

## REVIEW: A REVIEW OF CULTURE IN INFORMATION SYSTEMS RESEARCH: TOWARD A THEORY OF INFORMATION TECHNOLOGY CULTURE CONFLICT<sup>1</sup>

By: **Dorothy E. Leidner**  
**Baylor University**  
**P.O. Box 98005**  
**Waco, TX 76798-8005**  
**U.S.A.**  
**Dorothy\_Leidner@baylor.edu**

**Timothy Kayworth**  
**Baylor University**  
**P.O. Box 98005**  
**Waco, TX 76798-8005**  
**U.S.A.**  
**Timothy\_Kayworth@baylor.edu**

### Abstract

*An understanding of culture is important to the study of information technologies in that culture at various levels, including national, organizational, and group, can influence the successful implementation and use of information technology. Culture also plays a role in managerial processes that may directly, or indirectly, influence IT. Culture is a challenging variable to research, in part because of the multiple divergent definitions and measures of culture. Notwithstanding, a wide body of literature has emerged that sheds light on the relationship of IT and culture. This paper sets out to provide a review of this literature in order to lend*

*insights into our understanding of the linkages between IT and culture. We begin by conceptualizing culture and laying the groundwork for a values-based approach to the examination of IT and culture. Using this approach, we then provide a comprehensive review of the organizational and cross-cultural IT literature that conceptually links these two traditionally separate streams of research. From our analysis, we develop six themes of IT-culture research emphasizing culture's impact on IT, IT's impact on culture, and IT culture. Building upon these themes, we then develop a theory of IT, values, and conflict. Based upon the theory, we develop propositions concerning three types of cultural conflict and the results of these conflicts. Ultimately, the theory suggests that the reconciliation of these conflicts results in a reorientation of values. We conclude with the particular research challenges posed in this line of inquiry.*

**Keywords:** National culture, organizational culture, information systems, IT values

### Introduction

Culture is often partially blamed when organizations experience failure. For example, the Columbia and Challenger disasters experienced by NASA were in part attributed to a culture that valued conformity to rules resulting in the overlooking of potential risks (Vaughn 1996). Similarly, medical errors are responsible for 11 percent of all deaths in Australia (Mercola 2001) and more patient deaths than automobile accidents or HIV in the United States (Kohn et al. 2000), and yet the culture of medical professionals encourages them to

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refrain from exposing mistakes (Kohn et al. 2000). As a result, little learning occurs from mistakes and the same mistakes are repeated across institutions. Information technology is often implicated in failings of culture. In the case of NASA, reports have suggested that an over-reliance on simplified PowerPoint presentations of complex engineering might have contributed to the inability to pinpoint hidden risks (Tuft 2003). In the case of the healthcare profession, IT could possibly help reduce medical errors, and yet the very introduction of IT is often met with cultural resistance (Coombs et al. 1992). National culture has also been implicated in organizational failures. Avianca Airlines has twice experienced crashes that were subsequently blamed in part on the national culture of the crew, a national culture in which subordinates were uncomfortable expressing disagreement with superiors or conveying bad news (Helmreich 1994). In one case, a crash occurred in Madrid amid warnings from the Ground Proximity Warning System but the captain continued to maintain belief in his own situational perception and the copilot quietly asked questions hinting at his own disagreement with the captain while acquiescing to the captain's interpretation (Helmreich 1994). In another crash, an Avianca flight from Columbia to New York crashed upon landing after circling several times in bad weather and eventually running out of fuel. Examination of the flight recorder data showed that the first and second officers, who came from national cultures where subordinates tend to withhold bad information from superiors in order to maintain harmony, failed to provide the captain or Air Traffic Control with continued information on the worsening fuel situation (Helmreich 1994).

These examples help illustrate that culture at the national, organizational, or subunit level exerts a subtle and yet powerful influence on people and organizations and that information flows and information technologies are often closely intertwined with culture. Culture theory has been used to explain an extensive range of social behaviors and outcomes in organizational settings (Keesing 1974; Nadler and Tushman 1988), including firm effectiveness (Denison and Mishra 1995; Duncan 1989), firm performance (Gordon 1985, Gordon and DiTomasso 1992; Kotter and Heskett 1992), corporate strategy (Wallach 1983), job attitudes (Birnbaum and Sommers 1986), administrative practices (Thomas 1989), merger and acquisition outcomes (Weber and Shenkar 1996), technology transfer practices (Hussain 1998), and conflict resolution strategies in product innovation settings (Xie et al. 1998). Culture also has a powerful influence on information related behaviors including, at the most basic level, what is considered to be legitimate information (Hall 1983).

IT researchers interested in the relationship of culture to information and information technologies have studied the impact of national and organizational culture on sundry IT

issues. At the national level, research investigates the applicability of traditionally western-based management theories to non-Western cultures and the influence of national culture on the development and use of ICTs (Myers and Tan 2002; Straub 1994; Walsham 2002). More recently, works by Myers and Tan (2002) and by Ford, Connelly, and Meister (2003) provide critical examinations of cross-cultural information systems research and offer suggestions for future IT research examining issues involving national culture and IT.<sup>2</sup> At the organizational level, seminal work by Robey and Azevedo (1994) and by Robey and Boudreau (1999) has concentrated on theories of organizational culture as a means to explain the contradictory consequences of information technology within firms. An important contribution of such literature has been to present the view that IT is symbolic (Feldman and March 1981; Robey and Markus 1984; Scholz 1990) and therefore subject to the various cultural interpretations of those using it. Such a view provides an alternative to the notion of technical determinism (Weick 1990) and at the same time provides a fresh view of the potential for cultural transformation through technology use (Bernard and Pelto 1987; Coombs et al. 1992; Van Maanen and Barley 1985; Weick 1990).

In spite of this rich tradition of inquiry in both organizational and cross-cultural IS research, we believe that a comprehensive review that examines both streams of IT-culture research can help provide a more complete perspective of the relationship of culture to IT. The goal of this paper is to build upon the prior IT-culture research to inform our understanding of the construct of culture and its relevance to the IT field, to clarify prior IT-culture research streams, and to provide substantive directions for future research in the form of a theory and propositions. Our review will show where the national and organizational culture IT literatures overlap, even though they have been separate streams, will identify both major and minor gaps in the literature, and will build upon the insights from the review to inform a new theory. The theory, which we label the *theory of IT-culture conflict*, provides a new perspective of culture and IT by focusing on the potential value conflicts that may emerge in the context of IT development, adoption, use, and management. Whereas other theories consider the direct impact of culture on various aspects of IT use and outcomes (for example, see Karahanna et al. 2005), our framework introduces three types of cultural conflict and discusses the causes and implications of these cultural conflicts.

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<sup>2</sup>Myers and Tan (2002) in particular provide an extensive critique on the use of Hofstede's value dimensions in cross-cultural IS research.

The paper is organized as follows. The first section provides an overview of culture to clarify some of its definitional inconsistencies, underlying dimensions, and research challenges. Next, we present a brief overview of our research methodology in conducting this review. This is followed by our review of the IT literature that includes national or organizational culture as a central variable in the study. Building upon this review, we then present a fresh theoretical perspective on the relationship between IT and culture that includes propositions to guide future research. The paper concludes with a summary of key points drawn from our analysis.

## The Concept of Culture

### What Is Culture?

A first challenge in conducting research involving culture is arriving at an understanding of what culture is, given the myriad of definitions, conceptualizations, and dimensions used to describe this concept (Straub et al. 2002). Kroeber and Kluckhohn (1952), for example, identified 164 definitions of culture, and Sackmann (1992) discusses how culture has been framed in various studies as ideologies, coherent sets of beliefs, basic assumptions, shared sets of core values, important understandings, and the collective will. Others suggest that culture includes more explicit, observable cultural artifacts such as norms and practices (Delong and Fahey 2000; Hofstede 1998), symbols (Burchell et al. 1980), as well as language, ideology, rituals, myths, and ceremony (Pettigrew 1979). Jermier et al. (1991) make this distinction between tacit and explicit components of culture, describing the tacit aspect (e.g., assumptions) as *ideational* while the more explicit artifacts of culture (e.g., norms and practices) are referred to as *material*. Schein's (1985a, 1985b) three-level model of culture describes both the more observable aspects of culture, such as artifacts, and the less observable aspects.

According to Schein, basic assumptions are at the core of culture and represent the belief systems that individuals have toward human behavior, relationships, reality, and truth. These basic assumptions represent cognitive structures or interpretive schemes that people use to perceive situations and to make sense of ongoing events, activities, and human relationships, thereby forming the basis for collective action (Reichers and Schneider 1990; Sackmann 1992; Sapienza 1985; Van Maanen and Barley 1985). Basic assumptions are formed over time as members of a group develop strategies to cope with problems and pass along the strategies to new members (Van Maanen and Barley 1985).

At the next level, values represent a manifestation of culture that signify espoused beliefs identifying what is important to a particular cultural group. These values answer the question as to why people behave the way they do (Schein 1985). In organizational settings, corporate values form the foundation of corporate culture and provide a basis for appropriate behavior (Deal and Kennedy 1982). However, Schein (1985a, 1985b) makes it clear that values, in and of themselves, are merely a reflection of the underlying cultural assumptions. As such, these values are more visible, even debatable, with individuals having a greater level of awareness of them.

At the third level, culture is manifested through artifacts and creations which are the most visible manifestations of culture. These artifacts may include such things as art, technology, and visible and audible behavior patterns as well as myths, heroes, language, rituals, and ceremony (Pettigrew 1979). While cultural artifacts are the most observable of the three levels, they are also the hardest to decipher in terms of their underlying cultural meanings. An important point to be made is that certain artifacts, such as information technology, are not culturally neutral and may come to symbolize a host of different values driven by underlying assumptions and their meaning, use, and consequences (Coombs et al. 1992; Feldman and March 1981; Robey and Markus 1984; Scholz 1990).

