Carl Lawrence

INNOVATING WITH INFORMATION TECHNOLOGY IN A GLOBALIZED WORLD

BEING PROACTIVE ABOUT CULTURE
CARL LAWRENCE

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Abstract

The diffusion of information technologies (ITs) throughout the globe provides both opportunities and challenges for information systems (IS) researchers and practitioners. New perspectives on culture that reflect our global society has prompted significant research of the role of culture in IS innovation. Research in this area has contributed knowledge and understanding of how culture mediates organizational innovation with IT. While IT adoption and implementation dominate the research stream, emerging studies have drawn our attention to the frequently ignored pre-adoption phase of IS innovation —“comprehension”. Organizations interested in adopting IT must first understand its context of use. To accomplish this, they must acquire knowledge and make sense of IT through various modes of interaction and across diverse cultural contexts. Theoretical and empirical research on the comprehension of IS innovation with a cultural perspective are lacking in the research stream. The goal of this thesis is to contribute theoretical and empirical knowledge to this area and to IS innovation research in general.

Theoretically, this thesis contributes, (1) a contemporary conceptualization of culture, (2) an explanation of the cultural challenges facing innovators with IT, and (3) a deeper understanding of culture’s mediating effects on IS innovation. Guided by the theoretical contributions, the empirical investigations focused on the comprehension phase with a cultural perspective. The results contribute knowledge through the study of three contemporary contexts of comprehension—active, passive and virtual. The findings revealed that in an active mode of comprehension, locally driven collaboration across cultures aided innovators overcome IT knowledge deficits. In a passive mode of comprehension, normative culture values were identified that were instrumental in shaping IT discourse. In a virtual mode of comprehension, unique taken-for-granted methods of interaction were shown to facilitate effective cross-cultural knowledge sharing that improved comprehension of IT innovations. Collectively the findings provide knowledge that can aid organizational innovators with IT act proactively by improving their understanding of the mediating effect of culture on IS innovation.

Keywords: comprehension, culture, information Technology, IS Innovation, IT Discourse, knowledge sharing, organizing vision
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Oulu

Tiivistelmä


Asiasanat: informaatioteknologia, IT diskurssi, kulttuuri, käsityystyylit, tietojärjestelmäinnovaatio, tietämyksen jako
This thesis is dedicated to my late mother,
Icilda Broomfield
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List of Original Papers

This thesis is based on six (6) original research articles, which are referred to in this text by their roman numerals.


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Original Publications
1 Introduction

Information technology (IT) is a significant investment for any organization; thus, extracting the most value from these innovations is vital, and can be highly rewarding (Rau & Bye 2003). As a key resource for business, IT innovations enable the complex interactions that are required to support our global economy (Barrett et al. 2003). IT has become a symbol of progress throughout the world, and the pressure to adopt the latest IT has never been greater. However, growing awareness of cultural diversity has forced researchers to reexamine the technorationalist perspective that dominates information systems (IS) innovation research in order to select appropriate innovations that bring true value to organizations (Avgerou 2002).

1.1 Background and Motivation

The terms IT and IS innovation are concepts that are intrinsically intertwined and are used liberally throughout the discipline of IS. In this thesis, the distinction is made based on coverage. The selected term IS innovation, was introduced and defined by Swanson (1994) as “innovation in the organizational application of digital computer and communications technologies,” more commonly known as IT. Other studies have used IT innovation to describe a similar process (King et al. 1994; Wang & Ramiller 2009). The selected term IT innovations thus refers to technical, process, and product innovations1 (Swanson, 1994; Fichman 2004), such as enterprise resource planning (ERP), Microsoft Office, and Agile methodology. Henceforth, the terms IS innovation and IT innovations are used where appropriate. Consequently, IS innovation research is fundamentally concerned with “understanding the factors that facilitate or inhibit the adoption and diffusion of emerging IT-based processes or products within a population of potential adopters” (Fichman 2004).

IS innovation research has mainly studied innovation as adoption and diffusion (Tornatzky & Klein 1982; Fichman & Kemerer 1999; Frambach & Schillewaert 2002). Many organizations do not possess the technical fortitude to develop new IT innovations; thus, they are more likely to adopt them. IS innovation is the adoption of IT innovations for use in unique ways, and the term

1 Swanson (1994) provides a typology of six types of IT innovations.
has normally been restricted to early adopters (Swanson & Ramiller 2004; Swanson 2010). Whereas many studies have focused on adoption, it is not the initiation of the innovation process. Prior to adoption, the adoption decision must be made, and after adoption, the innovation needs to be implemented and assimilated by the organization (Swanson & Ramiller 2004). The benefits of innovation adoption can only truly be realized when it has been integrated into the activities of the organization’s value chain (Armstrong & Sambamurthy 1999).

The decision to adopt an innovation can be viewed as “a temporal sequence of steps through which an individual passes from initial knowledge of an innovation to forming a favorable or unfavorable attitude toward it, to a decision to adopt or reject it, to putting the innovation to use, and to finally seeking reinforcement of the adoption decision made” (Karahanna et al. 1999). During this process—conceptualized by Swanson (2004) as “comprehension”—potential adopters seek knowledge and attempt to make sense of IT innovations by accessing the discourses of the IT community. Fastidiousness at this phase varies and is typically reduced to a “me too” approach. The bandwagon phenomena in IS innovation has inspired research that has questioned this “mindless” innovative behavior. Riding the technology bandwagon suggests that an organization adopts a “follow the leader” strategy that exhibits limited reasoning when selecting technologies for adoption (Swanson & Ramiller 2004). Although this strategy may prove successful for some, the emerging research on culture and IS innovation negates the application of this strategy.

The unquestionable importance of IT in our global society should not allow for the naive assumptions that IT innovations will exhibit the same productive attributes in organizations and individuals existing in culturally distant contexts (Ein-Dor et al. 1993; Kaye & Little 1996; Wagner & Newell 2004; Vodanovich et al. 2010). Globalization has generated significant research interest in culture and IT as organizations, seeking to keep pace with a growing competitive marketplace, are motivated to adopt the latest innovations at a more rapid rate, ignoring potential pitfalls (Hanseth & Braa 2000; Barrett et al. 2003; Leidner 2010). Successful adoption and diffusion of innovations, outside of one’s own cultural context, frequently require business process changes that encroach on employee work behavior (Mustonen-Ollila & Lytytinen 2004). Additionally, adoption and the resulting diffusion of IT innovations can adversely affect an organization’s culture, often leading to reduced productivity (Vasst & Walsham 2005). The dynamic, transformative, and sometimes unpredictable nature of
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culture presents many challenges to IS innovation, as it is seen as a key mediating factor (Harvey & Myers 1995).

1.2 Research Purpose and Questions

The goal of IS innovation research is “understanding the factors that facilitate or inhibit the adoption and diffusion of emerging IT-based processes or products within a population of potential adopters” (Fichman 2004). Previous research on culture and IS innovation have focused on post-adoption failure, using their findings to draw attention to cultural naivety. (Bunker et al. 2007, Van Akkeren & Rowlands 2007; Ravishankar et al. 2011). These studies, however, do not provide the proactive strategies needed to avoid innovation pitfalls. This thesis seeks to contribute knowledge and understanding that would allow innovators with IT to act proactively. The primary research question (PRQ) is thus:

PRQ: How can we mitigate the pitfalls of innovating with IT in a multicultural world, by taking a proactive rather than reactive approach to cultural issues?

Previous research on IS innovation by senior scholars has already encouraged IS researchers to act proactively through preadoption activities. However, it has been lacking a cultural perspective. Swanson and Ramiller (2004) propose that mindful innovators engage in comprehension prior to adoption. During comprehension, innovators engage in boundary-spanning activities in order to derive an IT innovation context of use (Wang & Swanson 2007; Tsui et al. 2009; Wang & Ramiller 2009). During comprehension, knowledge about how to innovate with IT is required, and this is achieved through learning (Wang & Ramiller 2009). In this thesis, knowledge and understanding is sought on the contemporary modes of comprehension as well as how these modes are used to learn about IT with cultural perspective. There are three commonly known modes of learning interaction: active, passive (Mohamed & Lam 2002) and virtual (considered a combination of the two or as a mode of active learning) (Carayannis 1999). These modes of learning are used in acquiring new external knowledge (Lane & Lubatkin 1998).
Fig. 1. Research Questions and Structure.
This thesis seeks to contribute an improved understanding of the comprehension process informed by a cultural perspective that can provide proactive innovators with IT the understanding they need to avoid innovation pitfalls due to culture. To facilitate empirical investigations, this thesis sought to address conceptual gaps in the literature that would enable an improved contemporary understanding of culture and IS innovation. The study identified the need for a contemporary conceptualization of culture that could address innovators’ cultural assumptions about IT innovations. The study also saw the need to access the rich findings of interpretive studies on culture and IS innovation that have arguably contributed most to our understanding of deep cultural issues. Finally, the study found it important to conceptualize the cultural challenges facing innovators with IT. The findings of the study are represented in the following secondary research questions (SRQ):

- **SRQ1**: What assumptions about culture should guide IS innovation research and practice?
- **SRQ2**: What do interpretive case studies collectively tell us about the mediating effect of culture on the IS innovation process?
- **SRQ3**: What are the cultural challenges facing organizations when they are innovating with IT?

This theoretical foundation provided the understanding and confidence needed to focus on the comprehension phase of IS innovation. Culture presents us with a world of multiple cultural contexts beyond those of national culture (Myers & Tan 2003). Innovators attempting to comprehend IT innovations in our globalized society are presented with multiple avenues and contexts. Comprehending new IT innovations requires interorganizational collaboration between different groups and through different mediums and modes, including virtual communities (Armstrong & Hagel 1996), commercial publications (Wang & Swanson 2008), and global/local collaborations (Walsham 2002). This thesis investigates contemporary context where comprehension occurs, with an attention to culture and the goal of understanding how innovators are learning about IT. The following three (3) focused research questions (FRQ) guide our empirical investigations. The structure of the research questions and their relationship with the literature is displayed in Figure 1.
FQ1: How can we innovate with IT, cross-culturally, by sharing knowledge through global/local collaboration?

FQ2: How have IT values been interpreted and legitimized in the IS community discourse by its contributors?

FQ3: How do innovators with IT collaborate via online communities to get from “know-what” to “know-how” effectively?

1.3 Major Findings

The thesis provides conceptual and empirical findings that are derived from individual investigations of IS innovation and culture. The conceptual studies help us better understand the impact of culture on the IS innovation process. Collectively, the conceptual contributions provide a contemporary view of the research on IS innovation and culture, by applying theory and synthesizing the existing research. The first conceptual contribution provides three cultural assumptions that would sensitize innovators with IT to issues of culture. The second and third conceptual contributions help provide clarity to the research area by synthesizing relevant existing literature. Through this synthesis, the thesis provides conceptualizations of the cultural challenges facing innovators with IT, such as differentiation, externality, incompatibility, and embeddedness. It also provides a holistic explanation, specifically derived from the findings of interpretive research on IS innovation and culture, to provide a deeper understanding of culture’s mediation of IS innovation.

The conceptual background provided by these studies supported further investigation on the comprehension phase of IS innovation. To answer our primary research question three contexts of comprehension, representing three modes of learning about IT were studied. The findings provide knowledge of how mindful innovators with IT can be proactive about addressing cultural issues by learning about IT through different modes of comprehension. The findings reveal that in an active mode of comprehension, innovators need to understand cultural elements through incremental collaborative spirals that are locally driven.

In a passive comprehension context, it was revealed that normative cultural elements embedded in the organizing vision of IT innovations are transmitted through symbolic systems to innovators. It was found that the values of contributors to the discourse on IT were embedded in the discourse itself and were used to provide legitimacy for the innovation. Finally, in the virtual
comprehension context, taken-for-granted shared methods embedded in cultural interaction mediate virtual collaborative environments. The study found unique taken-for-granted knowledge-sharing mechanisms that supported effective knowledge sharing for comprehension.

Collectively, the contributions of the thesis provide and improve understanding of culture’s impact on IS innovation by supporting proactive strategies enabled by comprehension. Through an improved understanding of the contexts and modes of comprehension, the empirical findings provide us with knowledge that allows innovators to address proactively cultural issues by applying the effective knowledge processes found.

1.4 Delimitations of Scope and Key Assumptions

The concepts of innovation, culture, and knowledge used in this thesis are broad and intertwined. This focused investigation contributes to specific areas of knowledge that are within the discipline of IS. First, our discussion on innovation is only related to IS innovation in organizations. IS innovation is conceptualized as representative of the combined processes of comprehension, adoption, implementation, and assimilation (Swanson & Ramiller 2004; Lucas et al. 2007). IS, as a discipline, views IT beyond a narrow tool view. Outside the IS field, it is recognized that IT is normally associated with specific technologies, particularly in terms of its design and use. IS, however, covers areas beyond the artifact to include knowledge and social issues (Avgerou & Madon 2004).

As previously stated, our conceptualization of IT innovation uses the comprehensive definition by Swanson (1994). These included type I innovations that are confined to the IS task, type II innovations that support administrative tasks, and type III innovations that are imbedded in the core technology of the business. These forms of technological and process innovations are considered to be IT innovations.

The conceptualizations of culture used in this thesis are detailed throughout the study to cover the concept holistically by including national, organizational, and endemic forms. More importantly, the contemporary and British anthropological perspective that views culture as dynamic and evolving are included (Avison & Myers 1995). Static conceptualizations that use characteristics that are limited temporally and spatially are avoided.

The inclusion of knowledge and collaboration research in this thesis is limited by the phenomena and context of the investigation. Knowledge issues
covered are those involving the IS innovation process and are supported by literature related to those processes. This is also similar to our discussions on collaboration. Collaboration research is specifically referenced in the context where organizations cross boundaries to share and acquire knowledge to innovate with IT. This covers a fairly narrow segment of the research stream that deals with boundary spanning, knowledge sharing, and sense making for IS innovation (Pawlowski & Robey 2004; Levina & Vaast 2005; Newell et al. 2005; Lindgren et al. 2008; Kimble et al. 2010).

The previous literature also provides us with three important assumptions about IS innovation and culture that are fundamental to this thesis. The first is that IS innovation is critical to organizational success in our global economy (Swanson 1994). The adoption of the latest productivity enhancing technologies has been fundamental to business strategies. The second is that culture has a significant impact on organizations, and on the adoption, and diffusion of IT innovations (Avison & Myers 1995). Third, IT community discourse has a significant impact on the adoption and diffusion of IT in the organization (Wang & Swanson 2007, Tsui et al. 2009). These three fundamental assumptions, supported by research, propose that it is imperative that organizations continue to adopt productivity enhancing IT innovations and that culture must be understood in order to gain the greatest benefit from innovating with IT.

1.5 Thesis Structure

This thesis progresses by first providing a background on the research on IS innovation and culture covered in section 2. Section 2 reflects on early research, which revealed the dominant paradigm, and follows its metamorphosis into promoting social and cultural perspectives. Narrowing the literary focus, the thesis identifies contemporary issues in the early phases of IS innovation. The specific and under-researched areas that are investigated in this thesis are highlighted in section 3.

