, 21, 427-459.
- Spradley, J. P. (1979). *The ethnographic interview*. Forth Worth, TX: Harcourt Brace Jovanovich College Publishers.
- Sproull, L. & Kiesler, S. (1986). Reducing social context cues: electronic mail in organizational communication. *Management Science*, 32(11), 1492-1512.
- Sproull, L. & Kiesler, S. (1991). *Connections: New ways of working in the networked organisation*. Cambridge, Mass.: MIT Press
- Star, S. L. & Bowker, G. C. (2002). How to Infrastructure. In S. Livingstone & L. Lievrouw (Eds.), *Handbook of New Media* (pp. 151-163). London: Sage.

- Stefi-Mabry, J (2003). A social judgment analysis of information source preference profiles: An exploratory study to empirically represent media selection patterns. *Journal of the American Society for Information Science and Technology*, 54(9), 879-904
- Steinfeld, C. (1986). The social dimensions of computer mediated communications. In M. McLaughlin (Ed.), *Communication yearbook 9* (pp. 777-804). Newbury Park: Sage
- Steinfeld, C.W. & Fulk, J. (1990). The theory imperative. In J. Fulk and C. Steinfield's (Eds.) *Organizations and communication technology*. Newbury Park, CA: Sage.
- Stephens, K., Browning, L., Sørnes, J-O., & Sætre, A. S. (2002). *A reflexive model of ICT practices in Norway and the US: An integration of adaptive structuration theory and self-organizing systems theory*. Paper presented at the International Communication Association's Annual Conference, Seoul, Korea
- Stohl, C. (2001). Globalizing organizational communication. In F. Jablin & L. Putnam (Eds.), *The New Handbook of Organizational Communication* (pp. 323-375). Thousand Oaks, CA: Sage.
- Straub, D. W. (1994). The effect of culture on IT diffusion: e-mail and fax in Japan and the US. *Information Systems Research*, 5(1), 23-47.
- Straub, D. W. & Karahanna, R. (1998). Knowledge worker communications and recipient availability: Toward a task closure explanation of media choice. *Organization Science*, 9(2), 160-175.
- Straubhaar, J. & LaRose, R. (1996). *Communications media in the information society. Communications media in the workplace*, 342-363. Belmont, CA: Wadsworth
- Straus, S.G. (1997). Technology, group process, and group outcomes: Testing the connections in computer-mediated and face-to-face groups. *Human-Computer Interactions*, 12, 227-266.
- Strauss, A. (1970). Discovering new theory from previous theory. In T. Shibutani (Ed.), *Human Nature and Collective Theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Strauss, A. & Corbin, J (1994). Grounded Theory Methodology: an overview. In Denzin N.K and Lincoln Y. S., *Handbook of Qualitative Research*. London. Sage.
- Strauss, A., & Corbin, J. (1990,1998). *Basics of qualitative research: Grounded theory procedures and techniques* (2nd. ed.). Newbury Park, CA: Sage.
- Sydow, J. & Windeler, A. (1998). Organizing and Evaluating Interfirm Networks: A Structurationist Perspective on Network Processes and Effectiveness, *Organization Science*, 9(3), 265-284.