Schein (1985b) argues that values are more easily studied than basic assumptions, which are invisible and preconscious and therefore not easily studied, as well as cultural artifacts (technology, art, visible and audible behaviors) that, while being most visible, are not easily decipherable. It is not surprising, then, that the vast majority of theories that conceptualize culture do so in terms of reference group value orientations (Jackson 1995) such as value dimensions of national culture (Hofstede 1980) or, at the organizational level, the competing values framework (Quinn and McGrath 1985, Quinn and Rohrbaugh 1981, 1983). Even while the focus has largely been on values, there is a tight linkage between cultural values and the subsequent behaviors and actions of social groups (Posner and Munson 1979). In this sense, values can be seen as a set of social norms that define the rules or context for social interaction through which people act and communicate (Delong and Fahey 2000; Keesing 1974; Nadler and Tushman 1988). These social norms have an impact on subsequent behaviors of firm members through acting as a means of social control that sets the expectations and boundaries of appropriate behaviors for members (O'Reilly and Chatman 1996). Thus, the study of organizational values may be particularly useful in explaining certain behaviors with respect to how social groups interact with and apply IT in organizational contexts.

It is important to note that our treatment of culture is not to be confused with that of organizational climate. While there are close similarities to these two constructs, there are also distinct differences (Reichers and Schneider 1990; Pettigrew 1990). One key difference is that climate is a more specific construct than culture that generally focuses on individual member's perceptions about a particular referent idea or thing (e.g., safety climate) whereas culture refers to the more general assumptions, values, and patterns of behavior (Pettigrew 1990, p. 416). Given, these differences, the subsequent analysis will not include coverage of literature at the intersection of IT and climate.

### Values in Culture Research

National culture (or cross-cultural<sup>3</sup>) research and organizational culture research have emerged as largely separate research streams. While the two streams have experienced little overlap, they both share a focus on defining the values that distinguish one group from another. To date, the most popular conceptualization of national culture has been Hofstede's (1980, 1983) original taxonomy describing culture along the dimensions of power distance, uncertainty avoidance, individualism–collectivism, and masculinity–femininity. Trompenaars (1996) also describes national culture in terms of such polar opposites as: universalism versus particularism, affective versus neutral relationships, specificity versus diffuseness, achievement versus ascription, and internal versus external control. Others have conceptualized national culture in terms of such values as Confucian dynamism (Hofstede and Bond 1988), polychronism versus monochronism (Hall and Hall 1990), context (Hall 1976), and time-orientation (Hofstede and Bond 1988; Trompenaars 1996). According to these taxonomies, certain sets of values will persist in all countries yet will vary in their magnitude across geographic regions. Table 1 summarizes some of the more prevalent and well-established values found at the national level. Whereas the national culture research has focused on a few, well regarded taxonomies of values, the organizational culture research has experienced a much wider range of values. As with national culture taxonomies, the aim of organizational cultural taxonomies has been to enable the differentiation of organizations along the lines of dominant values guiding organizational behaviors. While it is beyond the scope of this work to identify an exhaustive list of

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<sup>3</sup>We will use the term *national culture research* rather than *cross-cultural research* to avoid potential confusion given that research can study dynamics across two cultural types at the organizational level just as readily as at the national level and both might accurately be labeled *cross-cultural*.

organizational culture theories, some of the more prominent ones are summarized in Table 1.

To summarize, we believe that culture is a critical variable in explaining how social groups interact with IT. And, as Table 1 illustrates, the predominant theoretical approach to culture has been to conceptualize it, at any level, in terms of values. To be consistent with this predominant approach to studying culture in organizational contexts, we will also adopt a values-based approach. Adopting this values approach to culture will enable us to use this rich foundation of culture theory as a framework for our subsequent analysis of the IS-culture literature. Moreover, taking a values perspective will enable us to look at the contradictions that might occur across national, organizational, and subunit levels as well as to uncover the similarities in the IT-culture research across these levels. Finally, using a values-based approach allows us to uncover the types of cultural conflicts that might arise from the development, adoption, use and management of IT.

### Research Methodology

Our literature review required (1) the development of criteria for the types of studies to be included in our analysis, (2) a literature search strategy, and (3) an analysis scheme outlining the documentation and coding of the various studies. Given the pure vastness of the culture literature, we chose to limit our initial sample of empirical studies to those where both IT and culture were significant themes of the manuscript. This strategy was adopted in order to avoid having an unmanageable sample of articles with limited value. In addition, in order to broaden our understanding of the empirical IS-culture literature, we also focused on identifying key nonempirical IS-culture manuscripts as well as leading books or management journals focusing on theoretical perspectives of culture.<sup>4</sup>

Several methods were used to search for appropriate literature. First, we examined each issue of each volume of the leading journals<sup>5</sup> in our field dating back to the early 1990s. Second, using such phrases as "IT culture," "information sys-

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<sup>4</sup>Samples of journals included are *Organization Science*, *Administrative Science Quarterly*, *Academy of Management Review*, and *Academy of Management Journal*.

The authors thank an anonymous suggestions on additional articles and book chapters to read.

<sup>5</sup>This initial search included *MIS Quarterly*, *Journal of Management Information Systems*, *Information Systems Research*, and *Communications of the ACM* as well as *Decision Sciences* and *Management Science*.

**Table 1. A Taxonomy of Cultural Values**

Value Dimension	Description of Value	Level
<b>Uncertainty Avoidance:</b> Hofstede 1980, 1983	The degree to which members of a society feel comfortable with uncertainty and ambiguity. Members in high uncertainty avoidance countries prefer less ambiguity than do those in low uncertainty avoidance countries.	National
<b>Power Distance:</b> Hofstede 1980, 1983	The extent to which members of a society accept that power in institutions and organizations is distributed equally; status differences among workers may either be very pronounced (high power distance) in contrast to workers in low distance countries that follow a more egalitarian philosophy when making decisions (Tan et al. 1995).	National
<b>Masculinity–Femininity:</b> Hofstede 1980, 1983	High preference for achievement, assertiveness and material success (high masculinity) vs. low preference (femininity).	National
<b>Individualism vs. Collectivism:</b> Hofstede 1980, 1983	The preference for a social framework where individuals take care of themselves (individualism) as opposed to collectivism where individuals expect group to take care of them in exchange for their loyalty.	National
<b>Time-orientation:</b> Hofstede and Bond 1988	A measure of people's consideration of the future; being comfortable with sacrificing now for long term benefit (long-term orientation) or more focused on immediate results (short-term orientation).	National
<b>Monochronism vs. Polychronism:</b> Hall 1983	Attitudes toward use of time in performing tasks either focusing on issues one at a time (monochronic) or performance of activities in parallel (polychronic).	National
<b>Context:</b> Hall 1976	High context cultures prefer a communication style in which individuals prefer to draw inferences from non-explicit or implicit information. Individuals in low context cultures prefer information to be stated directly and exhibit a preference for quantifiable detail.	National
<b>Locus of Control:</b> Smith, Trompenaars, and Dugan 1995	The degree to which an individual perceives that his or her life is controlled by luck or powerful others (external locus) as opposed to being controlled individually or internally (internal locus).	National
<b>Solidarity:</b> Goffee and Jones 2000	The degree to which an organization's members pursue shared objectives quickly and effectively regardless of personal ties.	Organizational
<b>Mission:</b> Denison and Mishra 1995	Sense of purpose.	Organizational
<b>Involvement:</b> Denison and Mishra 1995	Sense of ownership and responsibility among a firm's members.	Organizational
<b>Sociability:</b> Goffee and Jones 2000	The tendency toward sincere friendliness among members of a community.	Organizational
<b>People-Oriented:</b> Cooke and Lafferty 2003	Concern for people issues.	Organizational
<b>Concern for People:</b> Blake and Mouton 1964	Fairness, collaboration, enthusiasm for job, trust	Organizational
<b>Constructive:</b> Cooke and Lafferty 1987	Values emphasized collaboration and support	Organizational
<b>Supportiveness:</b> Wallach 1983	The degree to which workers are fair and helpful to one another.	Organizational
<b>Employee Orientation:</b> Hofstede 1991	Concern for people.	Organizational
<b>Group:</b> Quinn 1988	Emphasis on developing people resources.	Subunit

Table 1. A Taxonomy of Cultural Values (continued)		
Value Dimension	Description of Value	Level
<b>Task-Orientation:</b> Cooke and Lafferty 2003	Concern for efficiency.	Organizational
<b>Concern for Production:</b> Blake and Mouton 1964	Compliance, risk-taking, precision, competition.	Organizational
<b>Innovation:</b> Wallach 1983	Values emphasizing challenge and risk-taking.	Organizational
<b>Results Orientation:</b> Hofstede 1991	Values emphasizing achievement of goals.	Organizational
<b>Job Orientation:</b> Hofstede 1991	Concern for getting the job done.	Organizational
<b>Customer Interface:</b> Hofstede 1998	Emphasis on results in a loosely controlled environment, bound by fixed rules.	Subunit
<b>Bureaucratic:</b> Jones 1983	Emphasis on results in a loosely controlled environment, bound by fixed rules.	Subunit
<b>Rational:</b> Quinn 1988	Emphasis on production and efficiency.	Subunit
<b>Passivity:</b> Cooke and Lafferty 1987	Values emphasizing approval, dependency, and avoidance	Organizational
<b>Aggression:</b> Cooke and Lafferty 1987	Values emphasizing power, competition, and perfectionism	Organizational
<b>Consistency:</b> Denison and Mishra 1995	Tendency toward individual conformity as opposed to voluntary participation.	Organizational
<b>Adaptability:</b> Denison and Mishra 1995	The capacity for internal change in response to external conditions.	Organizational
<b>Bureaucracy:</b> Wallach 1983	Values emphasizing organization, hierarchy, systems, control, procedures.	Organizational
<b>Hierarchy:</b> Ouchi 1981; Wilkins and Ouchi 1983	Values emphasizing control over individuals through authority relationships.	Organizational
<b>Process:</b> Hofstede 1991	Values emphasizing means by which goals are achieved.	Organizational
<b>Normative Values:</b> Hofstede 1991	Emphasis on correctly following organizational procedure.	Organizational
<b>Administrative:</b> Hofstede 1998	Emphasis on processes, routine, work standardization, and correctly following procedure.	Subunit
<b>Production:</b> Jones 1983	Emphasis on processes, routine, work standardization, and correctly following procedure.	Subunit
<b>Hierarchical:</b> Quinn 1988	Emphasis on internal stability and control.	Subunit
<b>Markets:</b> Ouchi 1981; Wilkins and Ouchi 1983	Values emphasizing control over workers through price mechanisms.	Organizational
<b>Clans:</b> Ouchi 1981; Wilkins and Ouchi 1983	Values emphasizing control over workers through shared beliefs.	Organizational
<b>Parochial Values:</b> Hofstede 1991	Identification with the organization.	Organizational
<b>Local Values:</b> Gouldner 1957	Strong identification with the organization as an extension of personal life.	Subculture
<b>Pragmatism:</b> Hofstede 1991	Values emphasizing customer needs over the needs of the organization.	Organizational
<b>Professional:</b> Hofstede 1998, Jones 1983	Emphasis on meeting customer needs, performance of nonroutine tasks, specialization, tight control, and less concern for people.	Subunit
<b>Cosmopolitan Values:</b> Gouldner 1957	Values identifying most strongly with associations external to the organization.	Subunit
<b>Professional:</b> Hofstede 1991	Values identifying most closely with work profession.	Subunit
<b>Developmental:</b> Quinn 1988	Concern for growth and acquisition of resources.	Subunit