The research approach and the process taken to investigate these contemporary issues are detailed in section 4. This includes relevant and contemporary phenomena under study, along with our philosophical perspectives, and methods of inquiry. As this is a compilation thesis, a guide to the attached articles is provided in section 5. The findings from the empirical investigations are then summarized in section 6, and the following discussion, section 7, further articulates their contributions to the research area, and how the studies can be
assessed in terms of rigor. Section 8 concludes by providing a summary of the thesis and a guide to future research.
2 Culture and IS Innovation

Fundamentally, innovation research in organizations has sought to study how innovation happens (Fagerberg et al. 2004, p. 4). The study of innovation is seen as interdisciplinary, and IS has mostly paralleled organizational and economic literature on innovation. Consequently, IS research has mainly cosigned studies on innovation adoption and diffusion (Daft 1978; Frambach & Schillewaert 2002; Jansen et al. 2006). IS, business, and organizational research have a natural symbiotic relationship, as the role of IT has primarily been to enhance the productivity of organizations; however, this is not easily quantifiable (Brynjolfsson 1993; Brynjolfsson & Hitt 1995). Rather, research on the innovation process has generally studied discrete events that happen over time to explain how and why innovation occurs (Burn 1996). Innovation in organizations is a social process, which is influenced by internal and external forces, many of which have been brought on by globalization through issues of culture and context (Senn 1994).

Innovation in organizations is a process that seeks to create wealth both financially and intellectually, through the exploration and exploitation of new and existing ideas. This process creates and develops them into commercially viable products, services, and processes (Jansen et al. 2006; Liyanage 2006). Fichman (2001) proposes that an organization should adopt and implement innovations earlier, at a more rapid pace, and more intensively relative to its competitors. In IS, the terms IT and IS innovations are often used interchangeably. For clarification, IT is focused on the IT artifact—its design and implementation—whereas, IS includes the artifact as well as knowledge, information, and how it impacts the organizations through implementation and use (Avgerou & Madon 2004). In section 2.1, the background literature on IS innovation is reviewed. In section 2.2, the departure from the dominant paradigm is discussed. Finally, in section 2.3, the research on culture’s mediation of IS innovation gradually narrows our focus to highlight the impact of globalization.

2.1 IS Innovation

Organizations look to IT innovations to improve efficiency and productivity (Brynjolfsson & Hitt 1998; Shane & Ulrich 2004; Verspagen 2006). According to Swanson and Ramiller (2004), IS innovation is a process where a company pursues “IT applications new to an organization”; that is, the application of IT in
novel ways. Founded on organizational innovation research, IS innovation seeks to improve administrative and technical functions through the adoption of technology (Daft 1978). This view of IS innovation is seen as “adaptor oriented,” and organizations that adopt IT in new ways, or for new uses, can also be seen as innovators in their own right (Grover et al. 1997; Swanson & Ramiller 2004).

Early research on IT adoption and diffusion was grounded in Rogers’s diffusion of innovation theory (Rogers 1962; Rogers & Shoemaker 1971). The theory explained the pattern of innovation diffusion by cultural group. This theory helped to define the phases of innovation, and it explains how likely an innovation will be adopted by an organization, by looking at the attributes that organizations possess (Fichman 2001; Zhu et al. 2006b). Early studies used the theory to understand the diffusion of IT innovation in organizations, and it set the foundation for the research stream (Brancheau & Wetherbe 1990, 1990; Agarwal & Prasad 1997; Fichman & Kemerer 1999).

A seminal paper by Swanson (1994) introduced a tri-core model of innovation that extended Daft’s organizational model of innovation to IS. Later, other studies tested and built on the model to include factors such as strategy (Grover 1997; Grover et al. 1997). The study also gave a topology of IT innovations that is useful for extending our notions of IS innovation to managerial practices that support IS functions in the organization, such as Total Quality Management (TQM) (Ravichandran 2000). During this period, research sought to study innovation as it was adopted, implemented, and diffused. Implementation studies became popular as they gave antidotes and strategies to aid the diffusion of innovations (Lederer 1988; Lederer & Sethi 1988; Galliers 1991; Kaplan 1993; Fleck 1994; Rao et al. 1995).

Swanson and Ramiller (2004) attempted to conceptualize the IS innovation process holistically, and identify four phases: (1) comprehension, (2) adoption, (3) implementation, and (4) assimilation. Comprehension studies address the preadoption phases of IS innovation. This involves interaction with community discourse to learn about IT (Wang & Ramiller 2009). The output of this phase is the adoption decision (Bacon 1992). Adoption introduces the IT innovation to the organization. The implementation phase follows, when IT is introduced to the wider population. These are by far the two most dominant phases in the studies of IS innovation. Assimilation follows where the IT innovation becomes embedded in organizational routines (Zhu et al. 2006b). While there are other categorizations of the phases (Burn 1996; Ciborra 1999; Ciborra 2002), Swanson
and Ramiller’s (2004) categorizations are a comprehensive representation of the corpus of the literary stream.

Fichman (2004) proposed that there was a dominant paradigm in IS innovation research, which exhibited a predisposition toward using technology and adaptor characteristics to explain organizational innovativeness with IT. Organizational and technology characteristics were often used to determine how successful an organization would be at adopting IT (Frambach & Schillewaert 2002; Teng et al. 2002). Innovation awareness and readiness were also seen as key to innovativeness (Wu 2004). This was aligned with user-level studies of task–technology fit in organizations (Goodhue 1995; Kanellis et al. 1999), which include the use of the technology acceptance model (TAM) (Veiga et al. 2001: McCoy et al. 2007). These studies proposed that characteristics of organizations and technology would determine overall adoption success.

In the dominant paradigm, attributes and capabilities of organizations were investigated as strong predictors of innovation success. Thong (1999) found that senior organizational leadership and innovation characteristics were important determinants of adoption. Top-management championship, in a study by Chatterjee et al. (2002), along with strategic investment rationale, helped achieve higher levels of web assimilation in organizations. K. H. Yang (2007) found that differences in management characteristics influenced early and late-stage adoption. In addition, Jeyaraj et al. (2006) found that top-management support was a strong predictor of IT adoption by organizations. Duan et al. (2012) found that top-management support emerged as the most critical determinant. Quality in leadership pertaining to adoption relates to the knowledge that the leadership possesses. Successful leaders in innovation adoption and diffusion possess knowledge of both business and high-level strategic information systems (Armstrong & Sambamurthy 1999).

Senior IS executives are found to influence adoption in the early period, whereas normative pressures influenced adoption in the late period (Jeyaraj et al. 2009). The difference between centralized and distributed decision-making will impact adoption, and later its widespread diffusion (Mustonen-Ollila & Lyytinen 2004). Centralized decisions can restrict individual groups or departmental ability to choose more appropriate technologies for their business area; however,

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2 TAM is a user-level model; thus, it is not used to theorize organizational adoption or acceptance of IT.
departmental decision-making comes at the risk of making inappropriate decisions for the business and can result in nonstandardization, which inhibits integration.

The context where the IT innovation is adopted and diffused has always played a role in IS innovation studies. Empirical findings suggest that contexts can restrict innovators ability to fulfill the wide range of adopter needs (Vega et al. 2008). Studies promote that IT adoption in organizations is best studied in a process-specific context (Wu et al. 2003). The organizational environment was revealed as a key factor in adoption (Raymond 2001). Environmental factors combined with other characteristics provide highly predictive models that determine IT adoption success (Vilaseca-Requena et al. 2007). Organizations are a part of a larger social structure, such as industries, and they exist in national and global contexts. Researchers have indicated the need to consider industry when studying IS innovation in organizations. The industry perspective emphasizes the need to look at organizations as a group that fosters similarities due to environmental forces (Chiasson & Davidson 2005). Adoption of technology is affected by governmental regulations that either provide incentives or taxation to influence the availability and use of technologies (Zhu et al. 2006a).

Gordon and Taraďar (2007) found that IT competences in information and knowledge management, project management, collaboration and communication, and business involvement are likely to improve an organization’s ability to innovate. Other studies found that prior investment in IT enables an organization to more effectively adopt additional IT innovations and those of greater complexity (Park et al. 2007). Organizations with a strong technological foundation have a better record in adopting and diffusing IT by leveraging these existing resources (Armstrong & Sambamurthy 1999; Forman 2005; Zhu et al. 2006b). Technology decisions that are properly aligned with business goals, and are compatible with the existing infrastructure, organizational culture, and work ethics of the organization result in successful implementations, and also lay a good foundation for new technology adoption (Forman 2005).

Competition drives adoption by forcing organizations to pursue new technologies to improve processes that reduce expenses and increase productivity (Jansen et al. 2006). Another area of competition is in skilled labor. Organizations are increasingly forced to compete for skilled labor, and this directly influences technology adoption (Zhu et al. 2006b). High-tech skills are increasingly in demand, and a lack of skilled labor can reduce an organization’s ability to adopt innovation. An organization cannot adopt a technology if it cannot support it
through in-house or third party resources. Access to skilled labor markets is an important issue in innovation adoption. Lack of skilled personnel limits IS innovation and also adds a layer of complexity to the adoption decision (Lai & Guynes 1997; Forman 2005). Many organizations may not be able to adopt a technology for this reason: this effect can be referred to as a knowledge barrier (Fichman & Kemerer 1999).

Organizational size is a factor in adoption and diffusion; however, studies have shown that it is not always a factor in determining adoption and diffusion rates, as it is mediated by the type of innovation being adopted (Armstrong & Sambamurthy 1999; Torkzadeh & Dhillon 2002; Byrd & Davidson 2003; Zhu et al. 2006a). The size of an organization is still often shown to have an effect, primarily owing to the economies of scale. Larger organizations use their purchasing power to acquire preferred vendor agreements, customized technologies, and to influence standards (Lai & Guynes 1997; Forman 2005). Other researchers found no significant relationship between business size and World Wide Web adoption (Goode & Stevens 2000).

The factors discussed here are not limited to certain types of innovation. However, their impacts vary based on the types of innovation, such as process innovation vs. technological innovations. Different factors may affect the assimilation of software process innovations, for example (Cho & Young-Gul 2001). Liao and Tseng (2010) studied the adoption of Voice of Internet Protocol (VoIP) by import-export enterprises in Taiwan and found similar impacting factors such as top-management support, environmental competition, and business size.

Studies that can also be characterized by the dominant paradigm but do not use characteristics reveal other interesting factors. Individual factors and task complexity increase the perceived usefulness of IT innovations that significantly influence the intention to adopt and aids its diffusion (Xu & Quaddus 2005). Other studies have explored behavioral processes related to technology adoption (Pereira 2002). Organizational capabilities affect the ability to assimilate IT innovations through strategic change, making some business better able to adopt IT (Noor Akma Mohd 2009). Further research suggests that organizational capabilities influence managers’ views of technology and affects adoption (Mishra & Agarwal 2010).
2.2 Beyond the Dominant Paradigm

As the use of IT in organizations continues to increase globally, important socioeconomic issues have emerged (Sharma & Gupta 2003). This area of IS innovation research identifies sociopolitical issues that explain IS innovation success and failure, and demonstrates a shift from the dominant paradigm. Early work by Markus (1983) illustrates the impact of politics and power in organizations on IS. With power comes resistance, and people in organizations often resist innovations because of their own internal issues, the nature of the IT innovation, and their previous experience with the innovation. Particularly relating to the experience with IT implementation, Markus (1983) explains by using interaction theory, how politics and power can produce resistance to innovation that is often unrelated to the features of the technology. IT innovations can be disruptive and may affect organizational processes through imposed structural changes (Lyytinen & Rose 2003).

To address issues of politics and power in organizations, researchers have put an emphasis on participation in adoption and implementation decisions. Ophert and Damodaran’s (2007) study of e-government participation shows that even though much emphasis was placed on participation, it was not evident in the diffusion of that innovation. In Wiredu (2012) similar study, the nature of public organizational ethos, and the efficient principles connected with IT created tension. Wiredu suggest that these cultural elements should be deinstitutionalized to support assimilation. According to Ophert and Damodaran (2007), by using the sociotechnical approach where participation is of critical importance, users are more involved in the innovation process for two reasons: (1) participation would have been democratic and ethical, and (2) involving clients would help to build the right capacity to use the systems successfully.

Using the concept of networks of power, Constantinides and Barrett (2006) demonstrated how the relationship between users, organizational arrangements, and IT can rearrange organizational priorities and goals. Although Mumford believed in change due to innovation, she argued that it should not be suffered through (Mumford & Ward 1968; Mumford 2003; Stahl 2007). Innovation does not always bring about positive results; a deeper look at innovation shows its inevitable impacts on society. Research has found that socioeconomic factors, such as education, number of extended family dependents, and work criteria, impact innovation with IT (Pearson et al. 2008). Research shows that the changes
IT brings about must have an end goal in mind, and must not be so rigid that changes result in something unwanted (Stahl 2007).

Power can restrict equal opportunities in decision making (Feldman 1997). Power can be seen as a way to constrain human action, but can also be seen as the reason for human action (Tew 2002). Power is intertwined in organizations through policies, practices, and structures; however, it is multidimensional, and its hidden aspects cannot be easily defined and explained (Jasperson et al. 2002). Power exists in relationships between entities where one’s action has an impact on the actions of others. Power is not seen as something possessed by an individual or a group, but is transferred through individuals (Willcocks 2004). Power structures emerge from historically contested conflicts about meaning (Avgerou & McGrath 2007). Power’s impact on IT innovation, transfer, and diffusion can be easily seen in the decision-making process over what to adopt and how to implement IT. Two ways in which power can influence innovation adoption are through (1) restrictive practices that inhibit participation in the decision process and (2) its influence over knowledge disciplines (Avgerou & McGrath 2007).

The decision whether or not to adopt innovations is normally top down, and rarely do decision makers take into consideration user input (Olphert & Damodaran 2007). Research has shown that organizations continue to fail at reaching strategic objectives through IS innovation owing to the issue of power and resistance. Any plan to implement IS innovation should be accompanied by an understanding of the deep organizational structures (Silva & Hirschheim 2007). Deep structures, according to Silva and Hirschheim (2007), have five features: (1) the core beliefs and values of the structure; (2) distributions of power; (3) horizontal and vertical integration arrangements; (4) nature, type, and pervasiveness of controls systems; and (5) service technology and political time. Power often causes people to act irrationally and has a negative impact on innovation adoption and use decisions. To address these issues, IS theorists have suggested the equal participation of all stakeholders in decisions regarding innovation (Bloomfield & Coombs 1992).

Critical theorist Jürgen Habermas believes that people only act rationally if power is removed from the situation, encouraging the free exchange of dialogue (Jasperson et al. 2002). Habermas’s theories have greatly contributed to the recognition of participation as an important element of IS research (Klein & Huynh 2004). Researchers have used his theory of communicative action to propose solutions to negative power structures that disrupt the adoption and
diffusion of innovations (Stahl 2006). However, this theory has been criticized, as it assumes that people are free to express themselves (Walsham 2005b).