- Sætre, A. S. (1998). Toward a grounded theory of organizing and communicating in the postindustrial economy. *Dissertation Abstracts International*, 58(07), 2464. (UMI No. 9803010)
- Taylor, J., Groleau, C., Heaton, L., & Van Every, E. (2001). *The computerization of work: A communication Perspective*. Sage.
- Taylor, J., Flanagan, A. J., Cheney, G., & Seibold, D. R. (2000). Organizational communication research: Key moments, central concerns, and future challenges. In W. Gudykunst (Ed.), *Communication Yearbook 24*, 99-137. Newbury Park, CA: Sage Publications.
- Timmerman, C. E. (2002). The moderating effect of mindlessness/mindfulness upon media richness and social influence explanations of organizational media use. *Communication Monographs*, 69(2), 111-131.
- Trevino, L.K., Daft, R. L., & Lengel, R. H. (1987). Media Symbolism, Media Richness, and Media Choice in Organizations: A Symbolic Interactionist Perspective. *Communication Research*. 14(5), 553-574.
- Trevino L.K., Webster, J., & Stein, E.W. (2000). Making connections: Complementary influences on communication media choices, attitudes, and use. *Organization Science*, 11, 163-182.
- Trevino, L.K., Daft, R.L., & Lengel, R.H. (1990). Understanding managers' media choices: A symbolic interactionist perspective. In J. Fulk and C. Steinfield's (Eds.) *Organizations and Communication Technology*, (pp. 71-94), Newbury Park, CA: Sage.
- Trevino, L., Lengel, R., Bodensteiner, W., Gerloff, E., & Mui, N. (1990). The Richness Imperative and Cognitive Style - The Role of Individual Differences in Media Choice Behavior. *Management Communication Quarterly*, 4(2), 176-197.
- Trist, E. (1981). The evolution of socio-technical systems. A conceptual framework and an action research program. In Van de Ven & Joyce (Eds.). *Perspectives on organizational design and behavior*. Wiley, 19-75.
- Turner, B. A. (1981). Some Practical Aspects of Qualitative Data Analysis: One Way of Organising the Cognitive Processes Associated with the Generation of Grounded Theory. *Quality and Quantity*, 15, 225-247.
- Tushman, M. L. & Romanelli, E. (1985). Organizational evolution: a metamorphosis model of convergence and reorientation. In: Staw, B. M., Cumming, L. L. (Eds.). *Research in organization behavior*. Greenwich: JAI Press
- Utterback, J.M. (1994). *Mastering the Dynamics of Innovation*. Cambridge, MA: Harvard Business Press.

- Van den Belt, H. & Rip, A. (2001). The Nelson-Winter-Dosi model and synthetic dye industry, in: Wiebe Bijker, Thomas P. Hughes and Trevor Pinch (Eds.), *The Social Construction of Technological Systems* (Cambridge, Mass.: MIT), pp. 135-58.
- Van den Hoonaard, W. (1997). *Working with sensitizing concepts: Analytical field research*. Newbury Park, CA: SAGE.
- Walsham, G. (1993). *Interpreting information systems in organizations*. New York: John Wiley.
- Walsham, G. (1995). Interpretive case studies in IS research: nature and method. *European Journal of Information Systems*, 4(2): 74-81
- Walsham, G. & Sahay, S (1999). GIS for district-level administration in India: problems and opportunities, *MIS Quarterly*, 23(1), 39-66.
- Walther, J. B. (1992). Interpersonal effects in computer-mediated interaction: A relational perspective. *Communication Research*, 19, 52-90.
- Walther, J. B. & Parks, M. R. (2002). Cues filtered out, cues filtered in: Computer-mediated communication and relationships. In M.L. Knapp & J.A. Daly (eds.), *Handbook of interpersonal communication* (3rd. ed) (pp. 529-563). Thousand Oaks, CA: Sage Publications.
- Webster, J. & Trevino, L. K. (1995). Rational and Social Theories as Complimentary Explanations of Communication Media, *Academy of Management Journal*, 38, 1544-1572.
- Weick, K. E. (1979). *The Social Psychology of Organizing*, Reading, MA: Addison Wesley.
- Weick, K. E. (1974). Middle range theories of social systems. *Behavioral Science*, 19, 357-367.
- Weick, K. E. (1990). Technology as equivocate: Sensemaking in new technologies. In P.S. Goodman, L.S. Sproull & Associates (Eds.) *Technology and organizations*. San Francisco: Jossey-Bass.
- Weick, K. E. (1995). *Sensemaking in organization*. Beverly Hills (CA): Sage.
- Weinberg, B. H. (1996). Complexity In Indexing Systems—Abandonment And Failure: Implications For Organizing The Internet. *ASIS, 1996, Annual Conference Proceedings*.
- Westmyer, S.A., DiCioccio, R.L., & Rubin, R.B. (1998). Appropriateness and effectiveness of communication channels in competent interpersonal communication. *Journal of Communication*, 48, 27-48
- Whittaker, S. & Sidner, C. (1997). Email overload: Exploring personal information