tems culture,” and “IT values,” we conducted a search of ABI/Inform and Business Source Premier. Third, we conducted similar searches in the Science Direct (Elsevier) database. Finally, we looked through the bibliographies of key articles to ensure that we had not overlooked other articles. Our initial review was conducted during the summer of 2003; we then updated the review in the fall of 2004 for any articles that had appeared between summer 2003 and fall 2004. The resulting 82 articles reviewed came from 38 different journals, two dissertations, and one working paper (see Appendix C for the exact distribution of studies across journals).

Our method for analysis of empirical IS-culture studies was to first classify each study according to its focus on either organizational or national culture. Next each article was reviewed to determine the following information: general IS theme, methodology and measure of culture, independent, dependent and control variables used in study, and relevant findings. This information has been summarized in Appendices A and B, respectively, for both national culture-IS literature and organizational culture-IS studies. The data contained in these appendices provides the basis for subsequent analysis to identify themes in IS-culture research as well as perceived gaps and directions for future research.

### **Literature Review**

In total, we reviewed 82 articles. Of these, 51 examined culture at the national level (i.e., cross-cultural studies of IT) and 31 examined culture at the organizational or subunit level. Among the national culture studies of IT, over 60 percent utilized one or more of Hofstede’s dimensions. Of the organizational culture and IT studies, 85 percent considered culture at the organizational level whereas 15 percent considered culture at the subunit, or group, level. The following themes were observed: (1) culture and information systems development, (2) culture, IT adoption, and diffusion, (3) culture, IT use, and outcomes, (4) culture, IT management, and strategy, (5) IT’s influence on culture, and (6) IT culture. Table 2 provides a matrix summarizing this research by cultural level (national or organizational) across each of these six categories.

We also categorized these studies by methodology across each of our six themes (Table 3). As this table shows, there was no single methodology of choice. Rather, researchers have drawn from a wide spectrum of methodologies in examining the relationship between culture and information systems. We now review the literature within these six themes.

### **Theme 1: Culture and Information Systems Development (ISD)**

Ten studies dealt explicitly with the question of how culture influences information systems design, including seven that considered national culture and three that considered organizational culture. The choice of research methodologies included industry surveys (4), matching lab experiments (2), qualitative field studies (4), and content analysis (1).

The common theme emerging from these studies is that variation across cultural values may lead to differing perceptions and approaches to the manner in which information systems are developed. For example, Dagwell and Weber (1983) examined systems designers’ perceptions of end-users across four national groups (United States, United Kingdom, Australia, and Sweden). While they did not explicitly measure national culture, they did find differences across these groups in approaches taken to the systems development process. Australian and Swedish designers favored a more Theory Y (people) orientation for ISD while U.S. and U.K. designers favored a Theory X (process and efficiency) orientation. Similarly, the study by Kumar et al. (1990), using England’s (1967) Personal Values Questionnaire to study differences in systems designer values between Danish and Canadian subjects, found that the Danish designers (more socialist values) placed greater emphasis on people-related issues in ISD projects while the Canadian subjects (more capitalist values) tended to focus more on technical issues.

Other studies in this theme investigate the relationship between national culture and perceptions of ISD project risk and risk management behaviors. Keil et al. (2000) conducted matching lab experiments in Finland, Singapore, and the Netherlands to investigate how escalation of commitment behavior in software projects differs among cultures. They concluded that cultures low in uncertainty avoidance had lower perceptions of project risk than cultures high in uncertainty avoidance. Consequently, project managers in lower uncertainty avoidance cultures had a greater tendency to continue with troubled IT projects than their counterparts in high uncertainty avoidance cultures. In another study, Tan, Smith, and Keil (2003) examined the impact of national culture on the predisposition to report bad news about failing ISD projects. They found that individualistic cultures (U.S.) were more predisposed than collectivistic cultures to report bad news on troubled IT projects.

At the organizational level of analysis, three studies deal with the influences of organizational culture on software develop-

<b>Table 2. Information Systems–Culture Themes by Level of Analysis</b>		
<b>Theme</b>	<b>Organizational Level</b>	<b>National Level</b>
Culture and IS Development	Dube (1998) Dube and Robey (1999) Ngwenyama and Nielsen (2003)	Dagwell and Weber (1983) Hunter and Beck (2000) Keil, Tan, Wei, Saarinen, Tuunainen, and Wassenaar (2000) Kumar, Bjørn- Andersen, and King (1990) Peterson and Kim (2003) Tan, Smith, and Keil (2003) Walsham (2002)
Culture, IT Adoption and Diffusion	Cabrera, Cabrera, and Barajas (2001) El Sawy (1985) Hoffman and Klepper (2000) Huang, Newell, Galliers, and Pan (2003) Kitchell (1995) Ruppel and Harrington (2001) Von Meier (1999)	Al-Gahtani (2003) DeVreede, Jones, and Mgaya (1998) Galliers, Madon, and Rashid (1998) Garfield and Watson (1998) Griffith (1998) Hasan and Ditsa (1999) Hill, Loch, Straub and El-Sheshai (1998) Hussain (1998) Jarvenpaa and Leidner (1998) Loch, Straub, and Kamel (2003) Madon (1992) Png, Tan, and Wee (2001) Straub (1994) Straub, Keil, and Brenner (1997) Shore and Venkatachalam (1999) Srite (2000) Thatcher, Srite, Stepina and Liu (2003)
Culture, IT Use and Outcomes	Alavi, Kayworth, and Leidner (2004) Baltahazard and Cooke (2003) DeLong and Fahey (2000) Gold, Malhotra, and Segars (2001) Harper and Utley (2001) Hult, Ketchen, and Nichols (2002) Jarvenpaa and Staples (2001) Kangungo (1998) McDermott and Stock (1999) Robbins (2000) Robey and Rodriguez-Diaz (1989) Tolsby (1998) Weber and Pliskin (1996) YiHua, Pearson, and Crosby (2003)	Calhoun, Teng, and Cheon (2002) Chau, Cole, Massey, Montoya-Weiss, and O'Keefe (2002) Choe (2004) Chow, Deng, and Ho (2000) Chung and Adams (1997) Downing, Gallagher, and Segars (2003) Gamble and Gibson (1999) Ishman, Pegels, and Sanders (2001) Johns, Smith and Strand (2003) Kambayashi and Scarbrough (2001) Leidner et al. (1999) Mejias, Shepherd, Vogel, and Lazaneo (1996/97) Quaddus and Tung (2002) Rose, Evaristo, and Straub (2003) Tan, Wei, Watson, Clapper, and McLean (1999) Tan, Wei, Watson, and Walczuch (1998) Watson, Ho, and Raman (1994) Yoo and Torrey, (2002)
Culture, IT Management and Strategy	Grover, Teng, and Fiedler (1998) Kanungo, Sadavarti, and Srinivas (2001) Tomlin (1991)	Burn, Saxema, Ma, and Cheung (1993) Cougar (1986) Einings and Lee (1997) Husted (2000) Kettinger, Lee, and Lee (1995) Milberg, Burke, Smith, and Kallman (1995) Shore, Venkatachalam, Solorzano, Burn, Hassan, and Janczewski (2001) Slaughter and Ang (1995)
IT's Influence on Culture	Doherty and Doig (2003) Doherty and Perry (2001)	Madon (1992) Walsham (2002)
IT Culture	Kaarst-Brown (2004) Kaarst-Brown and Robey (1999)	



**Table 3. Information Systems–Culture Methodologies by Theme**

Topic	Methodology										
	Level*	Lab Experiment	Survey	Case Study	Interpretive Case Study	Longitudinal Case Study	Multi-Method	Ethnographic	Grounded Theory	Archival Data Analysis	Structurational Analysis
Culture and IS Development	N	X	X	X	X						
	O			X	X						X
Culture, IT Adoption and Diffusion	N	X	X	X	X		X		X	X	
	O		X	X		X	X				
Culture, IT Use and Outcomes	N	X	X	X	X		X				
	O		X	X	X						
Culture, IT Management and Strategy	N		X							X	
	O		X							X	
IT's Influence on Culture	N					X					X
	O			X	X						
IT Culture	N										
	O							X	X		

\*N = National; O = Organizational

ment process improvements. One study concluded that implementation of a new process evoked a wide variety of cultural interpretations from organizational stakeholders (Dubé and Robey 1999). The authors deduced that the success of such projects depended on the degree to which the values of various subgroups fit with the particular values embedded in the new software development innovation. Another study by Dubé (1998) demonstrates that a good fit between the values embedded in the software development process and the overall organization's values will lead to a more successful implementation. Ngwenyama and Nielsen (2003), in a content analysis of longitudinal data from three software process improvement initiatives, found that cultural assumptions built into the process methodologies could be in conflict with the cultural assumptions of developers, leading to difficulties in implementing the process improvements.