Numerous attempts at participation in IS innovation have failed to meet the prerequisite for participation: emancipation. Emancipation is seen as a prerequisite because there are barriers to open and free participation. Three issues that can constrain participation are (1) the lawful use of power that prevents individuals from expressing their views, (2) pressure on individuals to align with group ideas so they do not become outcasts or thought of as radicals, and (3) inability to access information that would give them the clarity to speak out (Hirschheim & Klein 1994). Knowledge spheres are constituted through power mechanisms and relationships between individuals that create dominant views and meanings (Bloomfield & Coombs 1992). The adoption and diffusion of innovations over time lead to changes in work practices and ways of thinking (Jasperson et al. 2002). To explain this relationship, researchers often draw on the work of Michael Foucault and his theories on power. They show that rationality is historically constructed and that it supports the current social structure developed over time through relationships (Willcocks 2004). Foucault asserts that a relationship, not power, is what is important to understand. Knowledge is socially constructed, and power is constituted and implemented to support existing power structures. Knowledge and power cannot be separated and are mutually constitutive (Tew 2002). Interpretive power can be used in IS innovation to promote individual or group desires that are not always productive (Davidson 2002). A study of IT adoption in Chinese firms by Cui et al. (2008) showed how government influenced IT management decisions by using power.

To address power, it is essential to problematize it. To problematize is to engage in thought that is triggered by questioning the meaning of existing knowledge, social conditions, norms, and goals. “Regimes of truth” use power to legitimize knowledge that supports a society’s institutions (Willcocks 2004; Avergerou & McGrath 2007). To truly understand the historical social shaping of society and innovation, we have to understand how power, rationality, and knowledge are intertwined (Avergerou & McGrath 2007).

IS innovation introduces changes in the way we work, our productivity, and organizational culture (Avison et al. 1995; Avergerou 2001, Avergerou & McGrath 2007). Nowhere has this inevitable change been exhibited more than in studies of culture and IS innovation. Such studies have reported findings of sustained dissonance, reduced productivity, and increased conflict (Walsham 2002; Barrett et al. 2003; Vass & Walsham 2005). The process of IS innovation naturally
brings about change. Researchers argue that the innovation process is naturally conflictual, emergent, and contested (Rajão et al. 2009).

The complexity of organizations and their contextual uniqueness is manifested through the evolution of IT during its adoption, implementation, and assimilation (Yang & Ashley 2006). Sociopolitical issues in IS innovation often exploit the natural separation between management and employees. IT vendors are more focused on satisfying senior management interests and often marginalize user needs in the process. This is particularly evident in the procurement of prepackaged IT (Howcroft & Light 2008). The discourse of popular IT innovations will influence IT management to adopt innovations, whereas the value achieved from its implementation will often be achieved long after the popular discourse in the IT community is gone (Swanson 2012).

2.3 Culture’s Mediating Effect

Culture has emerged as a cardinal research stream in IS, which can be attributed to the phenomenon of globalization. It has initiated one of the most important challenges to the dominant paradigm in IS innovation research. Barrett et al. (2003) describe globalization as a “process of social change, with many manifestations” and as one that is “connected to issues of self-identity,” “traditional ways of life affected by common cultural goods and global markets having common techniques of discipline,” and “interdependence and diversity in economic, political, and social environments.” As the catalyst for the growth in cultural studies in IS, globalization has forced reconceptualizations of culture and IT innovations.

2.3.1 Culture in the Age of Globalization

Researchers investigating culture in IS research have drawn on conceptualizations outside the discipline (e.g., Schein 1985; Hall 1990; Hofstede 2004). Hall’s high-and low-context cultural framework has been used to investigate the impact of culture on IT adoption (Hall 1976; Everdingen & Waarts 2003). Hofstede’s national culture framework has been widely used in IS to study differences in adoption and diffusion rates across cultures (McLeod et al. 1997; Thong 1999; Bunker et al. 2008). More contemporary frameworks, such as Schein’s organizational culture, provide a more flexible conceptualization of culture that can be applied at different levels: artifacts, espoused values, and basic underlying
assumptions (Schein 1985, 1996). Schein’s framework has been applied to study a wide range of contexts of IS innovation, such as implementation (Cooper 1994; Iivari & Huisman 2007; Bunker et al. 2008).

Walsham’s (2002) conceptualization of culture is as “shared symbols, norms, and values in a social collective.” Other social meta-theories have been used to understand the complex nature of culture. Institutional theory has been used widely to understand organizational culture as a combination of regulative, normative, and cultural cognitive pillars (DiMaggio 1988; Chatterjee et al. 2002; Wiredu 2012; Wolf et al. 2012). Actor-network theory has been used to understand the complex sociotechnical environment of IT implementations to explain the complex nature of IS innovation (Kaniadakis 2012; Williams & Pollock 2012). Structuration theory has been used to gain understanding of cultural situatedness during innovation and the impact of embedded structures on IS innovation (Barrett & Walsham 1995; Barley & Tolbert 1997; Walsham 2002).

The attention to culture in IS innovation research was supported by the emerging social constructionist viewpoint, which situates IT innovations in the context of their design and development (Pinch & Bijker 1984; Kaptelinin & Nardi 2006; Pinch 2008). Thus, users of IT will view the same IT innovation in different ways (Orlikowski & Gash 1994). The focus on cultural research here is owing to the increased interaction between cultures due to globalization. According to Walsham (2002), cultural diversity in itself is not a problem in cultural interaction. It is only when this diversity produces conflict that cultural diversity is cast in a negative light.

The aforementioned conceptualizations of culture are useful; however, they can be further enhanced by moving beyond static characteristics to theories of emergence, construction, and evolution (Kappos & Rivard 2008; Leidner 2010). Critics note that Hofstede’s cultural dimensions do not take into consideration the complexity of culture in our modern world, nor do they provide explanations for creation, recreation, emergence, or destruction (Myers & Tan 2003). The first contribution of this thesis is presenting one such addition to the emerging cultural discourse in IS. In IS innovation, assumptions about culture by innovators are vital to the adoption decision (Hirschheim & Smithson 1988). Lawrence and Beltran (2010) used activity theory to develop three assumptions that would guide innovators when innovating with IT. The three assumptions—historicity, mediation and internalization—present a culturally sensitizing device to innovators with IT. This conceptualizations of culture, indubitably puts into question the appropriateness of IT uses in culturally distant contexts motivated to
explain IT’s unequal diffusion across cultures. It has been shown that context appropriateness is the overarching factor inhibiting widespread assimilation of IT innovations globally (Avgerou 2001; Avgerou & Madon 2004; Zhu et al. 2006a).

2.3.2 Contributions of the Research Stream

Much of the empirical research on IS innovation and culture has been focused on adoption and implementation. Since the 1980s, adoption and implementation studies have been a mainstay in IS research. Although reconceptualization of these studies into a IS innovation framework did not occur until the early 1990s, there was an assumption that these studies were part of a larger process (Swanson 1994; Lucas et al. 2007). Empirical research on multiple phases of the IS innovation process requires significant time and resources. Longitudinal studies were typically required to cover all phases of the innovation process. Although there have been some that have investigated multiple phases (Mustonen-Ollila & Lyytinen 2004; Wagner & Newell 2004; Kim & Malhotra 2005), in general, studies have only tackled one or two phases, primarily adoption and implementation. Studies of IS innovation and culture have examined the phenomenon in numerous organizational contexts and cultural levels.

Wagner and Newell’s (2004) study investigated the issue of best practices in the IT industry. Their study revealed that organizations are made up of many endemic cultures; therefore, best practices presented by vendor organizations do not necessarily apply to adopting organizations and the endemic cultures that exist within them. In Chiasson and Green’s (2007) study, they proposed that various subgroups in organizations present challenges for innovators with IT.

In Kietzmann’s (2008) study of two organizations collaborating to innovate with IT, she found that the two organizational contexts differed in their motivations to engage in the project. Without the development of an explicit shared vision, both organizations attempted to fulfill their own personal interests in the collaboration, leading to contradictions and poor participation. Walsh et al. (2010) developed an IT user profile that would essentially be useful in identifying or creating customized applications for user groups within the organization. Their study was motivated by prepackaged software adoption, which is common practice in organizations. The externality of IT artifacts is emphasized in these studies because prior literature saw IT artifacts as neutral and not embedded with any cultural elements.
These studies draw our attention to differences in cultural groups at different levels, and how their values, practices, and knowledge affect how we view and use IT. Barrett’s (1999) longitudinal study found that cultural assumptions held by key stakeholders explained low levels of technology adoption in the organization. How managers view culture has a determining factor on what technology they choose to implement and how it is implemented. McCoy et al. (2007) warned against assuming that IS theories developed and tested in a Western context would apply across cultures. In their study, they showed that applying TAM across cultures revealed inconsistent results. Contemporary conceptualizations of culture go beyond those of national and even organizational levels; thus, understanding user-level cultural phenomena has also been investigated. Jurison (2000) proposed that targeted implementation strategies that identify end-user subgroups are likely to be more successful than a general strategy.

Ingira’s (2008) study sought to understand situated culture and its implications for IS innovation in a healthcare organization. Using activity theory, Ingira provided an explanation of situated culture as activity systems representing user work practices. Culture itself was seen as embedded in activities that continuously transform over time with the introduction of new elements such as IT. The study drew attention to the persistence of cultural elements embedded in work practices. Any introduction of new elements into existing systems would create contradictions that would have to be resolved before value could be achieved. Hsiao’s (2003) study further highlighted deep cultural issues, such as values, fear, and trust. The study showed that cultural values related to how trust was achieved were embedded in external IT innovations. The study encouraged sensitivity to embedded cultural beliefs, as they would discourage technology use.

Bunker et al. (2008) demonstrated a skills-focused approach in determining the appropriateness of an IT innovation. Willis and Chiasson (2007) also illustrated how cultural fit during ERP implementation was vital, by applying the concepts of Gramsci to aid democratic participation. Silva and Hirschheim (2007) saw that long-standing organizational cultures are embedded within structures that pose issues to IT implementation. The changes to organizational structure in order to implement IT innovations will face resistance. Of all the cultural elements deemed necessary for compatibility, values appear to be the most difficult to conceptualize, but values have been found to cause the most cultural conflict. Krumbholz et al. (2000) saw that national culture minimally impacted the influence on IT implementation, but that incompatibility of core values based on organizational culture was a factor in the innovation process.
Misfits of culture and other organizational elements are a focal area that still has many challenges. Strong and Volkoff (2010) investigated technology fit in three organizations. They found that organizational culture fit was a key misfit domain. Ravishankar et al. (2011) tackled the issue of alignment in their study of a knowledge management system implementation. They saw that the subculture level was a key element for technology alignment. When organizations understand the necessity of technology fit with subcultures in the organization, the innovation process is more successful. Similarly, Iivari and Huisman’s (2007) study showed that a fit with organizational structure was an important technology fit dimension. Essentially, the cultural elements of IT through associated practices would compete with existing organizational practices when implemented. Thus, if organizational structures aligned to those of the IT innovation, a smoother transition could be made.

Boersman and Kingma’s (2005) study indicates that transformation of the organization is often inevitable in large-scale IT implementations such as ERP, involving a transformation of both the organization, and the IT innovation. Their study showed that incompatibility is generally accepted and that transformation is necessary on both sides to achieve fit. Abraham and Junglas (2011) studied how the transformation of an organization with the implementations of IT can be positive. IT was not directly implicated in all the transformations but was seen as a catalyst. The resulting transformations, however, enabled easier implementation and assimilation. Macredie and Sandom’s (1999) study showed that local improvisations were correlated to customer satisfaction during IT implementation. In cases where IT was adopted in a traditional hierarchical organization, local improvisations created improved implementation success. The study, however, does suggest that the IT innovation itself had to be adoptable. IT innovations that are rigid provide less opportunity for local reconfiguration. This draws attention to the IT innovation and its ability to be manipulated and reconfigured. It is considered generally that a more flexible IT innovation is of greater value in organizations.

Organizations need to change, and organizational leadership is the orchestrator of change. In studies where there were apparent cultural differences (e.g., Walsham & Sahay 1999; Walsham 2002), it was necessary to understand culture, but also to understand the role of leadership in cultural transformation. Particularly in cases of extreme cultural difference, technology fit and compatibility may be out of reach. Thus, organizational leaders must identify ways of reshaping their organizational cultures to take advantage of the necessary
technological advancements essential for competitiveness. From this theme, the research shows that understanding cultural compatibility is key, but it may be impractical in many cases. Transformation of both the organization and its IT is thus essential to IS innovation success.

For many organizations, a perfect fit is an illusion; thus, the agents charged with integrating IT into the organization’s value chain are faced with the issue of conflict that is not only related to incompatibility, but also to unanticipated cultural resistance. Kai’s (2004) study showed that while early adoption may prove successful, institutionalizing IT in cross-cultural settings reveals roadblocks related to culture. This theme addresses studies that go beyond implementation and look at the assimilation of IT into the organization. The sources of resistance and conflict in assimilation have to do with changing deeply embedded cultural elements. This complex area of study has been leveraged and has led to the development of a wide range of theoretical explanations and social theories.

Tai and Phelps (2000) studied the abilities of chief executives to overcome cultural resistance when innovating with IT. The study showed that the ability for chief executives to build a corporate culture to overcome resistance to technology was based on their perceptions of the IT vision, organizational IS issues, and IT support for knowledge management. The ability of senior leadership to understand the potential cultural challenges is key to mitigating cultural resistance. Canessa and Riolo (2006) studied how different implementations of computer-mediated communication would strengthen or dilute organizational culture, thus leading to differences in communication effectiveness. In their study, IT was shown to have a direct impact on the resilience of culture over time. Keith and Harper (2006) conducted a longitudinal study of three police departments in the United Kingdom (UK). They concluded that the innovation process was a social activity involving constant social negotiations in the selection, implementation, and use of IT.

Baptista (2009) studied the institutionalization of an intranet in a UK organization. The study found that the process of institutionalization is a product of ongoing negotiations of goals that present the IT artifact as the correct solution for the organization. The negotiations of changes to work practices were enacted to help embed the IT innovation into the organizational culture.

While improved productivity is generally the goal of IS innovation, embedded organizational culture has been shown to negate value owing to a lack of assimilation. Avgerou and McGrath (2007) conducted a longitudinal study of IT innovation where power and authority over knowledge played a critical role in
implementation failure, and where changes in governmental regimes continually changed the focus, and the direction of IT in the organization. Wainwright and Waring (2007) studied how IT diffusion in organizations with strong professional cultures and ridged organizational controls posed problems for IT assimilation. Uprooting existing embedded organizational cultures is a challenge for innovators. Van Akkeren and Rowlands (2007) studied the assimilation of IT and its impact on organizational culture. The results showed that culture associated with IT through professional groups resulted in conflict. Professional groups such as those in the healthcare industry develop their own best practices. When these practices are not a part of new IT solutions, conflicts will arise in assimilation. The researchers saw the need for greater interaction, reflection, and regulations in order to help the assimilation process.

In reviewing these studies, it is important to highlight the contributions of the interpretive research stream. Interpretive research has been particularly valuable in IS research in organizations. For IS innovation and culture, interpretive research has uncovered social phenomena previously ignored or taken for granted, particularly issues of power and conflict (M. L. Markus & Lee 1999; M. Myers & Walsham 1998; Nandhakumar & Jones 1997; W. J. Orlikowski & Baroudi 1991). However, it is particularly difficult to draw holistic conclusions from these studies. The second contribution of this thesis provides a holistic narrative of culture’s mediation of IS innovation drawn from interpretive research on IS innovation with a cultural perspectives. Detailed in paper III, the “larger narrative” of the mediating effect of culture on IS is synthesized from the rich interpretive research on culture and IS innovation. The paper preserves, through a qualitative meta-synthesis, the rich descriptions provided by interpretive research. The holistic interpretation reveals three cultural transformational processes that mediated IS innovation: (1) the reaffirmation of cultural structure through persistent agency, (2) the negotiation of cultural structure through pliable agency, and (3) the abandonment of cultural structure through inertial agency.