- management of email. In S. Kiesler (Ed.), *Cultures of the Internet* (pp. 277-295). Mahwah, NJ: Lawrence Erlbaum.
- Whitfield, J, Lamont, B., & Sambamurthy, V. (1996). The Effects of Organisation Design on Medium Richness in Multinational Enterprises, *Management Communication Quarterly*, 10(2), 209-226.
- Woolgar, S. (2000). Analytic Framework Social Basis of Interactive Social Science. *Science and Public Policy, Journal of the International Science Policy Foundation, Special Issue on Interactive Social Science*, 27(3), 165-73.
- Yin, R. K. (1994). *Case Study Research, Design and Methods*, 2nd ed. Newbury Park, Sage Publications.
- Zack, M. H. & McKenney, J. L. (1995). Social context and interaction in ongoing computer-supported management groups. *Organization Science*, 6 (4), 394-422.
- Zack M. H. (1994). Electronic messaging and communication effectiveness in an ongoing work group. *Information & Management*, 26(4), 231-241
- Zafeiriou, G., Nunes, J., & Ford, N. (2001). Using Students' Perceptions of Participation in Collaborative Learning Activities in the Design of Online Learning Environments, *Education for Information*. 19, 83-106.
- Zuboff, S. (1988). *In the age of the smart machine: the future of work and power*. Basic Books: New York.
- Zuckerman, L. (1999, April 17). Words Go Right to the Brain, But Can They Stir the Heart? *New York Times*, A17-A19.

## Statement of Consent from Co-authors

This dissertation includes co-authored material. According to PhD guidelines at NTNU, a declaration of consent from co-authors is required in such instances. The purpose of this consent form is to explicate my contribution in the co-authored papers in this dissertation in particular, and my role in research team in general.

This dissertation consists of 6 chapters (see table of contents). Chapters 1-5 is my own work, while chapter 6 (individual papers) are co-authored. The following points provide further detail about my specific role in the research team (4 members) – which is precursory to the papers included in this dissertation:

### In-depth interviews, transcription and translation

- Conducted 32 in-depth interviews (72 total in the project during 2 ½ years)
- Transcribed all 36 Norwegian interviews
- Translated 22 of 32 interviews from Norwegian to English.

### Coding, analysis, and data management

- Line-by-line coded and analyzed 60 of 72 interviews.
- Categorized entire dataset into a 59-category system - twice (see Chapter 3 for more detail)
- Transferred, formatted, and maintained dataset (Excel worksheet – 4972 individual codes, 160 pages) together with another team-member

### Write-ups

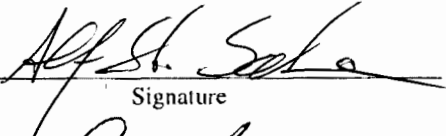
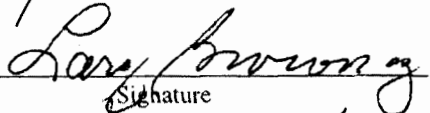

- Active role in idea generation, conceptualization, literature reviews, and writing process in all four papers.
- Active role in presenting papers at conferences and seminars.
- Active role in getting work published

### Other

- Active role in grant proposal and evaluations

Consent by co-authors:

I hereby acknowledge Jan-Oddvar's role and contribution in producing the co-authored papers as significant, and give my consent to allow this to be included as part of his dissertation.