Together, the studies at the national and organizational levels of culture are concerned with the influence of values on the process of system development. One area in need of expanded research that we highlight here is culture's influence on globally distributed, culturally diverse, software development teams. Given recent trends toward culturally

diverse ISD project teams, more research needs to be conducted to examine how these diverse team member values compliment, or contradict, each other as the ISD process unfolds over time. One example of such research is Walsham's (2002) field study of a culturally mixed ISD project team composed of Jamaican and Indian software developers. Using structuration theory (Giddens 1979, 1984) to explain the recursive relationship between the mental structures (of which values are a part) and the subsequent actions and behaviors of these groups, Walsham concluded that differences in structures between Jamaican and Indian developers led to significant levels of conflict and contradiction in the software development process but that, over time, the actual software development process acted to shift or change the respective structures or underlying values of each group toward software development practices. As a result, the Jamaican and Indian software developers achieved a negotiated culture or convergence of views.

With the expanding use of offshore development practices (Carmel and Agarwal 2002; Kaiser and Hawk 2004), it will become increasingly important to understand how value differences in culturally diverse software development teams

may influence the systems development process and subsequent development outcomes. Furthermore, researchers will need to consider how such teams might reconcile conflicting value orientations to engage in effective software development practices.

## **Theme 2: Culture and Information Technology Adoption and Diffusion**

In all, 24 of the studies addressed the question of whether culture influences the adoption and diffusion of IT. Among these, 16 viewed culture at the national level and 8 viewed it at the organizational level. Of the 15 national-level studies reviewed with this theme, 10 mention one or more of Hofstede's cultural values to describe the relationship between national culture and IT use and adoption. Uncertainty avoidance was the most used dimension (nine studies) followed by power distance (seven), individualism–collectivism (four), and masculinity–femininity (three). Also, this theme includes an eclectic range of research methodologies ranging from both single (six) and multisite case studies (six) to surveys (five), multi-method studies (four), the grounded theory approach (one), and a laboratory experiment (one).

One of the dominant ideas of this theme is that uncertainty avoidance plays a significant role in determining how groups will potentially adopt and diffuse information and communications technologies. The logic of these studies is that since IT is inherently risky, those less comfortable with uncertainty will be less likely to adopt and use new technologies. For example, in a study surveying 153 businesses across 23 countries, Png et al. (2001) determined that countries high in uncertainty avoidance are less likely to adopt frame relay technology. In a similar vein, the survey of university students by Thatcher et al. (2003) demonstrated that students from countries high in uncertainty avoidance were less willing to experiment with new information technologies. Hasan and Ditsa's (1999) interpretive study of 10 organizations in the Middle East, Africa, and Australia found that IT is less readily adopted in risk-averse cultures. Other studies (Jarvenpaa and Leidner 1998; Straub 1984; Straub, Keil, and Brenner 1997) reflect similar results.

While there seems to be general support for the hypothesis that greater uncertainty avoidance will be associated with less adoption and diffusion of IT, at least one study contradicted this logic. In a study of a Pakistani government agencies' adoption of IT, Galliers et al. (1998) found that low uncertainty avoidance was associated with a slower rate of adoption of IT. They account for this contradictory finding by explaining that low uncertainty avoidance in the Pakistani

public sector has led to an attitude where "management is not overly concerned with the information available to them" (p. 97). This lack of concern has, in turn, resulted in a decreased interest among managers in adopting information systems for the support of planning and decision making. However, what really might be at issue is the entire notion of information and whether the Pakistani notion of what constitutes valuable information is consistent with the type of information contained in the systems they were considering adopting. The research to date on culture and IT adoption and diffusion has focused on IT as a construct rather than breaking the IT construct down into both the information aspect and the technology aspect. There might be contradictory forces at work, wherein uncertainty avoidance tends to incline one away from purchasing expensive new technologies but wherein the same uncertainty avoidance encourages one to seek as much information as possible in order to understand the environment. Thus, as a start, research needs to consider the implications of any value chosen in a study of culture on both the informational and technology aspects of an IT decision.

By singling out individual dimensions from Hofstede, one can reasonably argue either way on a multitude of IT adoption related issues. For example, DeVreede et al. (1998) found a positive relationship between power distance and GSS acceptance. They argued that, as power distance increases, the rate of GSS acceptance does also, presumably since subordinates are less likely to question their supervisor's decisions in high power-distance cultures. Contrarily, Hasan and Ditsa (1999) contend that successful adoption of IT is more likely to occur in a low power-distance environment by virtue of the fact that in such environments, underling IT staff will be more likely to give advice to managers, presumably leading to more favorable IT adoption outcomes. What appears critical is to focus on the full adoption process, as well as the rate of adoption, rather than on any single aspect of it. Studies need to move beyond trying to use cultural values to predict whether or not a group will adopt an IT to understanding the dynamics of adoption. We suggest that culture is less instrumental in predicting whether or not an IT will be adopted than it is in predicting the time of adoption (forerunners, those in the middle, laggards), breadth of diffusion, and the objective of adoption (e.g., firms may adopt the same technology but with very different underlying objectives, influenced in part by their national culture).

An important theme that emerged from our analysis is the idea that groups are more likely to adopt a technology if their own values match or fit the values embedded within the technology or those associated with its development. Hill et al.'s (1998) field study of five Arab countries demonstrates how certain cultural values (preference for face-to-face interaction,

allegiance to family, concept of time, religion, and gender relations) tended to either facilitate or impede technology transfer to the host countries. In a study of Internet diffusion, Loch et al. (2003) found that the degree of similarity in values with respect to technology between adopting and host countries will influence the level of adoption of IT. In particular, they found that acceptability of computers (a value) in Arab countries was positively related to the level of Internet usage. In a similar study at the organizational level, Cabrera et al. (2001) concluded that successful technology assimilation requires either the technology to fit the organizational culture or the culture to be shaped to fit the behavioral requirements of the technology. These three studies are significant in the acknowledgment that the information, and technology, associated with IT comes embedded with values. These values are assumed in the underlying work practices that the IT is meant to inculcate.

We also found many articles at the organizational level interested in understanding how culture influences IT adoption and diffusion. Hoffman and Klepper (2000) found that organizations low in sociability and high in solidarity (mercenary cultures) experienced more favorable outcomes with technology assimilation than did more networked (high sociability and low solidarity) cultures. Another study by Kitchell (1995) found that organizations with cultures seen as being flexible or open and having a long-term orientation evidenced a greater propensity to adopt advanced manufacturing technology. Finally, Ruppel and Harrington (2001), drawing the competing values framework (Quinn and McGrath 1985; Quinn and Rohrbaugh 1981, 1983), concluded that intranet adoption is much more likely to succeed in development (values emphasizing flexibility and innovation) type cultures. The latter studies have in common a focus on the flexibility aspect of organizational culture.

Other studies dealt with culture at the subunit level of organizations. Three studies specifically examined the relationship between organizational subculture and IT adoption and diffusion. The study by Huang et al. (2003) investigated the relationship between organization subculture inconsistencies and the adoption of component-based software development methods. They found that clashing values among organizational subcultures hindered the information sharing and collaboration needed to effectively integrate a technology like component-based software development. In another study, Von Meier (1999) examined work-group subcultures' interpretations of proposed technological innovations. She found that two different occupational subcultures (engineers and operators) had entirely different cultural interpretations of proposed technologies and, as a result, experienced conflict and resistance to adopting certain technologies. These findings highlight the potential contradictory consequences of

IT implementations due to potentially competing sets of values within the same organizations (Robey and Azevedo 1994; Robey and Boudreau 1999).

In spite of some mixed results (Galliers et al. 1998; Hasan and Ditsa 1998), these findings provide reasonable evidence that value orientations (national, organizational, or subculture) may predispose certain social groups toward either favorable or unfavorable IT adoption and diffusion behaviors. It is clear from this theme of research that the degree of fit between social groups' values and values embedded in the IT has emerged as an important construct for studying the relationship between values and IT adoption and diffusion.

### **Theme 3: Culture, Information Technology Use and Outcomes**

Thirty studies incorporated a diverse set of methodologies to examine the influence of culture on IT use and outcomes. Eighteen of the studies viewed culture at the national level, and twelve viewed it at the organizational level. Of the eighteen national studies, a significant number (seven) specifically examined the influence of national culture on GSS use and outcomes. Furthermore, 13 of the 18 national studies utilized one or more of Hofstede's dimensions with individualism–collectivism being the most prominent (ten) followed by power distance (eight) and uncertainty avoidance (eight). Seven of the articles examined the influence of either national culture (two) or organizational culture (five) on knowledge management practices.

Two questions of central importance to inquiry within this theme are:

- (1) Will the same IT be used in similar ways across cultures and result in similar benefits, or will the same IT be used differently across cultures and result in different benefits?
- (2) What cultural values are best able to predict user satisfaction and IT implementation success?

The first question has been the focus of research at the national level whereas the second has been the focus of organizational level culture research. The overwhelming response to the first question is that differences in culture result in differences in use and outcomes of IT. For example, Chau et al. (2002) found that consumer attitudes toward the Internet varied significantly between Hong Kong (value preferences for shared loyalty and relationships) and the United States (value preferences for personal competence and

loyalty to oneself) subjects. As a result, patterns of Internet use varied dramatically: Hong Kong subjects used the Internet primarily for social communication while U.S. respondents used it primarily for information search. These results suggest that cultural values shape how people use information technology. Similarly, Leidner et al.'s (1999) study of executive information systems (EIS) use among Mexican, Swedish, and U.S. managers concluded that cultural values influenced perceptions of EIS use outcomes. They found that this technology was more favorably perceived in countries with lower power distance and uncertainty avoidance than in countries high in uncertainty avoidance and power distance. Other studies have produced similar results (Calhoun et al. 2002; Downing et al. 2003; Kambayashi and Scarbrough 2001; Rose et al. 2003).