Studies of culture and IS innovation are varied in their goals, and the problem they address lack clarity, both holistically as one innovation process, and at individual phases. The third theoretical contribution comes in the form of a descriptive and explanatory framework, detailed Lawrence and Oivo (2012). The paper proposes four cultural challenges facing innovators with IT: differentiation, externality, incompatibility, and embeddedness. The paper also proposes that the challenges reveal a domino effect, where unaddressed cultural issues in the early phases of IS innovation create further challenges in the later phases. In particular,
the paper finds that the challenge of differentiation is both vital and understudied in IS research.
3 Contemporary Issues in Comprehending IT Innovations

In section 2, the literature on IS innovation and culture was reviewed to provide us with a foundation to guide our empirical investigations. In the attached paper (Lawrence & Oivo 2012) it was revealed that unaddressed cultural challenges in the earliest phases of IS innovation generated and explained latter issues. This knowledge guided the thesis toward a focus on comprehension. Research on IS innovation has suggested that organizations tend to focus on their ability to adopt innovations and not appropriate selection. The research is also reactive to challenges that arise rather than dealing proactively with early phase issues (Chau & Kar Yan 1997).

There are several compelling reasons for studying the early phases of IS innovation. McMaster and Wastell (2005) addressed a mythical idea called diffusionism that promotes the unidirectional diffusion of innovations from advanced centers to a passive community of adaptors. It promotes an imitator strategy for organizations. This is also considered “mindlessly” innovating with IT, a symptom of the bandwagon phenomenon. The solution to prevent this preadoption misstep is to comprehend IT innovations mindfully through learning (Swanson & Ramiller 2004). To adopt and implement IT innovation mindfully, innovators must acquire knowledge of know why, know when, and know how (Swanson & Wang 2005).

The importance of this initiation phase is recognized in research and investigates those processes that lead to adoption decisions and implementation strategies (Rossi et al. 2012). In our multicultural and global society, the issue of standardization that is strongly promoted from technical perspectives is problematic in practice. Given the complexity of IT innovations and their various levels of abstraction, standardization is unappealing (Markus & Gelinas 2006). Environmental factors can increase the propensity for organizations to select standard or popular IT solutions; however, organizations that avoid the bandwagon phenomenon frequently reap the benefits (Wolf et al. 2012).

Prior to adoption, organizations, in order to comprehend IT innovations, access IT community discourses on available innovations. These IT community discourses do not develop randomly, but are products of loosely coupled collaborations called organizing visions. Organizing visions are said to be comprised of interorganizational communities of heterogeneous organizations who have varying interests in a particular IT innovation (Swanson & Ramiller...
An organizing vision is a focal community idea about the application of an IT innovation. Organizing visions are often grandiose and exaggerated beliefs of how IT should be applied. An organizing vision provides the functions of interpretation, legitimating, and mobilization. The aim is to provide a context of use of the IT innovation by giving social accounts of its potential applications. The next step is to legitimize the innovation by linking it with contemporary business issues, and with established and respected organizations, and people. Finally, organizing vision mobilizes market forces to develop and promote it throughout the community (Ramiller & Swanson 2003).

### Table 1. Framework for Empirical Investigation.

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<th>Comprehension Modalities</th>
<th>Interactive</th>
<th>Passive</th>
<th>Virtual</th>
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<td>Paper IV: Global/Local Knowledge</td>
<td>Paper V: Cultural Shaping of IT</td>
<td>Paper VI: Virtual Knowledge</td>
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<td>Transfer</td>
<td>Discourse</td>
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IS innovators, in order to comprehend innovations successfully, must possess contextually differentiated reasoning in order to select the appropriate IT for their organization. Contextually differentiated reasoning directly addresses the issue of the “bandwagon phenomenon” (Swanson & Ramiller 2004; Walden & Browne 2009). The phenomenon exposes mimicry in IT adoption trends. Organizations will adopt technologies simply based on best practice or technology fashion (Baskerville & Myers 2009; Wang & Ramiller 2009).

To acquire the necessary knowledge about IT innovations during comprehension, innovators must reach outside organizational boundaries. Knowledge associated with IS innovation is social and does not exist in a single individual; it is embedded in social roles, structures, and norms of behavior within the organization, as well as in the culture, social rules, and behavior external to the organization. This social knowledge is historically constructed and socioculturally shaped through engaging in activities at work and in society (Avgerou 2001). It is thus inevitable that culture will mediate the comprehension process, particularly in instances of cross-cultural learning. In an organization, individual knowledge is a primary source of innovation. Knowledge is created by the interaction and intersection of tacit and explicit knowledge. This process happens through four different types of dialogue: socialization, internalization,
externalization, and combination. The types of dialogue can be facilitated by an organization to increase the potential for innovation (Nambisan et al. 1999).

Knowledge needed for IT innovative processes consists of explicit, or technology awareness knowledge, and tacit, or “how-to” knowledge (Alavi & Leidner 2001; Andersson et al. 2008). Explicit knowledge consists of general knowledge of IT and its various applications in business and industry. Tacit knowledge is knowledge of the application of IT in a particular context. Knowledge is a key part of IS and organizational literature (Blackler 1995; Alavi & Leidner 2001). Knowledge is a key driver of innovation; thus, a major challenge in organizations is identifying useful knowledge and harnessing it for innovative purposes (Liyanage & Jones 2006).

For the purposes of comprehension, knowledge on how to innovate with IT is required, and like in other modes of learning, comprehension can be achieved through various avenues. There are three commonly known modes of learning interaction: active, passive (Mohamed & Lam 2002), and virtual (considered a combination of the two, or as a mode of active learning) (Carayannis 1999). These modes of learning are for acquiring new external knowledge (Lane & Lubatkin 1998).

Research in IS has investigated comprehension through passive modes, which involve acquiring articulable knowledge about technical and managerial innovation from publications sources (Lane & Lubatkin 1998). This has been previously studied in research, as organizing visions and technology fashion, but with a culture perspective (Howcroft & Light 2008; Baskerville & Myers 2009; Wang 2010a, 2010b; Swanson 2012; Williams & Pollock 2012). Innovators can also use active modes of learning about IT through collaboration (Barua et al. 1997; Ye & Agarwal 2003; Coakes 2004; Pardo et al. 2006). Virtual modes of learning, a combination of both modes, is becoming a popular way to enhance innovation through interorganizational collaboration (Geber 1995; Sarker & Sahay 2004; Gordon & Tarafdar 2007; Faraj et al. 2011).

As summarize in Table 1, this thesis finally seeks to understand culture’s mediation of the comprehension phase of IS innovation by investigating these three modes of comprehension through empirical study. In the context of our global society, there are many contemporary issues facing innovators, which provide unique context to study these modes. These include, global/local knowledge transfer, cultural shaping of IT discourse, and IT innovation knowledge sharing in virtual environments.
3.1 Global/Local IT Innovation Knowledge Transfer

The comprehension is essentially a boundary-spanning process (Swanson & Ramiller 2004). The ability to span boundaries has been affirmed as an important capability possessed by individuals and groups in organizations, with the main purpose being knowledge sharing and innovation (Levina & Vaast 2005; Kimble et al. 2010). Globalization has produced a multiplicity of boundaries owing to greater interaction and specialization (Lindgren et al. 2008). Within boundaries, knowledge tends to be homogenous and stagnant (Kimble et al. 2010). Thus, to acquire knowledge of something that exists outside one’s own organizational context, one must reach across organizational boundaries. Linking two or more groups separated by institutions, location, hierarchy, or function, facilitates boundary spanning (Kimble et al. 2010).

The ability to differentiate between cultural contexts would be valuable for innovators in a global environment. As we move to a more globally interconnected world, adoption of innovations without due consideration of the cultural contexts has been shown to be unwise (Baptista 2009). In the comprehension phase, the innovator must cross organizational boundaries to learn about the purpose, benefits, and technical features of an IT innovation, in order to derive solutions or identify opportunities (Swanson & Ramiller 2004). This type of learning is collaborative and rests on mutual understanding (Swanson & Ramiller 1997; Wang & Ramiller 2009).

Within organizations, knowledge sharing occurs naturally through interaction and organized formal and informal gatherings (Kimble et al. 2010). Knowledge sharing with the external environment is problematic often because of reluctance and contextual understanding. “Learning about” occurs during the comprehension and early adoption phases of innovation. It involves searching and exploring IT innovations. Learning about or learning without doing enables learning without actual engagement with the innovation (Wang & Ramiller 2009). This knowledge is used in the adoption decision: know why and know when. Knowledge gained may also be used to reject or modify IT innovations.

More and more, organizations are seeking to collaborate with other organizations to innovate with IT. This requires significant knowledge sharing across boundaries. Such organizations face barriers that limit the effectiveness of knowledge sharing (Pardo et al. 2006). Research on IT in a global context has played a significant role in drawing our attention to issues of culture and context. Globalization will inevitably influence local contexts with the adoption of IT
innovations; however, any changes relating to IS innovation should reflect local aspirations and concerns (Avgerou 2002). As IS innovation in organizations is reliant on the organization’s ability to adopt IT innovation (Shane & Ulrich 2004), studies on technology transfer from technologically advanced countries to less advance countries has shown variations in adoption and diffusion.

In Mursu et al.’s (2000) study of IT in Nigeria, the authors cite issues that must be taken into consideration when considering IT deployment in Africa. These include the inadequate existing IT infrastructure in many cities and almost nonexistent infrastructure in rural areas; a shortage of skilled IT workers; and misalignment of the public sector with proposed IT strategies. Krishna and Walsham (2005) cited other factors in addition to the above-mentioned issues, which have to be considered when implementing IS in developing countries. They underscore the importance of technological leadership, alignment with the community, and prior technological investment. Al-Qirim’s (2006) study in New Zealand showed that local Small and medium enterprises (SME’s) were reluctant to invest the limited resources on advanced IT from abroad.

Capacity building is one of the original strategies for improving IS innovation where IT innovations have limited penetration (Fukuda-Parr 2002). The aim of capacity building is to transfer skills and knowledge from technologically advanced countries to less advanced countries, to give the latter the ability to more effectively transform resources (Park et al. 2007). This approach has been rejuvenated in recent years, as the technological age has taken root and the knowledge and skills’ gap has widened. In line with literature promoting innovative capacity, IT capacity building seeks to build knowledge of technology originating from technologically advanced countries (Liyanage & Jones 2006). Although innovation depends on external knowledge along with internal knowledge, few studies have investigated the formalization of local knowledge. Increasing capacity through skills and technological knowledge is seen as a way to provide long-term, sustainable IT growth (Schware 2005).

Studies addressing this issue propose that building IT capacity is essential for further adoption of new technologies. Such studies set in developed countries showed that each additional adoption of technology results in greater ease of further adoption (Ravichandram 2005). The basic strategy has been to transfer established practices from technologically advanced countries to less advanced countries. Rather than co-developing new practices and tools suitable for the new context, existing ones are repackaged. Embedded culture in organizations will
often require improvisations for them to be aligned with established norms and practices in that organizational context (Bada et al. 2004).

The rationale for technology and knowledge-transfer strategies is based on the idea that less advanced countries do not have the scientific knowledge, and, rather than developing their own, they should adopt (Fukuda-Parr 2002). Arguably, this is a proper strategy if you plan to replicate innovation from countries in a similar context and culture. This is also based on the idea that innovation and development are linear, and innovation adoption, or imitation, is essential for less advanced countries to be able to play catch up (McMaster & Wastell 2005).

Innovation and knowledge production in developing countries is, therefore, a little researched area. However, it is seen as critical to achieving greater IT adoption and diffusion (Avgerou 2008). Urquhart et al. (2008) see capacity building as a foundational step; they propose the building of fundamental knowledge that could lead to greater integration of new and existing knowledge. By focusing on acquiring individual, collective, and relational capabilities, the synthesis of new and existing knowledge would be better served in knowledge creation, exchange, absorption, and reconfiguration. The lack of foundational knowledge of technology by people in leadership roles has been cited many times as a barrier to adoption in developing country organizations. Heeks (2000) cites senior public officials as key, in a study of technology reform in India. The study finds that senior officials lacked the understanding of IT skills as well as managerial skills.

In Noir and Walsham’s (2007) study of IT in the Indian healthcare sector, they found that the organization involved took a simplistic view of IT implementation and assumed any IT implementation would translate into added efficiency. Their work also revealed that IT was playing a “ceremonial role” through institutional rules and formal procedures. In Avgerou’s (2008) critical review of IS in developing countries, she explains that the majority of the studies addressing IT still focus on IT as the tool, and not as a way for organizations to innovate. Addressing the issues of technological resources and IT capacity are not without merit, but these studies fail to address fully knowledge production, which is key to innovation. The dependence on external technology, skills, and knowledge is a major roadblock to IT diffusion. Innovators with IT are often bounded by the existing knowledge and understanding, and they use their knowledge of the local environment to determine innovation direction.
This is not always understood easily when people are collaborating with technology experts outside their unique context.

3.2 Culture’s Role in Shaping IT Community Discourse

The impact of macro-institutional forms on IS innovation is well studied. Activities of networks of organizations influence the adoption of IT innovations (Hovorka & Larsen 2006). These institutions seek to create rationalized myths about the efficiency and efficacy of IT innovations that travel across time and space, from the organizational field to the organization (Jensen et al. 2009). It is not unlike an informal governing mechanism that seeks to influence organizational adoption. Other studies have shown how general government policy influences organization IT policy (Currie 2012). We can easily understand this from a regulative point of view, but, from a normative perspective, it is harder to perceive.

The theory of organizing vision addresses social cognition in the adoption and diffusion of IS innovations. Of the cultural elements that are said to impact innovation, values have shown to be critical (Leidner & Kayworth 2006). Values in organizing vision were not specifically addressed in the initial development of the theory (Swanson & Ramiller 1997). However, the theory of organizing vision is based on institutional theory, and, thus, values are represented in its institutional foundations. Institutions are a collection of values, norms, beliefs, and taken-for-granted assumptions (Barley & Tolbert 1997).

The organizing vision of an IT innovation has collectively produced an interpretation of how it should be applied in the organization. This is not a static vision but one that is continuously changing. New contributors to the vision interpret and produce discourse based on previous interpretations (Ramiller & Swanson 2003). The vision of the innovation thus continues to propagate until it becomes widely accepted. Once institutionalized the vision takes on “rule-like status.” Cohesiveness in the interpretations arises from a “fundamental sharing of language and core meanings” that are negotiated and expressed in discourse (Swanson & Ramiller 1997). Values, forming the normative element of this vision, help to maintain the visions cohesiveness. These values along with other institutional elements travel across space and time. Values are transported using symbolic systems, of which media is a dominate form (Scott 2003).