Co-author: _____	<u>Alf Steinar Sætre</u> Co-author name – print	 Signature
Co-author: _____	<u>Larry Davis Browning</u> Co-author name – print	 Signature
Co-author: _____	<u>Keri Keilberg Stephens</u> Co-author name – print	 Signature

## Appendix B

### Interview guide

1. Walk me through what a typical day looks like in your job?
2. What are the most important things you do in a day that makes the difference between success and failure?
3. Specifically, how do you use the web/Internet? Can you show me an example?
4. How do you use the computer as part of the internal vs. external work process? Can you demonstrate to me how you do that on the computer?
5. What seems to be crucial in making internal/external communication work? Is there a single factor that predicts success? If so, what is it?
6. When building or sustaining relationships with others in your organization, under what conditions is computer communication most effective?
7. Do you use the computer differently when you build a new relationship with others in your organization vs. when you are maintaining an existing relationship? How do you use the computer for maintaining or sustaining relationships? What information is shared in that interaction?
8. If you could design your own work environment that would allow you to access the web/Internet more effectively, what would that look like?
9. Do you have any additional comments based on what we have talked about today?

Additional questions asked for second round of interviews (total of 30, starting fall 2001)

10. To what extent does term “culture” become a useful concept in your use of ICTs?
11. To what extent and in what way has Sept. 11<sup>th</sup> influenced the way you do business?
12. To what extent has the economic downturn (Dot.com)in the year 2001 affected the way you do business?

## Appendix C

### Interviewees – 72 Total

<b>Year one</b>	<b>Interviewees Norway</b>	<b>Interviewees US</b>
1	Software/hardware engineering	E-learning Consultant
2	Software/hardware engineering	Computer Hardware Sales
3	Software engineering	E-learning Consultant
4	Web-Designer	Web-Hosting
5	Software engineering	Sales/Accounting
6	Software Sales	Web-Designer
7	Software engineering	Software Engineer
8	E-learning	Semiconductor industry - Purchasing and engineering
9	Competitive Intelligence	E-learning industry, Sales manager
10	Software engineering	Researcher
11	Internet Service Provider - manager	CRM Consultant
12	Web-Designer	Sales, Computer Hardware
13	Software engineering	Semiconductor industry - Technical sales person
14	Competitive Intelligence	E-learning industry, inside sales person
15	Sales/Accounting and financial services	Marketer
16	Hardware engineering	Software Sales
17	Software engineering	Software Design.
18	VP/software engineering	Semiconductor, Outside Sales
19	Software engineering	Energy Consultant
20	Researcher/analyst	Internet, E-learning, Owner, Trainer, and sales
21	VP/software engineering	Finance Consultant
<b>Year two</b>	<b>Interviewees Norway</b>	<b>Interviewees US</b>
22	University Adm/Web adm./Higher Education	Small town store owner
23	University Professor/Higher Education	Communication consultant
24	Systems Engineer /Software Engineering	Consultant, Software
25	Pathologist/Health-hospital	Corporate communication consultant
26	VP of Software Design/	Financial consultant
27	Internet Stock Exchange	Internet Artist, and Engineer
28	Pig and dairy farmer	Presentation designer for a Public School District (government)

- |    |                                  |   |
|----|----------------------------------|---|
| 29 | IT consultant - Fish farming     | Chamber of Commerce manager               |
| 30 | Professor, Consultant, Publisher | Water purification, small business owner  |
| 31 | Pathologist/Health-hospital      | Vice President of Finance - Bank          |
| 32 | Distance and Continue            | Preacher using genealogy on the Internet  |
| 33 | Pig and dairy farmer             | History museum archivist                  |
|    | Energy Conservation              |   |
| 34 | Consultant/energy                | Lawyer                                    |
| 35 | Info Director, Fish farming      | Technical support person for a University |
|    | Systems Engineer/Software        |   |
| 36 | Engineering                      | Consultant, Software                      |

## Appendix D

### Sample Transcripts of Interview

#### U.S. Interview

INTERVIEWER: Okay. Probably the best place to start is for me to ask you the first question on there, and that's just to kind of walk me through what you typically do on a day-to-day basis.