This research stream is marked by studies that cover a variety of IT (such as Internet, EIS, group support systems, e-mail), a variety of outcomes (such as empowerment, decision making, communication), and a variety of cultural values (Hofstede's dimensions as well as Hall's). While most studies at the national level drew upon Hofstede's taxonomy, several focused on Hall's dimensions of culture. For example, Calhoun et al. (2002) found that high context cultures (Korea) experienced higher levels of information overload from IT use than lower context cultures (United States). Thus, it appears that information systems users from high context cultures will be less likely to use a given IT, particularly if that system provides individuals with more information than they are able to process. In one of the few studies investigating time-orientation as a cultural value, Rose et al. (2003) found that subjects from polychronic cultures (Egypt and Peru) tended to be less concerned with website delays than those from monochronic cultures (United States and Finland).

A large subset of empirical studies addresses national culture as a variable of interest in GSS research. Collectively, the GSS research (Chung and Adams 1997; Meijas et al. 1996; Quaddus and Tung 2003; Tan et al. 1998a; Tan et al. 1998b; Watson et al. 1994) provides strong evidence that the effect of computer-mediated communication (CMC) tools on certain group processes and outcomes may be dependent to some extent on culture. In particular, the values of individualism–collectivism and power distance figure prominently in these findings. The findings suggest that certain national cultures may be more susceptible to different types of group dysfunctions than others and that CMC tools may be targeted to neutralize these negative influences. For example, the study by Tan et al. (1998a) of decision groups demonstrated how teams in Singapore (high power distance, collectivist) using CMC achieved a greater degree of reduction in harmful

status influence effects than their U.S. counterparts (low power distance, individualist). Whereas the majority of the research interested in the relationship of culture to IT use and outcomes employed field studies or case studies, the subset related to GSS research relied upon lab experiments using students. Perhaps the greatest weakness of employing lab experiments using students is not that the students might not be representative of their country's culture, which certainly may be the case, but that the cultural values examined, such as power distance, are unlikely to play a role in an artificial environment, particularly among a group of equals (assuming that there is not an inherent hierarchy within a group of students).

At the organizational level, the research is less focused on whether or not differences in culture can explain differences in IT use and outcome, as on the question of which particular cultural values are related to user satisfaction and the successful implementation of IS. McDermott and Stock (1999) found group-oriented organizational cultures to be positively related to managerial satisfaction with advanced manufacturing technology (AMT) outcomes while rational-oriented cultures were closely associated with competitive success in AMT implementation. Another study by Harper and Utley (2001) showed that people-oriented cultures tended to experience greater levels of implementation success than those with more production-oriented cultures, while Tolsby (1998) found that the cultural values of a military organization contributed to participants failing to take ownership of a newly implemented information system. Additionally, Kanungo (1998) found that computer-network use had a impact on user satisfaction in more task-oriented as opposed to people-oriented cultures. In many ways, these findings are comparable to findings at the national level using the collectivist–individualist divide.

Several studies were specifically interested in cultural values that are associated with knowledge management success. The common finding across these studies is that values (both organizational and national) influence KM success (Baltazard and Cooke 2003), knowledge sharing behaviors (Chow et al. 2000; DeLong and Fahey 2000; Yoo and Torrey 2002), KM infrastructure capability (Gold et al. 2001), KM technology use (Alavi et al. 2004), and perception of individual ownership of information and knowledge (Jarvenpaa and Staples 2001).

As with the research on culture, IT adoption, and diffusion, the notion of fit figures prominently in the research on culture, IT use, and outcome. Robey and Rodriguez-Diaz (1989) found that closeness of fit between U.S. headquarters and subsidiary cultural values was an important predictor of implementation success of accounting information systems at

two foreign subsidiaries in Panama and Chile. The subsidiary with values most like the U.S. office (Panama) experienced the least implementation difficulty. Two other studies examined differences in work-group subcultures and IT-related outcomes. In the first, Robbins (2000) studied the integration of information services and instructional technology subgroup cultures in a secondary school district. She found technology performance outcomes were greater in situations where the two subgroup cultures were more effectively integrated. This suggests that similarity in cultural values among organizational stakeholders will lead to more effective use of IT, particularly when the two groups depend on each other.

#### **Theme 4: Culture, IT Management, and Strategy**

The fourth theme addresses the question of how culture influences IT management and strategy. By IT management, we refer to those studies focusing on any aspect of organizational decision making, choice, or policy with respect to the effective management of information resources. This could include such topics as IT personnel, governance, and information ethics and privacy. Eight of the eleven studies reviewed examined the influence of national culture on IT management while the remaining three focused on organizational culture's influence on IT strategy.

At the national level, Kettinger et al. (1995) concluded that service quality (SERVQUAL) dimensions for the IS function vary between certain Asian and North American cultures. This finding is important since it suggests that Asian and North American IT organizations may have entirely different philosophies regarding the means by which they provide high quality services to their organizational stakeholders. In a Delphi study of 98 senior IT managers in Hong Kong, Burn et al. (1993) concluded that cultural values may influence the types of IS issues perceived to be most critical by IT managers. Thus, IT issues considered most critical by U.S. and other westernized managers (Luftman and McLean 2004) may be entirely different from those of much different cultures. Another study by Slaughter and Ang (1995) concluded that value differences between the United States (individualistic) and Singapore (collectivist) resulted in much different approaches to IS employment structures. Specifically, they found that firms with collectivist values emphasizing loyalty and community tended to hire more from within while those with individualistic values tended toward more externalized employment structures.

Four studies examined the interaction between national values and IT ethical and social issues. Three of these used Hofstede's cultural dimension to explain the influence of national culture on such information related behaviors as level of software piracy (Husted 2000), regulatory approaches to privacy (Milberg et al. 1995), and attitudes toward intellectual property rights (Shore et al. 2001). Husted's (2000) analysis of archival data from the Business Software Alliance concluded that software piracy is more prevalent in societies characterized as being individualistic. Interestingly, Shore et al. (2001) found that national values influence attitudes toward intellectual property rights. In particular, they found that students from countries rating high in individualism perceived more of an ethical problem with software piracy than students coming from countries low in individualism. This provides an interesting paradox; even though individuals in highly individualistic countries have a higher awareness of ethical problems with software piracy (Shore et al. 2001), the rate at which individuals from these societies engage in software piracy behaviors is actually higher than those from less individualistic cultures (Husted 2000).

In another Hofstede-type study, Milberg et al. (1995) found that countries rated higher in individualism tend to have less government involvement in privacy regulation. The one study not using Hofstede's dimensions (Einings and Lee 1997) found that Chinese students placed more emphasis on relationships (as opposed to regulations) in addressing ethical dilemmas. These four studies provide strong evidence that a group's perceptions and responses to situations involving information ethics may vary widely across national cultures. The implications for IT management (particularly in global multinational corporations) is that, depending on cultural values, managers may need to adopt much different approaches across nationalities to counter the effects of unethical behaviors.

The three organizational studies examined the relationship between values and IT strategies. Grover et al. (1998) found that the presence of planning cultures at the top levels of an organization helps to facilitate recognition of the importance of strategic systems investments. The study by Kanungo et al. (2001) used Wallach's (1983) taxonomy of culture to determine that innovative type cultures are most closely associated with firms having a delineable IT strategy. Finally, Tomlin (1991) concluded that organizations using IT strategically have developed strong internal information cultures. While there is a wealth of research on strategic IT planning and IT alignment, there is very little research devoted to examining the role of national or organizational culture in the process of IT planning, in achieving IT alignment, or in the result of IT planning (the actual IT strategy). Furthermore, our review has

yielded scant research examining the role of culture in such key IT governance<sup>6</sup> areas as IT architecture, IT infrastructure strategies, IT investment and prioritization, business application needs, and IT governance archetypes (Weill 2004). One interesting area, for example, could be to examine how cultural values (both national and organizational) influence firms' choices for either centralized, decentralized, or federalized models of governance.

Thus far, we have reviewed the literature that examines the relationship of national and organizational values to IT development, adoption, and diffusion, IT use and outcomes, and IT management and strategy. We now turn to studies that have considered the impact of IT on culture.

### **Theme 5: The Impact of IT on Culture**

As evidenced by our review to this point, the thrust of empirical IS culture research has focused on culture's impact on IT. Relatively few of the studies explicitly examined the potential impact of IT on culture. This has been true for studies examining cultural influences at both the national and organizational levels. For example, the IS studies reviewed at the national level were evenly split in their treatment of culture as either a moderating or independent variable, with no studies explicitly treating national culture as a dependent variable. Similarly, all but a handful of studies at the organizational level examined culture's impact on IT outcomes with little consideration of possible cultural transformation. Therefore, the overwhelming focus in both national and organizational culture IS research has been to treat culture as being stable, persistent, and difficult to change.

Despite this focus, there have been some exceptions. In one study examining the implementation of an IS planning system in rural India, Madon (1992) found some anecdotal evidence that structural contradictions initially encountered between technology and Indian culture led to emergent uses of technology and ultimately to cultural transformation. Over an initial 3 to 4 year period, a range of cultural factors inhibited the adoption of the CRISP rural planning system (cultural persistence). However, at the same time, structural contradictions initially encountered between technology and culture have led to emergent uses of the technology, which, over time, has led to some degree of cultural transformation. The cultural transformation observed included changes in indi-

viduals' perceptions of status, hierarchy, and leadership, redistribution of power between state and local districts, and increasing use of computerized information for rational (as opposed to politicized) decision-making. In a related study of GIS implementation in India, Walsham (2002) found that GIS systems were initially rejected in India because the Indian culture did not value maps. However, over the course of time, there was an increasing awareness in India of the importance and usefulness of maps and map-based systems. So while in Walsham's study, the GIS were deemed failures because of lack of use, there was reason to believe that, over a longer period of time, the culture would increasingly value the technology and subsequent adoption behaviors (i.e., reliance or lack of reliance upon maps in this case) would change. It is important to note that culture change was not observed during the course of the study, but that Walsham found evidence to suggest that the culture might change as the use of the system became an integral part of work practices.