Symbolic systems are a type of schema where values, along with other information, are encoded and decoded. The transmission of these elements has
been used in theories of diffusion of innovation, organizational learning, and management fads and fashions (Swanson & Ramiller 1997; Ramiller & Swanson 2003; Wang & Ramiller 2009). Media such as IT and business magazines have been a focal area of study in symbolic systems as carriers of institutional elements. Values are normative elements that are encoded in media and thus must be decoded by potential adaptors (Scott 2003). For institutional elements to be transmitted, they need to be encoded in discourse in a generalized form that allows transmission, to be later decoded by recipients in different contexts with different agendas. The encoded elements in organizing vision represent how an IS innovation should be applied in the organization. The process of both encoding and decoding is a form of interpretation (Scott 2003). Innovators with it will initiate a sense-making process when they seek new IT innovations for adoption (Seligman 2006). Essentially, they are trying to decode and make sense of the message in the media.

Institutions consist of regulative, normative, and cultural cognitive elements that help “bring about the stability of social life” (Scott 2001, p. 52). Institutional theorists emphasized that normative elements have a stabilizing influence on institutions. Normative elements represent social beliefs, values, and norms that become internalized and imposed on others. Early institutional theorist saw shared norms and values as the basis of a “stable social order” (Scott 2001, p. 56). Research proposes that an organizing vision is sustaining through its production of credible discourse that contributes to its legitimacy and leads others to participate (Wang & Swanson 2008).

Social norms and values, rather than rules and authority, reinforce these normative institutions. An organizing vision is not practically enforceable by strict rules and authority. Contributors to an organizing vision collectively grant legitimacy based on socially constructed norms, values, and beliefs (Kaganer et al. 2010). Institutional theory supports norms and values as having significant impact on decision making and the development of formal structures (Barley & Tolbert 1997). Legitimacy in normative institutions is morally governed (Scott 2003; Kaganer et al. 2010). Moral legitimacy in this context means a general assumption that the actions (including produced discourse) are desirable and appropriate (Kaganer et al. 2010). The social accounts of how an IT innovation should be applied are the product of contributors to its vision, which have been interpreted and legitimate through normative means.
3.3 IT Innovation Knowledge Sharing in Virtual Environments

Knowledge and learning is the focus of many organizations that attempt innovation (Liyanage & Jones 2006). Building capacity to innovate through knowledge acquisition is a prerequisite for innovation, often described as a foundation of innovative capacity (Furman et al. 2002). Knowledge creation is now a vital activity in organizations (Nonaka 1994). Accumulating knowledge can be seen as an innovation in itself and as a key process in innovation (Shane & Ulrich 2004). An organization rarely possesses the knowledge needed for innovative activities internally, and thus relies on external sources for this knowledge (Andersson et al. 2008). External knowledge has to be internalized by the organization. An organization’s capacity to internalize knowledge has been shown to predict its innovative capacity (Liyanage 2002). The emerging use of online communities for knowledge sharing and collaboration is a global phenomenon (Faraj et al. 2011).

Nambisan (2003) asserted that IT innovations, like online communities, has untapped potential for facilitating efficient communication and collaboration. Online communities open up many opportunities for innovators. For innovators with IT, knowledge sharing is essential in all phases of the IS innovation process (Swanson & Ramiller 2004). Thus the use of online communities for IS innovation focuses on acquiring knowledge about when, what, and how to innovate with IT (Swanson & Ramiller 1997, 2004; Ramiller & Swanson 2003; Lindgren et al. 2008; Wang & Ramiller 2009). Further, this knowledge needs to be understood within the context of use.

Motivated by low communication costs and increased flexibility, online communities are growing rapidly even outside popular informal social networks (Denning & Yaholkovsky, 2008). Interorganizational knowledge sharing is vital to innovation and is said to require specific knowledge sharing practices and mechanisms. Knowledge-sharing mechanisms are formal and informal mechanisms for sharing knowledge embedded in individuals and groups (Boh 2006). It is proposed that distinct organizational settings require unique knowledge-sharing mechanisms (Ding & Peters 2000). Knowledge sharing mechanisms are perceived as either individual or institutional. Individual mechanisms are seen as informal and unstructured, whereas institutional mechanisms are formal and structured (Boh 2006).

The context of interaction where knowledge is shared is thus important for improving this process. Brachos et al. (2007) studied the role context plays in
knowledge sharing, revealing contextual factors that influence its success. Interacting in different contexts defined by technology, group or environment thus presents opportunities for research (Ciborra & Andreu 2001). Jeon et al. (2011) used behavioral social theory to find both internal and external motivational factors for knowledge sharing, where internal factors proved more telling. Interestingly, there was also a relationship between the formal and the informal knowledge-sharing mechanisms and motivations. McClure et al. (2000) investigated why people participate in electronic communities of practice and share knowledge. The research proposes that people participate because they want to be part of a community, and they see opportunities for knowledge acquisition not just for gaining information. Jarvenpaa and Majchrzak (2010) explored how users of online wikis deal with trust, and how trust influences contributors’ willingness to post and accept information posted.

Other studies try to assess the best or most practical knowledge-sharing mechanisms for distributed work. Studies show that different knowledge-sharing mechanisms are better suited for distributed work, and specifically, for transfer of knowledge and sense making (Chai et al. 2003). Majchrzak et al’s (2005) study found that improving knowledge of how to work in virtual environments would help contextualization that creates communication know-how that impacts sense making and knowledge sharing among distributed teams. One study that saw the necessity of micro-level analysis was Haider and Mariotti (2010). They use retrospective procedural analysis to study previously enacted procedures for knowledge sharing. Research on knowledge sharing in online communities promotes the development of mechanisms and seeks to identify positive and negative social behavior that encourages or constrains it (Lin et al. 2009). The previous research shows that depending on the context of the collaboration, different knowledge-sharing mechanisms are enacted to achieve learning.

When innovating with IT, researchers acknowledge the vital importance of knowledge. Research on IS innovation has thus attempted to relate knowledge to IS innovation success (Newell et al. 2003; Majchrzak et al. 2004; Srivardhana & Pawlowski 2007; Andersson et al. 2008). When innovating with IT, organizations need to know why, know when, know what, and know how (Swanson & Ramiller 2004; Wang & Ramiller 2009). Although this research overlaps with knowledge management, it is separated by its focus on knowledge acquisition, and does not cover the whole spectrum of knowledge work. It is mainly focused on combining knowledge with other resources for innovative purposes.
Cultural differences embedded in organizational and national contexts are sometimes better understood at the micro-level. Walsham (2002) proposes micro-level analysis as a better way to understand cross-cultural working. At this level, one can reveal and learn more about cultural dynamics. Working to develop new technologies to appease everyone in cross-cultural settings is challenging, and issues ranging from different perspectives on needs to different work practices and use of IT tools may arise in multicultural projects.
4 Research Approach

When conducting research, notations of knowledge, as to what it is, how we know it, and our process of studying it, must be made clear (Creswell 2003, p.6). The ontological and epistemological beliefs guiding this study have implications on knowledge construction and how it relates to the empirical world (Orlikowski & Baroudi 1991). In this section, the understanding of the world as an objective and subjective reality, the criteria for knowledge creation, evaluation, and the strategy for linking knowledge with empirical findings are explicated. Working within the lines of the existing research approaches and strategies, perspectives and methods are identified that are appropriate for the research problem. This thesis, however, is not simply bound to our discipline’s traditional approaches, as it seeks to apply methods appropriate for studying phenomena that involves comprehension processes. The research process begins by defining our philosophical perspective, explaining the process of rationalizing the studies basic ontological and epistemological beliefs. This perspective is used to view the identified phenomena of interest in this investigation. The appropriate method of inquiry is then aligned with the phenomena under investigation. This research process is shown in Figure 2.

Fig. 2. Research Process.
4.1 Philosophical Perspective

Orlikowski and Baroudi (1991) identify three sets of beliefs that “delineate a way of seeing and researching the world.” The first is our beliefs about the phenomenon under study, second our notion of knowledge, and third the relationship between knowledge and the empirical world. Research on IS and culture has traversed the spectrum of philosophical beliefs and has mainly sought to promote alternatives to the dominant paradigm. The philosophical perspective presented is not only guided by existing research, but by personal beliefs about the world and the nature of truth. As the following will illustrate, the existing research on culture and IS innovation has steadily embraced both methodological and philosophical pluralism.

4.1.1 Paradigm Pluralism in IS and Culture Research

The study of organizations has challenged researchers trying to quantify social reality through formal propositions and experimental controls. Social research presents many challenges (Lee 1991). The study of IS in organizations shares this challenge, as researchers seek to study culture and IS innovation, a phenomenon that is complex, uncontrollable, and constantly changing. It is for this reason that IS research has begun to embrace philosophical and methodological pluralism in order to find more explanatory theories. It is owing to the acknowledgment that there is a lack of absolute truth, and that our knowledge of reality can be a product of social construction (Walsham 2006). Our misassumptions about knowledge and the world have moved the discipline beyond positivism to embrace both interpretive and critical perspectives.

The interpretive approach to IS research in organizations proposes that the methods of natural science are inadequate for studying social reality. The approach takes the position that people and the physical and social artifacts they create are fundamentally different from the physical reality examined by natural science (Lee 1991). Human subjects can view the same object or phenomenon differently. Thus, the ideas of truth would also be subjective (Myers 1997). Interpretive studies assume that individuals generate and associate their “own subjective and inter-subjective meanings” as they interact with the world around them. Interpretive researchers thus attempt to understand phenomena through the meanings participants have attached to them (Orlikowski & Baroudi 1991). The recognition is that everyday life is socially constructed, and, thus, IT, as a product
of everyday life, is socially constructed (Pinch & Bijker 1984; Angela & Leiser 2005; Horton & Wood-Harper 2006). Hence, any investigation of IS processes cannot be understood without the inclusion of social actors.

It is thus the beliefs of interpretivists that the social process is not captured in hypothetical deductions, covariance, and degrees of freedom. Instead, they propose that understanding social processes involves accessing the social actors who generate them. Interpretive research attempts to bridge the gap in understanding by accessing members of a social group, endowed with meaning, and shows how these meanings, beliefs, and intentions constitute their social action (Myers & Tan 2003; Orlikowski & Baroudi, 1991).

Critical research has similar intentions, but it goes a step further by not only describing and explaining social reality, but also by challenging it. Critical researchers seek to change that reality by revealing contradictions and conflicts (Orlikowski & Baroudi 1991). That reality is often socially accepted, and it exhibits oppressive structures. Walsham (2005a) describes the critical approach as a “broad philosophical position” focusing on the social construction of truth, reality, and “cultural contingency and power relations.”

At the core of critical theory is the assumption that social reality is socially and historically constructed, and that individuals are not always aware they are being marginalized (Orlikowski & Baroudi 1991). This core concept separates critical theory dramatically from positivist approaches to research. In critical theory, one’s reality cannot be separated from its historical context (Myers 2009). The critical perspective values the freedom of individuals and their right to pursue individual goals and aspirations. The theory does not attempt to free individuals from physical subjugation, but from psychological repression, and does not promote revolution through the use of violent means (Dant 2003).

Contradictions and conflicts are revealed when using the critical lens, and this is vital to the social transformation and emancipative processes (Richardson & Robinson 2007). Through critique, the critical researcher aims to expose illusions and contradictions evident in contemporary society, often continually produced and reproduced by participants owing to encroaching power structures (Orlikowski & Baroudi 1991). This is in stark contrast to other methods that are satisfied with describing and predicting phenomena (Richardson & Robinson 2007).

In IS research, critical theory has led to a better understanding of complex social situations involving power (Avgerou & McGrath 2007); issues of the social construction of IS artifacts; and their impact on organizations (Ngwenyama &
Lee 1997). Although interpretive and critical research shares some similarities, both perspectives seek to give an account and interpret participant understanding. Interpretive research confines itself to description and interpretation, whereas critical research continues by questioning people’s understanding with the goal of emancipation (Orlikowski & Baroudi 1991; Dant 2003).

Pluralism in IS research is seen as highly beneficial. Established researchers have called for more critical perspectives in IS research and its acceptance in top IS journals (Walsham 2005a). Walsham and Sahay (2006) have also called for further studies involving critical-research perspectives for information and communication technology (ICT) in developing countries. There is still a lack of critical studies in technology, especially those that support underrepresented groups (Adam & Kreps 2006). Researchers often shy away from critical research, as the nature of the approach presents problems in organizational studies where revealing contradictions and conflicts may be harmful (Richardson & Robinson 2007). Even with the potential pitfalls, paradigmatic pluralism is still welcomed in the eyes of many academics.

4.1.2 Postpositivist Paradigm

In recent years, interpretive and critical studies have gained inroads in IS research, particularly those that deal with cultural issues. Both research paradigms, however, have come under significant scrutiny. While paradigmatic pluralism has welcomed pure positivist, interpretive, and critical studies, such studies can all be criticized for ignoring particular elements because of their strict alignment to their paradigm. Thus, the emerging attention to postpositivism in IS research is not surprising.

Postpositivism denotes the thinking after positivism. It emerged out of the questioning of absolute truth at the base of the positivist philosophy. Postpositivism recognizes that we cannot be positive about our knowledge claims (Creswell 1994, p. 7). Emerging from postpositivism is an approach that effectively blends positivist, interpretive, and critical perspectives: Critical realism. Critical realism can transcend existing paradigms by avoiding the limitations in the interpretive, critical, and positivist approaches, by integrating their philosophies (Mingers 2001, 2004). Klein (2004) agrees that middle-road interpretivists differ little from critical realists, as they share a common ontology. Social structures, according to the critical realist, are not independent of social activities, and of space and time (Mingers 2004).
From an epistemological perspective, the critical realist emphasizes understanding and description rather than measurement of meaning. Since we cannot observe absolute truth, critical realists recognize that social systems are dynamic, interactive, and open (Mingers 2004). This is true for our research, and while we traverse all three paradigms throughout our studies, we acknowledge the limitations of each and the lack of absolute truths in our findings. Alternatively, we present this work as a description and understanding of the meanings that have been given to the phenomena under study.

4.2 Phenomena of Interest

Investigations of contemporary modes of comprehension that include a cultural perspective are lacking in the research stream. There are many contexts where processes involving comprehension may occur. The modes of learning about IT innovations selected in this thesis provide us with contemporary phenomena for study. The first study presents us with an active mode of comprehension: an organization seeking to localize an IT innovation for adoption by working with both local and global assistance. In this scenario, both the IT innovation and the work teams are seen to be culturally distant. The second study, presents a passive avenue for comprehending IT innovations for adoption. The first step for many organizations wanting to learn about IT innovations is accessing written material that is provided freely to the consumer. The third and final study investigates virtual modes of comprehending IT innovations using online communities to facilitate cost-effective interaction with the global IT community.

4.2.1 The Localization of OpenOffice.org in an Ethiopian Organization

The research on IT in developing countries has made significant contributions to IS research for two practical reasons: (1) IT is seen as external, both culturally and contextually, and (2) they typically possess strong cultural differences to the culture where the technology was developed. Ethiopia was chosen as a case country for our first study because of its perceived cultural distance from the context where many IT innovations are developed. I have had previous experience working in IT in Ethiopia as a member of a nonprofit organization. This influenced my decision to select an Ethiopian organization as a unique case.
During my time there, I saw that technology transfer was a major issue preventing innovation adoption.