MR. x: I usually start off the day by about 6:00, start off with billing for the previous day's work, working up any orders that I need to place for the day.

INTERVIEWER: Okay. So you start out with billing.

MR.x: Billing and then prepare any orders for the day. The ones that work better faxing them in, I go ahead and fax since most fax machines are on 24 hours, so when they come in they have it laying right there in the tray.

INTERVIEWER: And these are orders for -- tell me some more -- give me a little bit of context behind what kinds of things you're ordering, what kinds of billing you're doing, and the kinds of customers that you work with, also.

MR. x: Okay. Everything having to do with storage, transfer, and the treatment of water. That includes a variety of different types of pumps, storage tanks, water softeners, reverse osmosis units, and components for all those.

INTERVIEWER: Okay. So you're ordering those for your customers. You're going to install them for some of them.

MR. x: Some are for inventory, because I have to maintain an inventory of certain specific items. Someone has a pump go out, they have to one have right then. And they'll go to somebody else if I don't have it in inventory.

And I can usually get things like that -- if I can get an order faxed in like Monday morning by, say, 7:30, eight o'clock, by the time they open in Fort Worth, by mid-afternoon I can have any pump or anything that I need that way; because the first thing they do when they come in is they -- the officer manager. The first thing she does is she goes through all faxes that have come in over the weekend.

### Sample Norwegian Interview

<p>Sætre Det høres ut som du bruker Internett, e-mail og elektronisk medier ganske mye, hvis du kunne få frie tøyler til å redesigne arbeidssituasjonen – hva ville du hatt annerledes dersom du hadde fått frie tøyler?</p>	<p>AS It sounds like you use the Internet, e-mail and electronic media quite a lot, if you could have free reign to redesign your work situation – what would you do different if you had a free reign?</p>
<p>X Hvis jeg skulle endre på min daglige...</p>	<p>X If I could change my daily...</p>
<p>Sætre Ja, altså, fått det merr sånn som du ville hatt det for å bli mer effektiv</p>	<p>AS Yes, that is, had it more like you would have wanted it to be more effective</p>
<p>X Ja, jeg tror det for meg så går det – ja, det går jo selvfølgelig på hvordan du bruker teknologien, men også hvordan du strukturerer dagen din og man bestemmer seg at man skal ikke sjekke e-mail før kl. 15.00 f.eks. For jeg tror folk blir liksom styrt av den jævla</p>	<p>X Yes, I think that for me it has to do with – yes, it has to do with how you use the technology, but also on how you structure your day and one decides not to check e-mail until 15.00 for example. Because I</p>

<p>innboksen sin, unnskyld uttrykket</p> <p>Sætre</p> <p>Ja</p> <p>X</p> <p>Hver gang det sier ”pling” i innboksen, selv om de ikke venter på noe, så må de liksom inn å se hvem de har fått mail fra. Jeg tror det er på en måte litt sånn småsykelig at de fleste får et sånn forhold til – for det ser jeg gjerne når jeg sender e-mail til folk i min organisasjon, det kan være folk som jeg vet der dødsbusy, men skriv en e-mail og du kan være ganske garantert at du får et kjapt svar.</p>	<p>think that people are governed by their fucking in-boxes, pardon the expression</p> <p>AS</p> <p>Yes</p> <p>X</p> <p>Every time the in-box says “pling,” even if they are not expecting anything, that they have to dash in and see who they got mail from. I think that it in a way is a bit sick that most people have that kind of relation to – because I see that easily when I send mail to people in my organization, it can be people that I know are extremely busy, but write an e-mail and you can be guaranteed to have a quick response.</p>
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## Appendix E