We identified two studies at the organizational level that explicitly addressed the impact of IT on culture. The first study, by Doherty and Doig (2003), examined the influence of new ICTs on organizational culture. The authors found that improvements in a firm's data warehousing capabilities led to changes in customer service, flexibility, empowerment, and integration values. In the other study, Doherty and Perry (2001) examined the influence of a new workflow management system (WMS) on organizational culture. They found that implementation of the WMS strengthened organizational culture values related to customer orientation, flexibility, quality focus, and performance orientation. At the organizational subgroup level, we found two studies examining cultural transformation in project teams. In the first, Brannon and Salk (2000) studied a German-Japanese joint-venture project team, while in the second, Sahay and Krishna (2000) investigated the dynamics of Canadian and Indian software outsourcing groups. In both studies, the researchers found that as these culturally diverse project teams interacted over time, their interpretations of behaviors and outcomes led to a convergence of cultural values among team members.

We draw two implications from these results. The first is that IT has the potential for use in organizational culture re-engineering efforts. This may be particularly true with such large-scale IT projects as ERP systems that impose their own logic on organizational structures and business processes (Davenport 1998). Second, different types of technology artifacts may influence certain types of values. One useful stream of research could be to identify the types of information values most likely to be influenced by certain types of ICTs (e.g., collaboration tools, ERP systems, data warehouses).

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<sup>6</sup>IT governance is defined as "specifying the framework for decision rights and accountabilities to encourage desirable behavior in the use of IT" (Weill 2004, p. 3).

## Theme 6: IT Culture

To this point, our review has spanned a gamut of studies employing different conceptualizations of national and organizational culture values and the impacts of these values on IT-related outcomes. What has received the least amount of attention in the literature on IT and culture is the very notion of an IT culture. By IT culture, we mean the values attributed to IT by a group. An important finding from the literature discussed in several of the themes above has been the idea that information technology is not values neutral; rather, IT is inherently symbolic and values laden (Coombs et al. 1992; Feldman and March 1981; Gobbin 1998; Freeman 1974; Kaarst-Brown 2004; Kaarst-Brown and Robey 1999; Robey and Azevedo 1994; Robey and Boudreau 1999; Robey and Markus 1984; Scholz 1990). For example, Feldman and March (1981) contend that in bureaucratic organizations, information is highly symbolic, representing the values of competency and legitimacy. These particular values might be used to explain why some organizations conduct excessive information searches beyond what is necessary in order to reflect these values. Likewise, Scholz (1990) argues that firms' computerized information systems are highly symbolic, representing such values as equality versus subordination, progressivism versus conservatism, community versus isolation, sympathy versus antipathy, and emotionality vs. insensibility. These values are formed over time through an individual's use of technology and lead to standardized ways of organizational data collection and processing, communication, and information and knowledge distribution. Understanding these IT values may provide a much clearer picture for predicting how social groups perceive and ultimately respond to IT-based change. Others suggest that information technology is embedded with such values as rationality as well as order, system, and control. Robey and Markus (1984) argue that information systems development and user involvement activities represent organizational rituals symbolizing the underlying value of rationality that people attribute to IT.

In this work, as well as in the research referring to a "fit" between IT and culture, the underlying assumption is that organizational stakeholders attribute certain values to IT. We refer to these as IT values. There has been scant empirical work explicitly examining the subject of IT values. However, drawing from nonempirical sources, we have compiled a sample list of IT values (Table 4). As this table shows, each value ranges on a scale representing polar extremes of the same value dimension. The Value A column represents one extreme of a value; Value B, the opposite extreme of the same value.

Research on IT values is still at a nascent stage and much remains to be done in isolating and understanding IT-related values and the impact of these values on IT projects. As a

start, research is needed that seeks to operationalize IT values, to discover which values in fact are most appropriate to consider, as well as to discover how values might cluster together to form some higher order constructs of IT culture.

## IT Culture from an Assumptions Perspective

Whereas this previous work on IT culture has focused on values associated with information, Kaarst-Brown (1995) and Kaarst-Brown and Robey (1999) take the novel approach of deriving assumptions about IT. Although we have taken a values-based perspective of culture in this review, the findings of Kaarst-Brown's groundbreaking dissertation, as well as her later work with Robey, provides essential insights for future research.

Using grounded theory and ethnographic methods, Kaarst-Brown identified five IT cultural patterns: the fearful IT culture, the controlled IT culture, the revered IT culture, the demystified IT culture, and the integrated IT culture. These five cultural patterns are distinguishable across several assumptions, specifically assumptions concerning who should control the IT, how central the IT is to strategy, how much IT skills are valued at various levels within the organizational structure, how IT expenditures are to be justified, and who benefits (or loses) from IT. She also provides a model to explain how these cultural patterns emerge and their consequence. According to the model, contextual factors (societal, individual, and organizational) influence the enculturation processes (individual and group socialization, knowledge set acquisition, leaders, heroes and mythos) that influence the IT cultural assumptions, which then create certain outcomes (conflict over IT direction, innovation, integration of IT with business strategy). In turn, the outcomes influence contextual factors and enculturation processes and the IT cultural assumptions also influence the enculturation process, in a recursive and ongoing process over time.

## Summary of the Research to Date

Based upon the number and variety of articles dealing with some aspect of IT and culture, there appears to be strong interest in understanding the relationship of IT and culture and in determining how social groups interact with and apply IT in organizational settings. Figure 1 provides a graphic to illustrate the key themes of our analysis; the impact of culture on IT (Themes 1 through 4), impact of IT on culture (Theme 5), IT culture (Theme 6), and cultural fit. As shown in the figure, little attention has been given to the relationship of IT values to the larger cultural context (e.g., the organizational or national values) or to the relationship of IT values to the major IT themes.

Table 4. A Taxonomy of Information Values		
Value A	Value B	Citation
Equality	Subordination	Scholz (1990)
Progressivism	Conservatism	Scholz (1990)
Community	Isolation	Scholz (1990)
Sympathy	Antipathy	Scholz (1990)
Emotionality	Sensibility	Scholz (1990)
Optimism	Pessimism	Deeks (1993)
Freedom	Enslavement	Deeks (1993)
Superiority of culture	Inferiority of culture	Deeks (1993); Penley and Ross (1991)
Deterministic	Uncertainty	Deeks (1993)
Objective	Subjective	Deeks (1993)
Neutrality	Partiality	Penley and Ross (1991)
Progress	Retreat	Pacey (1983); Penley and Ross (1991)
Adventurous	Routine	Pacey (1983); Penley and Ross (1991)
Glamorous	Dull	Pacey (1983); Penley and Ross (1991)
Known	Unknown	Penley and Ross (1991)
Order	Chaos	Penley and Ross (1991); Scholz (1990)
Friend	Enemy	Penley and Ross (1991)
Mythical	Factual	Penley and Ross (1991)
Rationality	Subjectivity	Robey and Markus (1984), Penley and Ross (1991)
Virtuosity	Basic needs	Pacey (1983)
Aesthetic	Practical	Pacey (1983)