Ethiopia has very low technology penetration; thus, several government organizations began projects to increase the use of IT. One of these, an Oromo government organization, began several IT projects to serve better their regional offices and constituents. The internal Oromo IT organization championed this effort. They perceived the need for a robust text editor for office staff. The government offices were currently using the Microsoft Office suite that is not available in any of Ethiopia’s local languages. Eventually, there was a greater need for documentation in the local language, but the language barrier and the cost of the Microsoft Office suite hampered the diffusion of the innovation throughout the organization.

Acting strategically, the IT organization initiated a project to acquire and localize an open-source suite. The organization took a very mindful approach to innovation. The primary purpose was to add the local Oromo language. The Openoffice.org suite was selected as the editing package of choice. However, the software could not be successfully adopted as is. Several factors, including language, made the technology external to the Ethiopian context. A number of changes to the software had to be made to localize it, primarily, the addition of the Oromo language.

4.2.2 The Role of Values in Agile Community Discourse

The impact of IT community discourse on the adoption of IT innovations is well recognized (Wang 2010a). The organizing visions in this discourse are field-level institutions that are made up of regulative, normative, and cultural cognitive elements (Swanson & Ramiller 1997; Ramiller & Swanson 2003). As a primary source of information about IT innovations, organizing visions provide essential information about the organizational context where that innovation would thrive. This passive approach to learn is often a first step in the comprehension process.

Values have been exposed in IS innovation research as a potential area of conflict once an innovation has been adopted (Leidner & Kayworth 2006). Of the IT innovations popular today, the Agile methodology is unique in that it was founded on core values (Conboy 2009). As an example of an IT process innovation that supports IS functions (Swanson 1994), Agile seeks to improve the software development process through a cultural change, driven by values. The study was thus interested in understanding how Agile values were interpreted and
legitimized in the IT community discourse; namely, white papers and IT business magazines. A white paper is a report that provides solutions to problems and helps potential adaptors make decisions or that provides an understanding of complex issues.

IT white papers are often the contribution of organizations and people associated with IT innovation. In the context our study, the purpose of the white paper is to promote the use of IT innovation and to help with successful adoption and diffusion. White papers are used in many disciplines and fields. In the IT field, white papers are a popular form of instructional literature used by many technology and management professionals.

IT is intertwined with business processes, which few modern organizations can operate without them. This is the reason why business magazines provide extensive coverage of IT innovations with the purpose of informing the business community of the opportunities those innovations can provide. Previous research and theory state that these publications are forms of symbolic systems that form part of an IT innovation’s organizing vision (Swanson & Ramiller 1997; Ramiller & Swanson 2003). It is for this reason that these publications are important for investigation.

4.2.3 Knowledge Sharing of IS innovations via Online Communities

IT provides us with many effective collaboration tools. The emerging use of online communities for innovation collaboration is no exception. Both the producers and the consumers of technology are leveraging this medium for cost-effective collaboration, particularly in the open-source community. Research interest in this phenomenon is twofold. First, the phenomenon is contemporary, and second, the use of this cost-effective medium has the potential for improving significantly the global knowledge divide. This provides an ideal setting for studying virtual modes of comprehension.

The software package Openoffice.org is an open-source productivity suite that is available in multiple languages and compatible with common computing platforms. It is free of charge and its use has grown significantly since its introduction twenty years ago. To support the inclusion of the wide range of

4 http://why.openoffice.org/
languages in use in our world, Openoffice.org created the OpenOffice.org localization project or l10n project. The l10n project provides tools and process workflows for both localization (l10n) and internationalization (i10n), to facilitate collaborative work on native-language inclusion in OpenOffice.org releases. The projects are facilitated through the l10n.openoffice.org website that brings together native-language teams along with OpenOffice.org experts to include local languages in OpenOffice.org releases through translation and coding. Although the OpenOffice.org community is large and involves traditional community issues, this study focuses on interaction that is focused and objective oriented. Participation in and the execution of these language projects is done exclusively online.

4.3 Strategies of Inquiry

In this section, the phenomenon is aligned with the available methods appropriate for studying these social situations. The existing research has used methods that were both traditional and nontraditional in IS. Existing idiographic methods have been used to understand a phenomenon in its social context. The stream has generally avoided nomothetic methods that seek general laws and draw solely on procedures used in natural sciences (Benbasat et al. 1987). Postpositivist research has generally supported the multimethod approaches that have been employed in this thesis. In this section, appropriate methods of studying the selected phenomena are reviewed.

4.3.1 Understanding Complex Social Processes Using the Qualitative Case Study

The case study method has been previously applied to study complex social phenomenon including cross-cultural work with IT (Walsham 2002). The case research strategy is appropriate where the phenomenon is in its early stages. It can handle “sticky, practice-based problems where the experiences of the actors are important and the context of action is critical” (Benbasat et al. 1987). In the first study, the IT innovation exists in a context outside that of the adopting culture. The organization in this study is seeking to learn about and localize the IT by

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5 http://l10n.openoffice.org/
collaborating with both local and global institutions. This approach helps us to
learn about the state of the art, to generate theories from practice, to answer
questions related to understanding the nature and complexity of the processes
taking place, and to study new areas (Benbasat et al. 1987).

The study investigates individuals in their natural setting, taking into
consideration social factors outside the control of the researcher. The case study
method has an established history in the social sciences and organizational
research. A case study, according to Yin (2003), is an investigation of a current
phenomenon occurring in a real-life context. He adds that case studies are
especially useful when we cannot fully define the boundaries of the environment.
IS innovation is characterized by constant technological change; thus, the case
strategy is more suitable than methods that require more control (Benbasat et al.
1987).

A defining characteristic of the case study approach is the lack of control the
investigator has over the phenomenon. This separates case studies from other
research methods such as experiments. Case studies are also a good choice for
research investigating contemporary events (Yin 2003). The case study approach
examines a phenomenon in its natural setting, and enables the use of multiple
methods of data collection. This enabled us to integrate observation, archival
data, interviews, and documents.

The case study method is currently a widely used method in IS research, and
it has several advantages. One of the strengths of case studies is the ability to
study actions that make up activities. Another is its ability to use multiple data
sources (Stark & Torrance 2004). A major disadvantage of the case study method
is the low generalizability of its findings. Because case studies are often focused
on one or just a few cases, the method has been criticized for being too specific to
the context (Yin 2003).

Important to every study is the choice of the unit of analysis. This is often
problematic in case studies, and, determining the appropriate unit of analysis is
important to the success and generalizability of the study (Yin 2003). In this
study, the unit of analysis is the organization. Using the case research strategy, we
can capture the knowledge of practitioners and use it to develop theory (Benbasat
et al. 1987).
4.3.2 Studying Symbolic Systems with Content Analysis

A more common research method also shows potential when investigating the comprehension phase. Content analysis is a research method for making inferences from text using a set of procedures. The study of text can reveal “cultural patterns of groups, institutions, or societies” (Weber 1980, p. 10). Krippendorff (2004) promotes the use of content analysis to expose social realities that “are too complex to be accessible otherwise.” This method can be used to identify various cultural elements in symbolic systems.

Content analysis, and other discourse methods, have been used to study IS innovation discourse at the field level (Tsui et al. 2009). This is a growing area of research that recognizes the importance of symbolic systems and their influence on IS innovation in organizations. An Organizing vision is an institutional, field-level phenomenon that is crucial in the comprehension and preadoption stage of IS innovation. Organizing vision is an institutional field-level phenomenon that possesses cultural elements that could shape its discourse. The presence and strength of normative cultural elements vary by level of analysis and thus would be different in organizations vs. institutional fields (Scott 2001, p. 56).

The interest in institutional fields is informed and driven by institutional theory. Institutional theory has helped inform IS theory on IT community discourse and the theory of organizing vision. Content analysis on qualitative historical documents has been used to trace the emergence of institutions and to identify institutional logics within disciplines and fields. Scott et al’s (2000) key contributors in this area used content analysis to identify key terms that distinguish particular healthcare logics. Similarly, Barley and Kunda (1992) use the frequency of articles in management journals to trace the emergence of new managerial ideologies (Schneiber & Clemens 2006). Baskerville and Myers (2009) used article counts in academic and commercial publications to explain fashion waves in the discourse on IT innovations (Baskerville & Myers 2009). In this study, identifying normative cultural patterns in discourse on IT innovations helps us explain their nature and purpose.

4.3.3 Uncovering Shared Methods with Conversational Analysis

Online collaboration presents us with a new domain of study, while simultaneously challenging us to recognize that social phenomena, regardless of technological mediation, remain focused on one of the underlying principles of
humanity: the need for interaction. Goffman (1959) stated that human interaction is a necessity of the human condition. According to Goffman “telephone and the mail provide reduced versions of the primordial real thing,” that primordial real thing being face-to-face social interaction. Similarly, our use of the Internet as a communication medium is a reduced version of face-to-face interaction.

Ethnomethodological methods have helped sociologists uncover taken-for-granted social norms and practices that are used in social interaction (Garfinkel 1967, p. 35). An offshoot of this approach used to investigate the specific context of talk-in-interaction is conversational analysis (Harvey & Myers 1995). Created by Harvey Sacks, through a synthesis of both Goffman and Garfinkel’s work, conversational analysis provides us with a method particularly suited to studying interaction through discourse, one that is facilitated through text-based interaction. Known as computer-mediated communication (CMC), interaction in online communities is a new domain of IS research. In formal environments, online collaboration is transacted generally through text-based interfaces and is defined by focused conversations. This interaction is considered as institutional talk by conversational analysts—focus interaction enacted to achieve institutional objectives (Heritage & Clayman 2010). Conversational analysis exposes shared methods in interaction that can reveal successful and effective collaboration methods for comprehending IT innovations.

Interaction is embedded in social order. Interaction is not totally bound by macro-institutional forces, or aggregate routines that form institutional order. To get to the heart of the matter, Goffman saw interaction as a self-ordered and separate domain based on mutual commitment between actors (Rawls 1987). Pinch (2008) supported a view of interaction with the use of technology. Pinch (2008, p. 463) saw in Goffman’s work references to space, which he believed represented material arrangements that constrain our social interaction. In Goffman’s use of drama to represent interaction, the stage represented the space where the interaction occurred. This space, in the context of online communication, is created through technology. This conceptualization is shared by many studies that have leveraged Goffman’s work in computer-mediated discourse (Cornwell & Lundgren 2001; Soukup 2004).
5 Guide to Articles

The articles attached to this summary provide a write-up of the studies that contribute to the motivation, knowledge synthesis, and empirical investigations for this thesis. Each paper is an independent study but collectively, they support the overall goal of providing knowledge and understanding of the IS innovation process and empirical investigations of the comprehension process from a cultural perspective.

5.1 Conceptual Contributions

In paper I, “Caveat emptor: Cultural assumptions in information systems innovation,” I draw on the concept of “Caveat emptor” or “let buyer beware,” an early maxim from common law to provide a motivation for the thesis. The maxim proposes that the buyer is responsible for using sound judgment in the purchase of goods and services based on their intended context of use. Used analogously for “let the innovator beware,” the paper looks at IS innovation from the innovator’s perspective and questions the mindless adoption of IT across diverse cultures. The paper proposes that cultural assumptions held by mainstream research on IT as culturally neutral are out of date. The paper discusses the emerging discourses on culture and social construction to highlight the need for the inclusion of alternative views on the conceptualization, construction, and development of culture. Using the historical, socioconstructivist perspective of activity theory, the paper presents three assumptions designed to act as a sensitizing device that enables innovators with IT to view culture in a new light.

In paper II, “Cultural challenges in information systems innovation: The need for differentiation studies,” issues of IT’s global diffusion are raised about its neutral application across cultures and contexts. This paper synthesizes a sample of the literature to conceptualize the key cultural challenges in IS innovation as, differentiation, externality, compatibility, and embeddedness. The study shows that the adoption decision is challenged by differentiation, and the adoption phase exhibits issues of externality. During implementation, compatibility is the key challenge of innovators, and the assimilation literature revealed that embeddedness was the cultural challenge of that phase. The synthesis also revealed that the comprehension phase where adoption decisions are made was lacking significant study. The paper proposes two opportunities for research, and
it provides examples of research methods that can be used to investigate preadoption phenomena.

Investigating the comprehension phase of IS innovation still requires a holistic understanding of the mediation of IS innovation by culture. In paper III, “A holistic narrative of culture’s mediation of IS innovation: A qualitative meta-synthesis,” I conduct a synthesis of the relevant research to identify the mediating effect of culture on successful innovation with IT. The use of qualitative inquiry, particularly the interpretive case study, has arguably provided the most significant insights into this phenomenon. The motivation of this paper is also driven by the diversity of this research stream that has produced a cloudy narrative on the mediating effect of culture on IS innovation. The paper provides a “larger narrative” of culture’s mediating effect on IS innovation by preserving, through a qualitative meta-synthesis, the rich descriptions provided by interpretive research. The holistic interpretation revealed three cultural transformation processes that mediated IS innovation: (1) the reaffirmation of cultural structure through persistent agency, (2) the negotiation of cultural structure through pliable agency, and (3) the abandonment of cultural structure through inertial agency. With the previous studies and the knowledge acquired from this study, we moved forward to empirical investigations.

5.2 Empirical Investigations

The study presented in paper IV, “IT innovation spirals in cross-cultural collaboration: A case of software localization in Africa,” investigates preadoption in a complex and challenging environment. The setting for this study was chosen for its extremity, as it highlights a culturally diverse and challenging environment for IS innovation. The paper is motivated by the recognition that IS innovation is a driving force for economic growth. Economic theories promote innovation adoption in the form of technological slipover from technologically advanced countries to less technologically advanced countries. The ability to adopt these technologies is often reliant on previous experience, knowledge, and cultural compatibility. Capacity building, an initiative to improve knowledge and skills, has been proposed as a central driver to enable the adoption of IT innovation. However, the adoption of innovation and capacity building are subject to significant barriers, which are particular to the context.

The framework is developed through the analysis of an organizational case in Ethiopia. The contribution of the study shows that global and local collaborators
share knowledge and learn from each other through reciprocal collaborations. The IT innovation spiral model provides an understanding of how organizations can collaborate to comprehend and localize IT innovations. It shows that learning about IT innovations that are outside of one’s cultural context takes gradual but progressive spirals of collaboration, which eventually enrich both the global and local contexts.

Building on this study, paper VI, “Getting from know-what to know-how via online communities: A conversational analysis of an Openoffice.org language project,” investigates taken-for-granted shared methods in online communities geared at IT comprehension. In the comprehension phase of IS innovation, organizations must acquire knowledge about what, when, why, and how to innovate with IT. To acquire this knowledge, innovators with IT may choose to use online communities as a cost-effective way of learning about IT innovations. Using online communities, organizations can circumvent logistical constraints to take advantage of networks of human capital that possess general technology know-how. In this paper, collaborations in the online community OpenOffice.org are collected and analyzed. The results showed that successful knowledge sharing in online communities where interaction is temporal and focused requires context-specific knowledge gaps. The analysis revealed patterns in the communication that exposed a taken-for-granted knowledge-sharing mechanism we conceptualized as “gap filling.” Within this mechanism “what I know” and “what I don’t know” statements provided a mechanism for identifying context-based knowledge gaps that enable participants to go from “know-what” to “know-how” effectively. The contribution of this study emphasizes the attention to a micro-level phenomenon that has an impact on a larger phenomenon such as the innovation spirals in paper IV. Expressing “what you know” and “what you don’t know” enables knowledge sharing by creating context-specific gaps.