### Sample of GT Codes 4,972 individual Codes

Cat.	Code	Interv.	Yr	NO/US	M/F	Coder	P
9	"a combination everything is absolutely essential" talking about ICTs	x	2	US	F	JS	38
22	"a lot of old-school lawyers who don't trust Westlaw, who don't like Westlaw, who don't know how to use it and still want to sit down with the book"	x	2	US	F	JS	33
19	"all e-learning is driven by emotion and motivation. It has absolutely nothing to do with where the buttons are on the technology."	x	2	US	F	KS	54
21	"almost every day I play around on the PC too." he looks for music info.	x	2	NO	M	KS	24
6	"Apparently there is something about developing a relationship without any other direct information that once some conversation is started in writing, it gets past the point of where you can make the judgments that most of us make all the time."	x	2	US	M	KS	55
1	"blanket emailing" used to search for information	x	1	US	M	KS	12
22	"Books are very robust-it is in a way comforting to sit and read a book--it has something to do with the validation of it--there the web has a problem. One must obtain an assurance that the information that is obtained from the net is worth something."	x	2	NO	M	KS	21
39	"But since the economy has started to drop, I have reps wining and dining me like crazy. Almost to an annoying state."	x	2	US	F	KS	7
31	"classical relationship building" is conducted face-to-face.	x	2	NO	M	KS	13
17	"each new ICT advance makes you wish you would have done something different in years past"	x	2	US	F	JS	18
16	"e-mail has become extremely powerful because of language issues"	x	2	US	F	JS	41
1	"email has in a way killed the fax"	x	2	NO	M	KS	32
1	"Email is such an indispensable tool that I don't see how we could live without it."	x	2	NO	M	KS	4

10	"Everything goes in cycles for a cow and therefore, a computer is especially suitable, because it uses cycles well."	x	2	NO	M	KS	4
43	"fax is almost dead"	x	2	NO	M	KS	32
12	"functionality as reached its maximum. I mean, you cannot add any more incremental functionality to these technology programs or they are simply not going to work"	x	2	US	F	JS	61
14	"I am very good about switching the phone off and over to the voice messaging system--I don't bother to be available on the phone all day long--the same thing with the cell phone--I am conscious of when I answer the phone and when I don't answer the phone"	x	2	NO	M	KS	10
3	"I can get ten times more done sitting at my desk [and using the web for research] than I can at the library."	x	2	US	M	KS	14
23	"I don't even use a dictionary, the English-Japanese dictionary anymore, you know. If our Web connection is down, then I let out a big sigh and get up from the chair and try to grab an English-Japanese dictionary. And I have to turn the page, God forbid, physically"	x	2	US	M	JS	27

## Appendix F

### 59 Categories

Cat.	Description	# of codes
1	<b>E-mail Norms</b> – Describes how interviewees use email as their chief medium of communication. Discusses issues such as appropriateness, email use for information-sharing, and CYA (self-protective) tendencies.	<b>386</b>
2	<b>What the Web Adds to the Sales Process</b> - Discusses how the Web has changed the sales process. For example, prospecting has been sped up, as has the information flow between people involved in the sale.	<b>301</b>
3	<b>Efficiency, Convenience and Time savings</b> - Examples illustrate the ways in which ICTs are used to accomplish more in less time, and with greater ease.	<b>291</b>
4	<b>Reliability of Sources: Credibility &amp; Trust</b> - Includes the need for credible information sources, how source credibility is assessed, and the expressed common characteristics of credible sources. Also includes information on trust building and the importance of trust.	<b>280</b>
5	<b>Face-to-Face (FtF) Communication</b> - Discusses FtF's role in the computer-mediated environment. Also discusses FtF's appropriateness, quality, and frequency of use.	<b>262</b>
6	<b>How the Web Affects Organizational Process (Other Than Sales)</b> - Shows how the Internet improves organizational work by speeding up information searches, enhancing customer support, facilitating information-sharing, and streamlining operations. Also discusses the Internet's downsides—e.g., loneliness and eye strain.	<b>237</b>
7	<b>Collaboration</b> - Includes formal and informal information-seeking and information-sharing behaviors	<b>226</b>
8	<b>Selecting the Right Media/Communication Channel for the Task</b> - Discusses how different media and channels are chosen to carry out a task (e.g., contacts), including the most efficient way of communicating with internal and external customers.	<b>201</b>
9	<b>Sequence of Media Choice</b> - Deals with which channels (FtF, email, phone, voicemail, memo, Internet, etc.) are used, and in what sequence, when communicating with internal and external customers.	<b>145</b>
10	<b>Control</b> - Identifies how ICTs help control information and relationships by such means as leaving a paper trail, emphasizing security, and being consciously redundant.	<b>141</b>