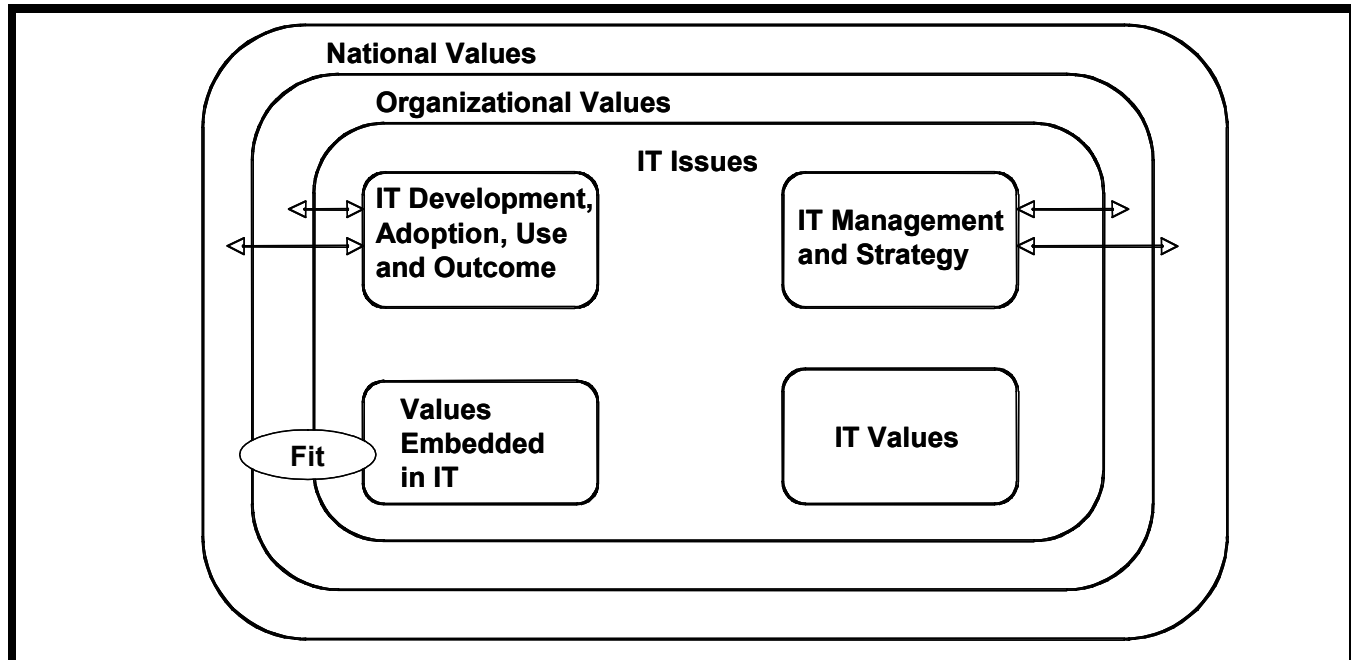


Figure 1. Summary of IT-Culture Research



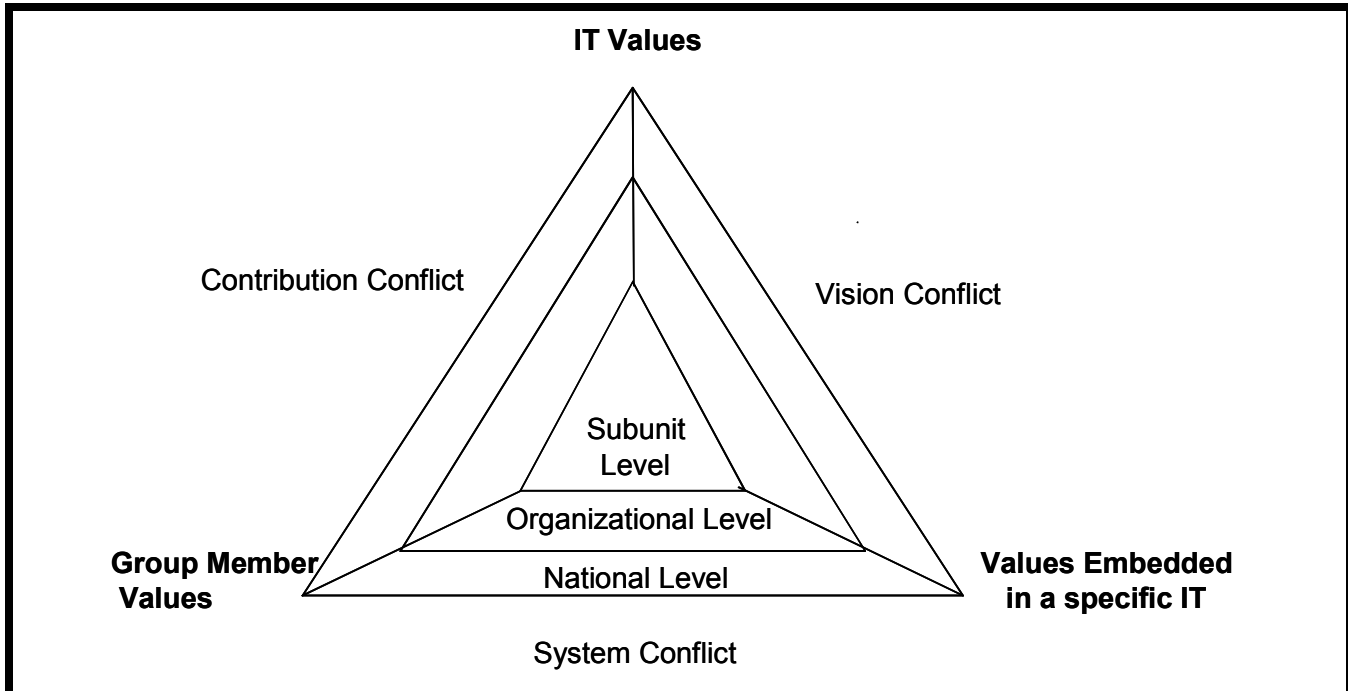
The studies reviewed provide a rich narrative of how different types of firm-wide and national values have an impact on information systems development, IT adoption and diffusion, IT use and outcomes, and IT management and strategy. In addition to these basic conclusions, we also summarize the following key points from our analysis:

- (1) To date, the IS literature has treated organizational and national culture-IS research as two separate streams of inquiry. Our values-based approach to analyzing the literature suggests that a more integrated approach to these two areas is warranted.
- (2) There does not seem to be any clear-cut methodological bias in the conduct of IS-culture research as evidenced by studies using survey, single and multisite case studies, ethnographics, content/archival analysis, and structural analysis in examining numerous IT phenomena.
- (3) IS-culture research is eclectic in nature as evidenced by the various IT topics examined in this body of research. However, there remain significant gaps in IS-culture research, particularly in the areas related to IT strategy, management, and governance (e.g., the structure and function of the IT organization within the larger organization; boundary spanning patterns of IT professionals; mechanisms/structures for IT project evaluation) and in the area of IT culture.
- (4) From our review, we found that fully two-thirds of the empirical studies and virtually all of the national culture studies conceptualized organizational culture from what Myerson and Martin (1987) refer to as the integration perspective: as being persistent, uniform, and consistent across the organization (or nation). Consequently, the focus has been to consider the impact of culture in a one-directional manner (as an independent or moderating variable) on certain IT-related outcomes without consideration for how IT might potentially play a role in transforming or reshaping culture (Coombs 1992; DeLisi 1990; Gobbin 1998; Scholz 1990; Weick 1990). Furthermore, the studies generally treat culture as being homogenous and do not specifically address the potential for competing values among organizational subgroups, conflict, and contradictory IT outcomes (Robey and Azevedo 1994). So, while cultural persistence is the predominant theme in IS-culture research, a handful of studies (Theme 5) have examined the intriguing question of how IT (IS development, adoption and diffusion, uses and outcomes, management, and strategy) might influence IT values, organizational values, and, over time, national values.
- (5) While the majority of the research looked for the direct implications of national or organizational culture on some aspect of IT, the notion of cultural fit has emerged as an important concept in the IS-culture literature. The concept of fit is that the level of congruence between a given group's general values and values embedded in a given system will determine how the social group perceives and ultimately uses the system. A lack of fit will lead to negative perceptions and behaviors regarding the system while closeness of fit will lead to more favorable responses. Although this idea of cultural fit has become popular, the existing fit literature has only considered specific IS applications and has not considered the more general IT culture. Little has been done to better elucidate the types of IT values that may exist and how they might influence IT use choices particularly when these values are in conflict with other sets of general organizational values.

Given these key points, we now seek to address some of the gaps. We believe that the IT-culture research stream is mature enough to merge the two separate streams (national and organizational) and look for consistencies across them. Likewise, the relationship among the three types of values discussed in the prior research (values of the user group, values embedded in systems, IT values) needs to be explored. We therefore devote the remainder of this paper to analyzing the relationship between national, organizational, and subunit values, specific values embedded in an IS, and IT values, and to considering the various forms of cultural conflict that might ensue as well as the result of such cultural conflicts.

### ***Toward a Theory of IT-Culture Conflict***

The culture literature described early in this paper (e.g., Hofstede 1980; Schein 1985a, 1985b; Trompenaars 1996) at both the national and organizational levels suggests that culture goes mostly unnoticed by groups until there is some cultural conflict. In other words, people are mostly unaware of their culture until they encounter a counterculture. Although it is understood that culture is a very subtle attribute of groups, little has been done to elucidate the forms of conflict that bring culture itself to the surface, or to consider the causes or implications of these conflicts. Drawing upon the IT-culture studies referenced in our review, we suggest that IT-culture research must consider several forms of conflict that result from the intersection of national, organizational, and subunit cultures, values embedded in specific IT, and IT culture, as depicted in Figure 2. To be consistent with our values based perspective of culture, we will refer to these henceforth as *values* rather than *culture*. The following para-



**Figure 2. A Tripartite View of IT-Culture Conflict**

graph describes the values, levels, and conflicts comprising Figure 2. We then build propositions concerning the causes and implications of each form of conflict, culminating in our notion of IT-culture conflict.

The three types of values are those that were reviewed in paper: the group member values represent the values held by members of a group that signify the espoused beliefs about what is important to the particular group (see “The Concept of Culture” section of this paper); the values embedded in a specific IT refer to values that are assumed in the work behaviors that the IT is designed to enable (references to values embedded in systems were found in themes 1 through 3); the general IT values refer to those values that a group ascribes in general to IT (theme 6 of the paper). The three forms of values and the conflicts that result exist at the national, organizational, and subunit levels as represented by the three layers of Figure 2. Given that culture is by definition *shared values*, the subunit level can signify a structural unit within an organization, an occupational unit, or an informal community. However, it must refer to a cohesive group of individuals that share values.

Three forms of conflict emerge from the interaction of the three values at any of the levels. The first of these, system conflict, describes conflict that emerges when the values implicit in a specific IT contradict the values held by the

group members using, or expected to use, the system. This form of conflict represents the notion of fit widely encountered in our review. However, we choose to examine this as a form of conflict since if indeed the values embedded in a system supported the using group’s values, then culture would remain imperceptible. It is only in the midst of conflict that the culture surfaces. We label this form of conflict *system conflict* because it is the conflict introduced by a specific system that brings the issue of culture to the surface. An example of system conflict would be a knowledge management system designed to foster communities in an organization that values individual billable hours. In this case, the values assumed in the particular KMS are collaborative whereas the values of the relevant group members (in this case, an organization) are individualistic. At the national level, an example would be an ERP system designed to foster more autonomy among operational levels in one subunit of an organization located in a low power distance country being transferred to a different subunit residing in a high power distance country. The system would be embedded with the values of the originating country, causing system conflict in the recipient subunit in a different country.

The second form of conflict—contribution conflict—is defined as the contradiction between group member values and the group’s IT values. We label this *contribution conflict* because at the heart of this conflict is the perceived relevance,

or irrelevance, of IT to complement the group's values. Kohli and Kettinger (2004) describe the case of a healthcare organization where the relevant user group (physicians) viewed IT in general as about cost control whereas they espoused to value first and foremost quality of care. Another example of contribution conflict might include IT being viewed as a tool for isolation in a relationship oriented group.

The third form of conflict—vision conflict—is the contradiction between values embedded in a system and a group's IT values. We refer to this as *vision conflict* because the using group must reconcile mixed signals concerning the values they associate with IT and the values they perceive to be embedded in a particular information system. The contradictory signals challenge their perception of IT. Examples of vision conflict include an ERP system embedded with values related to authority and control being implemented for a group that associates IT with autonomy, or an IT designed to promote efficiency (such that efficiency is the value embedded in the IT) for a group that perceives IT as a time-consuming burden.

Whereas much of the previous IT-culture research made assumptions about the direct influence of national, organizational, or subunit culture on the management, development, adoption, use, and outcomes of use of IT, we propose that, in the context of IT, it is equally important to look beyond the direct effects of culture *per se* and consider the ways in which these three cultural conflicts influence, and are influenced by, the management, development, adoption, use, and outcomes of IT.