Our final empirical paper, paper V, “The interpretation and legitimization of values in Agile’s organizing vision,” deals with differentiating IT innovations using normative cultural elements. The paper was motivated by the growing popularity of Agile methods and its value foundations, which have been publicized in IT community discourse. There are different ways to learn about IT innovations for adoption. The most common is to access commercial publications such as white papers and IT and business magazines. These IT community discourses provide the key functions of interpretation, legitimization, and mobilization. Conceptualized as organizing visions, these community discourses provide knowledge about how an IT innovation, such as Agile, should be applied
in the organization. Agile was a unique case because of its strong orientation toward values. Previous research into the impact of cultural values on the adoption and diffusion of IT innovations exposes its importance to the IS innovation process.

Using the Lasswell value framework, the paper investigates how values in the organizing vision of Agile are interpreted and legitimized by its key contributors. The findings propose that Agile’s value patterns, which are represented by the values of wealth, enlightenment, skill, and power, are a combination of its value foundations and practical business needs. The similarities of the value patterns found across Agile contributors also show that these values are part of an early-institutionalized element of its organizing vision. The similarities and nature of the values also represent a moral-legitimacy strategy implemented to improve its diffusion. The promotion of IT innovations in IT community discourse is designed to enhance its diffusion and will thus promote it as a one-fits-all solution. Organizations should assess the IT innovation based on their organizational culture in order to make the best adoption decision.
Table 2. Guide to Articles.

<table>
<thead>
<tr>
<th>Paper Title</th>
<th>Individual Contribution of the Author</th>
</tr>
</thead>
</table>
| Lawrence, C., F. Beltran (2010) “Caveat emptor: Cultural assumptions in information systems innovation” | Study Design: Major  
Write-up: Major  
Theory Development: Major |
| Lawrence, C., M. Oivo (2012) “Cultural challenges in information systems innovation: The need for differentiation studies” | Study Design: Major  
Write-up: Major  
Theory Development: Major |
Write-up: Major  
Data Collection: Major  
Data Analysis: Major  
Theory Development: Major |
| Lawrence, C., M. Rohde (2010) “Information technology innovation spirals in cross-cultural collaboration: A case of software localization in Africa” | Study Design: Major  
Write-up: Major  
Data Collection: Major  
Data Analysis: Major  
Theory Development: Major |
| Lawrence, C., J. Kuem (2012) “Getting form know-what to know-how via online communities: A conversational analysis of an Openoffice.org language project” | Study Design: Major  
Write-up: Major  
Data Collection: Major  
Data Analysis: Major  
Theory Development: Major |
| Lawrence, C., P. Rodriquez (2012) “The interpretation and legitimation of values in Agile’s organizing vision” | Study Design: Equal  
Write-up: Equal  
Data Collection: Major  
Data Analysis: Major  
Theory Development: Major |
6 Empirical Findings

As previously highlighted, the comprehension phase of IS innovation is a sense-making exercise that involves crossing organizational boundaries to learn about IT innovations. It is proposed in this thesis that culture mediates this process. Through an investigation of both the artifacts (global print media), and cross-cultural collaborative situations involving comprehension of IT innovations, this thesis provides empirical findings that contribute knowledge of how culture mediates three modes of comprehension: active, passive, and virtual. The following provides details of our findings that are summarized in Table 3.

<table>
<thead>
<tr>
<th>Comprehension Modes</th>
<th>Cultural Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active, Passive, Virtual</td>
<td>Artifacts, structures, processes</td>
</tr>
<tr>
<td>Mediation: Differences in cultural background makes sense making in collaborative environments difficult</td>
<td>Mediation: Normative cultural elements in IT discourse on IT innovations can influence interpretation and legitimacy of the innovation</td>
</tr>
<tr>
<td>Mediation: Shared method of interaction are different across cultures and present challenges to effective knowledge sharing</td>
<td>Taken-for-granted shared methods</td>
</tr>
</tbody>
</table>

Table 3. Summary of Findings.

6.1 Global/Local IT Innovation Spirals in Cross-cultural Collaboration

It was found that in active modes of comprehension, culture plays a mediating role by providing natural challenges to sense making due to cultural distance. In instances where IT innovations are noticeably designed for a context outside that
of potential adaptors, mindful innovators recognize that the IT requires localization or internationalization, and they initiate the comprehension process. In this study, it was recognized that the organization’s cultural context did not permit it to adopt mindlessly in fashion or popular innovations. A description of this case is found in section 4.2.1. The main issue in this case was localization of the software suite openoffice.org.

The organization in the study recognized that prior to any adoption, the innovation must be localized to include culture and contextual elements. The study tried to answer the research question, how can we comprehend IT innovations by sharing knowledge through global/local collaboration? The study contributed to the thesis but providing understanding of how culture mediates this active mode of comprehension. The findings revealed four themes that provided the foundation of the framework—IT innovation spirals in cross-cultural collaboration.

The first theme was the local vs. global context that epitomizes the impact of globalization on IS innovation. IT innovations are generally perceived to be culturally neutral; thus, their use globally is often not questioned. In the case study, it was found that diffusionism was rejected, as the mindful innovators looked for a context appropriate office suite. Although the local context had low IT penetration, they recognized that the popular global software suite Microsoft Office was not available in the local Ethiopian language of Oromo, thus preventing its effective use.

**Fig. 3. IT Innovation Spirals in Cross-cultural Collaboration.**

The first theme was the local vs. global context that epitomizes the impact of globalization on IS innovation. IT innovations are generally perceived to be culturally neutral; thus, their use globally is often not questioned. In the case study, it was found that diffusionism was rejected, as the mindful innovators looked for a context appropriate office suite. Although the local context had low IT penetration, they recognized that the popular global software suite Microsoft Office was not available in the local Ethiopian language of Oromo, thus preventing its effective use.
The second theme, innovation and knowledge push, revealed the pressures of diffusionism on the organization from the organizing vision of popular office suites and their supporters. The theme showed that what is common in preadoption knowledge related to IT innovations is “pushed” to local contexts. However, organizations of greater cultural distance must assess this knowledge to comprehend the use context of the IT innovation and its compatibility with their organization. These innovators must thus seek out knowledge beyond their organizational boundaries.

The third theme revealed the challenges of acquiring external knowledge about IT innovations. Knowledge acquisition was difficult owing to the lack of local knowledge about IT innovation. The organization must go beyond national boundaries to access knowledge about IT. The final theme localization and ownership was shown to be vital to improving the sustainability of the innovation in the organization. For the innovation to be successfully adopted and implemented, the organization needed to acquire sufficient knowledge to localize and maintain the software.

The themes were synthesized into a descriptive and explanatory model, which showed that comprehension in this cross-cultural context is a collaborative spiral, as shown in Figure 3. The framework shows that the barriers to comprehension in this cross-cultural context can be overcome through collaborative spirals. More importantly, culture mediates this innovation process by presenting natural challenges to comprehension by mediating sense making. When collaborators from different cultural contexts attempt to deal with a problem, they need to understand the problem from each other’s perspectives. In this study, it was revealed that it was vitally important that the local and global collaborators share knowledge equally and avoid the knowledge push.

By incrementally sharing knowledge, both global and local collaborating teams can better understand the other context in order to accomplish their goals. In this case, the local-language team shared knowledge about their language and context, enabling the global openoffice.org team to better direct them to localize their software.

6.2 Normative Cultural Patterns Shaping IT Community Discourse

Often the first stage of comprehending IT innovations involves accessing published material from IT vendors or supporting organizations. The findings in this study sought to understand how culture would mediate a passive mode of
comprehension by studying an example of an organizing vision for an IT innovation. By identifying cultural patterns in the discourse of IT innovations, we could understand the nature of the values and their purpose in the discourse. The Agile methodology was selected for study because of its cultural orientation (i.e., it has been established with a value base). Using the theory of organizing vision as our theoretical base, the study investigated how Agile values have been interpreted and legitimized in the IS community discourse by its contributors. Using Lasswell’s eight (8) value categories the study sought to identify value patterns in the discourse on Agile. The patterns found are displayed in Figures 4 and 5.

Fig. 4. Vendor-sponsored White Papers (%) (Lawrence and Rodriguez (2012) Publishing Permission by AIS).
Table 4. Value Categories.

<table>
<thead>
<tr>
<th>Value Categories</th>
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<tbody>
<tr>
<td>PowTot – Power</td>
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<tr>
<td>WltTot – Wealth</td>
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<tr>
<td>WlbTot – Well-being</td>
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<tr>
<td>RspTot – Respect</td>
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<tr>
<td>RcTot – Rectitude</td>
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<tr>
<td>EnlTot – Enlightenment</td>
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<tr>
<td>SklTot – Skill</td>
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<td>AffTot – Affection</td>
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</table>

The findings show that contributors to Agile’s community discourse share strong values related to enlightenment, power, and, to a lesser degree, wealth and skill. The patterns also show that the values of rectitude, respect, affection, and well-being are weak in Agile’s community discourse. The value patterns, vis-à-vis the combination of strong and weak values, represent how Agile’s values have been interpreted by its contributors. The result of our comparison leads us to theorize that the interpreted values are part of a legitimization strategy targeting the software industry.

Of the four strong values, enlightenment and skill correlate with the values originally expressed by the early founders of the methodology. Enlightenment and skill are values that would naturally be associated with software development and technical disciplines. Wealth, as a value expressing desire for income and power,
referring to influence on the actions of others, and would not be directly associated with the Agile methodology. However, everyone would acknowledge that the general purpose of Agile usage for software development is to derive economic value through improved flexibility and efficiency. We would also agree that influence over others (power) in an organizational context is necessary. Strong values of power and wealth represent desires of business enterprises, the main adopters of Agile methods.

The similarities in the patterns across the two samples also tell us that the values are highly institutionalized and reinforced at a normative level. The interpreted values espoused in our analysis are part of Agile’s organizing vision and, thus, are by design used to legitimize Agile in the business community. It is thus theorized that the value patterns represent a moral-legitimacy strategy. Moral legitimacy represents the “moral norms and values prevalent within a particular social audience” (Kaganer et al. 2010). The value patterns encoded in the organizing vision of Agile provide legitimizing accounts of Agile’s potential use in organizations by aligning their values to the common desires of its adaptors. Moral legitimacy is an attempt to support the desired values that would be applicable to the Agile community.

This study helps us to understand how culture can play a role in shaping an organizing vision and thus mediate comprehension of the discourse. The core process of sense making in comprehension is again mediated by embedded normative cultural elements in the discourse. An IT innovation and the cultural values that shape its discourse are essential for understanding its interpretation and legitimacy by innovators. Cultural values that appeal to innovators will resonate in the discourse of potential innovations and thus encourage selection.

6.3 Taken-for-granted Shared Methods in Virtual Knowledge Sharing for IS Innovation

The emerging use of virtual modes of knowledge sharing are now used for IS innovation. Comprehension of IT innovations can now be done cost effectively in virtual environments. How culture mediates this process is relevant and important for its future development. In this study of a passive mode of comprehension, the specific research question how do innovators with IT collaborate via online communities, enabling them to get from know-what to know-how effectively? was investigated.
Fig. 6. Excerpt from Conversation.

Online communities are now being used to share knowledge about IT innovations. Within these communities, diverse cultural groups interact, often oblivious to their cultural backgrounds. Details of this case can be found in section 4.2.3. In this unique interaction setting, taken-for-granted shared methods are employed to facilitate knowledge sharing. These social norms are negotiated during the conversations. The findings revealed two patterns in our messages that are related to knowledge sharing for comprehension. We refer to these patterns as “what I know” and “what I don’t know,” as shown in Figure 6. These patterns helped us identify recurring sequences in conversations between collaborating teams. The recurring sequence was conceptualized as “gap filling,” and identified as a knowledge-sharing mechanism.

The findings illustrate that “what I know” and “what I don’t know” are important elements in conversations that focus and limit further knowledge seeking. In this specific context, knowledge resources are scarce because they are offered without cost to clients. While mass publications of instructional documents offer companies information about IT innovations, they are generic. IT innovations are complex, and their applications diverse, particularly those offered for global markets. Providing “what I don’t know” by confirming “what I know”
is essential for creating context-specific knowledge gaps that enhance sense making.

<table>
<thead>
<tr>
<th>What I know</th>
<th>What I know</th>
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<td>What I don't know</td>
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**Fig. 7. Illustration of Gap-Filling Mechanism.**

The knowledge-sharing mechanism that proved effective in this context is one we conceptualized as gap filling. It appears in sequences of conversation with the purpose of sharing knowledge about an IT innovation. The knowledge sequence “gap filling” enables knowledge sharing in temporal and focused interaction in online communities by providing knowledge in context. The context is simply created by providing “what I know” and “what I don’t know.” Figure 7 provides a simple illustration of the mechanism. When “what I know” is articulated with “what I don’t know,” the knowledge gap becomes clear in the context of existing knowledge.

The study also reveals how culture mediates this virtual mode of comprehension. In a virtual environment, clues about cultural background and norms are not evident. Cultural diversity includes diverse methods of sharing knowledge through interaction. These methods of interaction are often taken for granted but are important for effective communication. The gap-filling mechanism found provides an effective method of sharing knowledge in a context where knowledge is scarce and participants are culturally diverse.
7 Discussion

In this thesis, knowledge and understanding is provided on how to better mitigate the pitfalls of innovating with IT in a multicultural world, by taking a proactively rather than reactive approach to cultural issues. Globalization will continue to challenge IS researchers to better understand culture and its impact on IS innovation. However, in this thesis, it is proposed that by informing the comprehension phase of IS innovation to understand culture better, the process can be improved. Culture’s growing importance for organizations innovating with IT necessitates the inclusion of research that furthers our understanding of culture’s mediation of IS innovation. The contributions in this thesis toward this end include conceptual frameworks and findings from literary investigations as well as empirical studies. In this section, the contributions are discussed, and a guide of how these studies are best assessed is presented.

7.1 Improving or Understanding of IS Innovation and Culture

The studies on IS innovation and culture are gaining inroads as globalization takes hold. The research stream, however, still provides opportunities for not only empirical study but also conceptual and literary investigations that help refine and clarify this broad research area. As shown in Figure 9, this thesis provides contemporary cultural conceptualizations through guiding assumptions, a deeper understanding of culture’s mediation of IS innovation, and a conceptualization of the cultural challenges facing innovators with IT.

Lawrence and Beltran’s (2010) study contributes to the literary stream by providing three cultural assumptions that can be used to guide innovators with IT. Using the theoretical lens of activity theory (AT), the study proposes transcending notions of technological neutrality, promoting sensitivity, and the awareness of issues of social construction. The three assumptions are meant to guide and sensitize innovators and researchers to cultural issues related to IS innovation. The three assumptions—historicity, mediation, and internalization—present cautionary signs that denote the need for sound judgment when innovating with IT that has been designed and developed outside one’s own cultural context.