11	<b>The Value of Traditional Sales Practices</b> - Shows how many elements of the traditional sales process remain both valid and useful, even with ICTs. Examples include gaining access to decision-makers, relying on customer referrals, and determining demo appropriateness.	<b>121</b>
12	<b>Desire for Future Technology</b> - Discusses desires for new technology such as streaming processes and personal- productivity enhancements. There are several interesting contradictions in this category.	<b>118</b>
13	<b>Information Organization</b> - Discusses the importance of being able to store, organize, and easily access lots of information. Includes a desire expressed for a software product to provide that organization.	<b>112</b>
14	<b>Telephone Norms</b> - Discusses how people use the telephone to (a) work with customers, (b) share information, (c) take conference calls, and (d) communicate. Includes information on the telephone's appropriateness and its relationship to other richer and leaner mediums.	<b>111</b>
15	<b>Competitive Intelligence</b> - Includes how people use ICTs (information communication technologies) to gather information about the market and competitors.	<b>87</b>
16	<b>Culture:</b> Displays comments regarding cultures, including subcultures, differences between national cultures, organizational cultures, the importance of language and cultural understanding.	<b>86</b>
17	<b>Technology Adoption</b> - Discusses the New Technology adoption process, including issues like how to adapt it, accommodating cultural differences, and coping with management-decreed adoptions.	<b>85</b>
18	<b>Company Details</b> - Provides context for the other categories.	<b>82</b>
19	<b>E-Learning &amp; General Training</b> - Displays how learning occurs in organizations. Including: learning from colleagues, Internet searches, and formal training programs.	<b>78</b>
20	<b>Internet Search Skills</b> - Deals with the skills required to search the Internet effectively.	<b>77</b>
21	<b>Work/Fun/Flow</b> - Discusses people's positive and negative perceptions about using technology for job enhancement, personal use, and play.	<b>73</b>
22	<b>Use of Paper</b> - Shows that paper still has its place as a medium, especially in formal and important communications.	<b>68</b>
23	<b>Preponderance of the Web</b> - Shows that many people feel helpless if the Internet is down. Also discusses problems with the Web such as narrow bandwidth and inflexibility.	<b>62</b>
24	<b>Newsgroups</b> - Discusses the use of Newsgroups for problem solving and information gathering - both personal and prof. use.	<b>62</b>