The study contributes to the stream of research that promotes modern conceptualizations of culture, and rejects mindless innovation with, exhibited by the bandwagon phenomenon (Wolf et al. 2012), and diffusionism (McMaster & Wastell 2005). The study supports a cultural view that the dynamic,
transformative, and sometimes-unpredictable nature of culture refutes constraining paradigms that have supported a technical rational perspective. (Harvey & Myers 1995). Greater emphasis needs to be placed on persevering cultural capital in the form of knowledge and values, embedded in social structures, individuals, historical artifacts, and forms of social exchange (Orlikowski & Iacono 2001; Kaptelinin & Nardi 2006; Corea 2007).

![Fig. 8. Conceptual Contributions to Research.](image)

In this thesis, it was recognized that the research on culture’s mediation of IS innovations remains cloudy. Because of the diverse conceptualizations of culture and phase base investigations, a need for a holistic explanation of the mediating effect of culture on IS innovation was need. Drawing from the significant contributions of interpretive research on IS innovation and culture, the holistic explanation developed in this thesis, provides a deeper understanding of culture’s mediation of IS innovation. The holistic reinterpretation draws our attention to issues of endemic and temporal cultures in organizations. Sensitivity to not only national or organizational cultural, but endemic and temporal cultures within the organizations requires the attention of innovators.

The Lawrence and Oivo (2012) paper proposes that the research on culture and IS innovation does not clearly provide a contemporary conceptualization of cultural challenges facing organizational innovators with IT. The study saw the importance of clearly conceptualizing these challenges. The paper revealed that the cultural challenges facing innovators are conceptualized as differentiation, externality, incompatibility, and embeddedness. The challenges follow the phases
of IS innovation, comprehension, adoption, implementation, and assimilation. The paper further states that these challenges are compounded. Each challenge unaddressed presents compounded challenges in the latter phases. The study promotes addressing early challenges, such as differentiation in comprehension, to mitigate latter challenges.

### 7.2 Culture’s Mediation of Comprehension

The previously mentioned conceptual and literary investigations motivated further research on the earliest phase of IS innovation: comprehension. The investigation of the comprehension phase was further motivated by the emerging contexts where comprehension occurs, namely global/local collaboration, the uses of whitepapers and business magazines, and the use of online communities (Dilnutt, Johnston & Vitale 1988; Faraj et al. 2011; Currie 2012; Gonçalves 2012; Swanson 2012; Wolf et al. 2012). Learning about IT innovations is the goal of the comprehension phase, and, thus, the investigations focused on culture’s mediation of these modes of learning. This thesis investigated three modes of comprehension mediated by culture: active, passive, and virtual. The contributions are summarized in Table 5.

When organizations collaborate across boundaries to comprehend IT innovations, they are faced with making sense of the use context of an IT innovation that is developed and used in a different cultural context. In this active comprehension mode, culture mediates the learning process through its diversity. The collaborators need to understand each other’s cultural context in order to identify the appropriate context of use for the innovation. The cultural element that mediated this mode of comprehension was language and other explicit cultural forms. Although other studies show how culture mediates the latter phases of IS innovation (Burn 1996; Kaniadakis 2012), the studies show that culture can also mediate the comprehension phase. This study supports comprehending the explicit cultural context where the innovation is developed and used to understand better its context of use. Globalization has made IT a global phenomenon, regardless of its origins and concentration. Previous research has viewed cultural issues using the global/local perspective, and illustrate that cultural structures embedded in organizations mediate the IS innovation process (Joshi et al. 2007). Mitigation in this study was achieved through an IT innovation spiral that essentially provides local/global knowledge inclusion through collaboration. Making sense of generic global knowledge of IT is
difficult, as diverse cultural backgrounds present problems for sense making. However, by collaborating with global knowledge experts, both parties can gain.

The investigation of passive comprehension focused on IT discourse. IT discourse, through its rhetoric, seeks to interpret and legitimize IT innovations to promote an organized vision promoting a collaborated context of use. Innovators with IT will be more susceptible to rhetoric than to the technology itself. Research on IT fashion shows that rhetoric in IT community discourse has significant effects on adoption (Baskerville & Myers 2009; Wang 2010b; Wang 2010a). The role of culture in this mode of comprehension is through its shaping of an IT’s organizing vision. Organizing visions also have their own culture, and this shapes the discourse that is transmitted to innovators.

Table 5. Empirical Contributions to Research and Practice.

<table>
<thead>
<tr>
<th>Lessons Learned</th>
<th>Active</th>
<th>Passive</th>
<th>Virtual</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS innovation in global environments should be locally</td>
<td>Attention should be paid to</td>
<td>Virtual comprehension</td>
<td></td>
</tr>
<tr>
<td>driven. The collaboration process should involve</td>
<td>normative cultural elements that</td>
<td>environments are unique; they</td>
<td></td>
</tr>
<tr>
<td>incremental learning by both parties in order to</td>
<td>are behind IT discourse. The</td>
<td>cater to a global audience.</td>
<td></td>
</tr>
<tr>
<td>understand clearly the context of use.</td>
<td>values that shape this discourse</td>
<td>will affect both adoption and diffusion.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>will affect both adoption and</td>
<td>Innovators should assess these values for</td>
<td></td>
</tr>
<tr>
<td></td>
<td>diffusion. Innovators should</td>
<td>fit with those of their organization.</td>
<td></td>
</tr>
<tr>
<td>Paper IV: Global/Local Knowledge Transfer</td>
<td>Paper V: Cultural Shaping of IT</td>
<td>Paper VI: Virtual Knowledge Sharing</td>
<td></td>
</tr>
<tr>
<td>Paper V: Cultural Shaping of IT Discourse</td>
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The study showed that value patterns in IT discourse could be identified, and that these values were shaped by its contributors. The impact of IT discourse is more prominent when dealing with prepackaged IT innovations. Emerging research in this area seeks to study how these innovations came into being (Williams & Pollock 2012). The study moves us closer to identifying cultural compatibility issues between organizations and technology. The study supports research in cross-cultural use of IT innovations and how they are interpreted and legitimized in discourse (Flynn & Du 2012). This discourse presents a general context of use for the IT innovation that may not represent unique and underrepresented cultures.

In the study of the virtual mode of comprehension, it was found that taken-for-granted shared methods of interaction, mediated comprehension. Cultures
naturally develop shared methods of interaction that are often taken for granted until they are required to interact outside their culture group (Goffman 1959). In this study, the knowledge-sharing mechanism, gap filling, was a mechanism unique to the virtual interaction context that provides effective knowledge sharing for comprehension. As organizations continue to work across their boundaries, methods of effective interaction will be of greater importance (Jarvenpaa & Ives 1994). Research on online communities continues to promote studies that look at micro-institutional elements that contribute to effective interaction online (Armstrong & Hagel 1996; Faraj et al. 2011).

7.3 Assessing Rigor

The studies in this thesis are of the qualitative genre, where rigor is assessed in line with the goals, data, and methods of qualitative study. While the natural science model is widely accepted for conducting research in IS, it presents several challenges for those studying cultural and social issues. First, one cannot create the controlled environment needed for methods such as experiments. Consequently, those studying complex social situations use natural controls by accurately describing and situating their studies in line with the phenomenon. Second, the deductions in this study are verbal propositions instead of quantitative measures. Third, the studies in natural sciences must be replicable; however, in the social sciences, it is often impossible to replicate socially complex phenomenon that are context dependent, both temporally and spatially. Last, the generalizability of the findings becomes limited to similar contexts (Lee 1989). Whatever caveats social research presents, its findings are highly valued in the IS field (Myers 1997). The following discussions help readers evaluate this research in order to apply appropriately the findings and contributions in research and practice.

7.3.1 Generalizability

In qualitative studies, generalizations from the sample to a population are not sought. This thesis, like other qualitative studies, is interested in understanding the “deeper structure of a phenomenon, which it is believed can then be used to inform other settings” (Orlikowski & Baroudi 1991). In qualitative studies, four types of generalizable findings exist: (1) concepts, (2) the generation of theory, (3) the drawing of specific implications from a particular context, and (4) rich
insights (Walsham 1995). Unlike statistical methods, generalizations in qualitative research seek generalization from population to theory (Lee & Baskerville 2003). In the studies in this thesis, generalized statements are made that are applicable in specific populations. However, this form of inductive research has been criticized for its lack of generalizability, but the work of Lee and Baskerville (2003), and an elaborated and rectified paper by Tsang and Williams (2012) propose that a lack of proper understanding of induction and generalizability has led to this misconception. Using these foundations, this thesis proposes that our studies provide the following specific types of generalizations.

In paper V, two types of generalizations are possible, theoretical generalization from research findings to theory and within-population generalizations. This includes characteristics of a sample transferring to those of the corresponding population. The value patterns found in paper V, are representative of the population from which it was extracted—the Agile community.

In paper IV, our case study provides cross-population generalization, where the findings from one sample can be generalized to another population in the same context and period. In this case, the claim is made that the IT innovation spirals would describe and explain the process of other organizations in Ethiopia innovating cross-culturally with a similar technology, in a similar period. In paper VI, our conversational analysis study also provides within-population generalization from the characteristics of a sample transferrable to those of the corresponding population. The knowledge-sharing mechanism found in the conversations of the collaborators can be generalized to other OpenOffice.org language-project teams.

7.3.2 Validity and Reliability

The qualitative studies conducted in this thesis use different methods, and, thus, their reliability and validity have to be assessed differently. However, they share a similar qualitative approach. In qualitative studies it is important to note that reliability, as in other studies, refers to “the extent to which the same or a different researcher can reapply the same procedure” (Lee & Baskerville 2003). In this section, details on how these studies are best assessed are provided.

In the interpretive case study, our reliability and validity relies on a good interpretation, one that resolves “apparent absurdities.” The iterative process of the hermeneutic cycle would reduce these absurdities until a theory is revealed
that does not conflict with the findings. A good test of validity of the interpretation is when the social phenomenon under investigation no longer appears to the researcher as surprising or confusing (Lee 1991). Findings from qualitative case studies are not prohibited from being extended to additional contexts (Lee & Baskerville 2003). Validation for the case study was supported through triangulation (observations, interviews, and documents), and other validation methods, such as multiple coding and respondent validation, were considered. However, because of the interpretive nature of the study, it was decided it would not add value to the analysis. The nature of the specific study is best evaluated using Walsham (2006) criteria, which establishes authenticity, plausibility, and criticality as requirements of good interpretive research. This is shown in Table 6.


<table>
<thead>
<tr>
<th>Authenticity</th>
<th>Plausibility</th>
<th>Criticality</th>
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<tbody>
<tr>
<td>Show the reader you have been there</td>
<td>How well the text connects to the personal and professional experiences of the reader</td>
<td>The way the text probes the reader to consider taken-for-granted assumptions</td>
</tr>
<tr>
<td>Demonstrated authenticity with a rich description of the case and quotes from interviewees</td>
<td>Clearly connected with the existing literature on IS innovation in a cross-cultural context</td>
<td>The study also clearly uncovers taken-from-granted assumptions, such as the knowledge push and the applicability of IT outside one's own context</td>
</tr>
</tbody>
</table>

In papers V and VI, the procedures and data make these studies highly replicable. In study V, computer-supported content analysis was applied along with a code dictionary that significantly improves both reliability and validity. The data collection procedures are clearly articulated, and the findings are easily validated through replication. The split-half technique was used to determine the validity of the constructs (Krippendorff 2004). In paper VI, the instrument of analysis is the researcher, as in the case study. However, the method and findings enabled validation through replication. Consequently, these studies successfully satisfy Lee’s (1991) test of falsifiability, logical consistency, relative explanatory power, and survivability.
8 Conclusion

This thesis sets out to contribute knowledge that would help innovators with IT better innovate in our global society by providing deeper understanding of the comprehension phase as well as the overall IS innovation process. The knowledge gained in this thesis will help innovators be proactive with issues of culture, by improving their understanding of culture and deepening their understanding of the comprehension phase of IS innovation. The thesis provides both conceptual and empirical findings that contribute to IS innovation research and specifically the comprehension phase.

The conceptual studies provide understanding of the impact of culture on the IS innovation process. The first contribution comes in the form of three cultural assumptions that would sensitize innovators with IT in a global context. The second and third conceptual contributions provide clarity by synthesizing the existing literature. The thesis conceptualizes the cultural challenges facing innovators with IT as, differentiation, externality, incompatibility, and embeddedness. It also provides a holistic explanation derived from the findings of the existing literature on IS innovation and culture to provide a deeper understanding of culture’s mediation of IS innovation.

The conceptual background provided understanding that focused the investigation on the comprehension phase. The investigation of three contexts of comprehension in IS innovation represent three contexts and modes of learning about IT. The findings provided insights into knowledge processes that support the comprehension of IS innovation and how culture mediates comprehension modes in different contemporary contexts. The findings reveal that through the active comprehension mode, innovators need to understand culture elements through incremental collaborative spirals that are locally driven.

In a passive comprehension context, the study revealed that normative cultural elements embedded in the organizing vision of IT innovations are transmitted through symbolic systems to innovators. Finally, in the virtual comprehension context, taken-for-granted shared methods embedded in cultural interaction mediated virtual collaborative environments where innovators were learning about IT. Thus, identifying unique and effective methods would improve its use. The study found unique taken-for-granted knowledge-sharing mechanisms that supported effective knowledge sharing for comprehension.

The thesis proposes that to be proactive about culture in our multicultural society, greater attention should be paid to the comprehension phase of IS
innovation. In this phase, various methods of comprehension can be used to gain knowledge about IT innovations that exist in a different cultural context. Each mode of comprehension is unique and should be understood to achieve effective learning.

While the paper presents valid contributions, the study is not without its limitations. This thesis is exploratory and qualitative in nature, and as with all such studies, its generalizability is limited. The methods used in this study produce specific findings that can only contribute specific knowledge. With that said, the studies remain unique, coherent, and logical. Thus, further research in the area of cross-cultural IS innovation, in particular, with emphasis on the comprehension and early adoption phases, is promoted. In particular, opportunities for research in this area should attempt to develop new models of cross-cultural IS innovation processes that provide alternatives to the adaptor-oriented approach that dominates in IS literature. The bandwagon phenomenon is still evident in IS, and, while many studies have chronicled the negative effects of technology adoption across cultures, research is needed to understand how these effects can be avoided prior to adoption. Such studies should follow the path of Wang and Swanson (2007) to study how actors can envision and execute change in their organizations.

Emerging research is promising in this area, and more studies are investigating the IT artifact’s development from the perspective of its situated context. Williams and Pollock (2012) suggest that researchers look at the biography of IT, particular package software products. Additionally, researchers are investigating the different sub groups that adopt innovation so they can be contrasted based on (1) vision, (2) key functionality, (3) mode of interaction, (4) structure, and (5) mode of appropriation (Lyytinen & Damsgaard 2011). The use of text for data analysis is also promising for IS innovation research. New methods of quantitative analysis are being tested in the field (Tsui et al. 2009). These include methods of deconstructing IS text (Chiasson & Davidson 2012), and, in general, the research stream is promoting diversity in theoretical perspectives, methodologies, and organizational sectors (Wastell & McMaster 2008).
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Original Publications


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