25	<b>Technical Issues</b> - Shows how the technical limitations and instability of Internet service providers affects the comm. process.	61
26	<b>September 11th</b> - Effects of 9/11 both professional and private. Including minimal effects in rural US and Norway, compared to US urban centers.	61
27	<b>Information Overload</b> - Discusses problems with—and recommendations for—managing lots of information in light of ITCs	57
28	<b>Just-In-Time Learning</b> - Discusses the importance of managing the learning process individually, not through a formal corporate system. The interviewees discuss how learning is needed just-in-time rather than just-in-case.	56
29	<b>Receiver Communication Preference</b> - Deals with the customer's preferred communication channel, whether actually expressed or only inferred.	48
30	<b>Internal Digital Knowledgebase</b> - Includes information stored or retrieved from an internal source (e.g., files, databases, shared drives). Examples range from a highly structured activity to merely dumping information into a digital source.	47
31	<b>Communication in General</b> - Discusses communication's role in relationship-building—specifically, how it affects trust, FtF, and information exchange.	46
32	<b>Role of PowerPoint</b> - Besides being a presentation tool, PowerPoint is widely used for consolidating and organizing information.	45
33	<b>Rules of Internet Use</b> - Includes instances of media or channel use based on company policy or institutional expectations. Includes examples of both compliance and non-compliance.	45
34	<b>Complexity &amp; Uncertainty</b> - Identifies how information users find uncertainties in their knowledge and practices.	43
35	<b>Customer Relationship Management (CRM)</b> – Includes ways to coordinate, organize, and document the activity and relationships with customers. Also includes the use of custom software applications and proprietary solutions.	41
36	<b>Generation Gap of Users</b> - Discusses how older people are generally more skeptical and old-fashioned in dealing with technology.	40
37	<b>Cell Phone (SMS)</b> - Discusses the use of cellphones and SMS for professional and private purposes.	37
38	<b>Hierarchy</b> - Discusses how internal information must often be translated between different organizational levels.	35
39	<b>Dot.Com Crash</b> - Effects of the dot com crash (also no effects). Including the liabilities and opportunities that resulted.	35
40	<b>Physical Work Environment</b> - Includes how the physical work environment affects both worker satisfaction and the quality of	33

	the work done.	
41	<b>Redundancy</b> - Deals with storing information/data in multiple locations (backup), using multiple sources, using multiple channels, rule of three (credibility checks).	<b>31</b>
42	<b>How a Web Site Establishes Culture</b> - Discusses how individuals gauge a corporate culture just by viewing the company's Website.	<b>30</b>
43	<b>The Demise of Fax</b> - The fax is rarely needed today given email's popularity for sending documents quickly.	<b>28</b>
44	<b>PDA</b> - Discusses the pros and cons of using a Palm Pilot and other PDA's	<b>27</b>
45	<b>Time Considerations-</b> Discusses how people differ in the way they define real-time data and bandwidth needs. Including: speed, time continuity, time delay, and waiting.	<b>26</b>
46	<b>Video Conferencing</b> - Discusses the pros and cons of videoconferencing and desktop videoconferencing.	<b>23</b>
47	<b>Anonymity</b> - Discusses how Web and email users can protect their anonymity.	<b>23</b>
48	<b>Portability of ICTs</b> - Discusses how portable computers are used, especially by sales people.	<b>23</b>
49	<b>E-commerce</b> - Discusses how the Web is used to market, sell, and support products and services, including the expressed goal of moving the business toward e-commerce.	<b>22</b>
50	<b>The Web's Role in Decision-Making</b> - Discusses how the Web aids in the decision-making process.	<b>22</b>
51	<b>Impression Management</b> - Shows examples of a person or organization that carefully manages appearances and others perceptions of them, including signaling: professionalism, care, busyness and availability.	<b>22</b>
52	<b>Value of the Internet</b> - Includes remarks about the Internet's general value, as well as its perceived potential for current and future use.	<b>17</b>
53	<b>Information Obsolescence</b> – Discusses how the Internet is sometimes the only way to obtain current information, since some information quickly becomes obsolete. Also shows how people use the Internet to obtain hot-off-the-press information.	<b>14</b>
54	<b>Routine tasks</b> - Examples of how people perform tasks habitually.	<b>13</b>
55	<b>Cooperative Analysis</b> - Includes how people use information to identify allies in business contexts.	<b>12</b>
56	<b>Learning by Failure</b> - Discusses how we can learn by failing.	<b>12</b>
57	<b>Discretion</b> - Shows examples of people using ICTs in discrete ways with a consciousness to avoid being intrusive.	<b>11</b>

58	<b>Combinatorial and Iterative Information-Seeking Process</b> - Demonstrates how several information sources are queried, ranging from Net-centric to F2F, in an effort to learn about a certain topic or problem.	9
59	<b>Satisficing</b> - Describes how people access the information they need and then stop the search process.	6