### **Toward a Theory of IT-Culture Conflict**

To develop the theory, in addition to drawing upon the papers comprising our review, we also extrapolate from Bourdieu's (1979) work on values and preferences held by groups. While Figure 2 stems from our interpretation of the literature review, it is helpful to supplement our review in building the theory of IT-culture conflict, particularly in terms of the contribution and vision conflicts since these have not been explicitly addressed in prior research. Bourdieu's theory, introduced below, prior to the propositions dealing with contribution conflict, concerns values and value changes in groups and is therefore relevant to a theory built around the cultural values held by members of a group.

### **Causes and Implications of System Conflict**

As defined above, system conflict occurs when the values held by a user group are contradicted by the values assumed

in a specific IT. Our review discussed several studies that found such a conflict at either the national, organizational, or subunit level. Some of these studies dealt exclusively with system developers' values, as opposed to the values of those sponsoring or championing the development of the systems, and how these values conflicted with values embedded in particular system development methodologies (Dubé 1998; Dubé and Robey 1999). Similar to the ways in which a developer's national values might conflict with a given system development methodology, a user group's national or organizational values might well conflict with the values embedded in a given information system. Two studies from our review support this claim: Robey and Rodriguez-Diaz (1989) looked at the implementation of an accounting information system from a U.S. company to two subsidiaries in Panama and Chile and found greater success in the implementation in Panama because of a closer cultural fit with the U.S. headquarters. Likewise, Cabrera et al. (2001) found greater implementation success when values of organizational subunits fit with those embedded in the system, or when the system was modified to fit with the particular subunit values.

At a practical level, system conflict is likely to arise when an organization implements applications from the market without customizing the applications for its particular user groups. In such situations, the non-customized applications are embedded with values of a different group, coming from a different organization and often a different country. It has been suggested that one of the reasons for the high failure rate of ERP is that the standardized ERP packages were at odds with organizational practices and cultures yet to customize the applications often increases costs and results in project failures (Davenport 1998). It is unlikely that a group's values will ever be fully embedded in a given system; however, the degree of divergence between the user group's values and those values embedded in a system affect the degree of system conflict. We therefore suggest that system conflict will be greatest in situations where the cultural distance between the groups responsible for the development of the system (the champions) and the groups expected to use the system is large. We thus propose,

Proposition 1a: The greater the cultural distance between the group responsible for championing the IT and the group adopting the IT, the greater the system conflict experienced by the group adopting the IT.

Even if the champions of the system and the developers reside in the same organization and national environment, when a system spans subunit barriers or national cultural barriers, the potential for system conflict at the organization and national levels increases. Global systems initiated by a single unit and

later determined to be a desirable solution organization wide would introduce the greatest potential system conflict since little forethought was given during the planning and development to the potential ramifications of the system in other units and countries. Even if it is decided prior to development that an application is intended to be a global application, system conflict might emerge because of the sheer constraints involved in adequately representing all potential user group values. For example, Lehmann (2004) presents a case study of a global agricultural cooperative that attempted to develop a system for use in business units around the world. After developing and prototyping the system in the North America region, the cooperative had difficulty transferring the system to other regions, in part because the other regions did not believe that their needs could have been represented accurately in a system designed without their input, and yet the IT developers did not consider it feasible to try to involve representatives from all of the regions. This example helps illustrate the greater potential system conflict as multiple organizational subunits across countries are spanned in the implementation of a single system. We thus propose,

Proposition 1b: The greater the breadth of IT implementation across groups, the greater the system conflict experienced by the organization.

Where user groups have the choice of whether or not to adopt a system, one possible response to system conflict is that they will choose to not adopt. Two studies in our review— Hill et al. (1998) and Loch et al. (1998)—found that cultural factors in Arab countries impeded the adoption of Internet technologies. However, other work demonstrates that, in spite of the adoption impediments entailed when Western technologies with Western values conflict with some of the Arab values, the systems are nevertheless being adopted (Wheeler 1998). Similarly, several of the studies reviewed for this paper found that cultures uncomfortable with uncertainty were less likely to adopt a new system (Kitchel 1995; Thatcher et al. 2003); however, even while the uncertainty made adoption and experimentation less likely, adoption nevertheless occurred in many environments where the culture ran counter to the values embedded in the system. What seems to be of issue is not so much whether or not organizations around the world will adopt similar systems, but rather the timing of the adoption. Thus, while culture often precluded early adoption of a new system, environmental factors worked to eventually make adoption necessary (Madon 1992).

Research has found that organizations are fastest to respond to issues or crises in their environments when the values of the organization are aligned with the particular issue (Bansal 2003). Organizations will respond more slowly when there is

a difference in values. We suggest that when a specific system is seen to conflict with the values held by members of a group, that the group will resist adopting the new system as long as possible. If and when they do adopt the system, they will be among the technology laggards. This holds at the subunit, organization, and national levels. At the level of nations, organizations in countries where system conflict is minimal will more likely be forerunners and leaders in the adoption of new technologies whereas organizations in countries where system conflict is major will likely be late adopters. In summary, we propose,

Proposition 1c: The greater the system conflict experienced by a group, the less likely the group is to be a forerunner in the adoption of the system.

As enterprise-wide systems are implemented, system conflict is unavoidable. The various subunits spanned may not share values, and indeed, during major organizational transformations such as those introduced by IT, value differences among user groups are likely to arise (Wollin 1999). When systems are adopted in spite of the presence of system conflict, one outcome will be that members of the user group will alter their use of the system to support their values. The alteration may be intentional but is more likely to be a natural behavior based upon what is culturally acceptable to the user group. Our review highlighted several studies that suggested that groups will modify their use of a system to fit their values. Gamble and Gibson (1999) found that managers in Hong Kong tended to distort information in order to maintain harmony (valued in their national culture) and Carlsson et al. (1999) found that Mexican managers used EIS to support informational managerial roles where the Swedish managers used EIS to support rational managerial roles. Similarly, Chau et al. (2002) found that the use of the Internet varied between Hong Kong and the United States with the former favoring uses that supported social activities and the latter uses that supported personal efficiency. The implication is that user groups will use a specific IT in such a way as to reinforce, where possible, their existing values. We thus propose,

Proposition 1d: The greater the system conflict experienced by a group, the greater the modification of use to support the group's values.

### ***Causes and Implications of Contribution Conflict***

Contribution conflict describes instances when the values of members of a group conflict with the values the group

associates with IT in general (IT values). Because contribution conflict is the only form of conflict not involving the use of a specific IT, we suggest that it will have implications for IT management and strategy rather than for IT development, adoption, use, and outcome, all of which necessarily entail a specific system. The notion of contribution conflict has not been directly addressed in previous work, primarily because the research and theory of IT values has been underdeveloped. As such, we draw upon the work of Bourdieu in informing our understanding of the causes and implications of contribution conflict.

While Bourdieu's theory of distinction explains differential preferences and values across societal classes, it holds implications for understanding values and value changes across groups within an organization or across societies and nations. According to Bourdieu, classes are formed based upon the volume and structure of social, economic, and cultural capital such that there exists groups high in economic and social capital, but low in cultural capital (such as industrialists, or the *bourgeoisie*); groups that have low economic capital, high cultural capital and high social capital (such as professors); groups with low levels of economic and social capital, but high levels of cultural capital (such as artists); and groups with high levels of economic capital but low levels of cultural or social capital (such as children of post-industrialists). Within each of these major fields, as he labels them, exist distinct preferences and values. Those who have the largest volume of overall capital within a field determine the legitimacy of preferences and define the values of the field. Struggles exist both within and between fields. Within a field, struggles exist as individuals try to gain additional volumes of capital, and hence power. The struggle for the definition of legitimacy is part of the incessant struggle in which the different factions of the dominant class engage. Between fields, struggles for dominance occur as each group tries to maintain or change its position in the social structure. It is through these struggles that value changes occur and become legitimized.

In the case of contribution conflict, what we draw from Bourdieu is that IT might be perceived as an important source of capital in certain fields more than in others. We would expect IT to be perceived as an important source of capital when individuals perceive IT to be supportive of their values (e.g., when contribution conflict is low). Thus, if individuals highly value financial capital and IT is perceived as a means of obtaining financial capital, then individuals will experience low contribution conflict (their perception of IT is consistent with their dominant value). To the contrary, if individuals do not believe that IT is a means of obtaining valuable capital, then their contribution conflict would be high. Whether or

not IT is perceived as a legitimate source of capital in itself, or a legitimate means by which to obtain other important capital, is largely determined by the dominant actors in a field. In the organizational context, the dominant actors in the management field could be viewed as the senior managers such that only if IT is considered to be a strategic imperative by the senior managers, will the contribution conflict, at the organizational level, be low. At the level of nations, one can consider the predominant organizations in a country as the equivalent of the most powerful actors in a given field (in the context of the nation's business sector). To the extent that the predominant organizations in a nation embrace IT, smaller, local organizations might follow suit. Likewise, if the dominant actors in a group do not perceive IT as a source of capital, then their contribution conflict, and that of the larger group over which they exert influence, would be high. We thus propose,

Proposition 2a: The lower the contribution conflict experienced by the most powerful actors within a group, the lower the contribution conflict experienced by the group.

Because groups evolve and are influenced by other groups, it is important to consider the effects of high, or low, contribution conflict experienced in other groups on a given group. Bourdieu discusses trajectories that groups take from one field to another. Fields do not remain static; rather, actors in a field migrate across fields depending upon the degree of relevant capital that they are able to obtain. The particular trajectory taken depends to a large degree on the capital to which individuals in a group aspire. For example, if lower managers aspire to become senior managers, they will accept as legitimate the forms of capital promulgated by senior management and aspire to imitate senior management both in terms of values and behaviors. Thus, if senior management employs IT as a means of obtaining valued capital, in which case their contribution conflict is low, then lower level management is apt to do likewise.

However, not all groups within a firm or within a nation aspire to the same field. In a global firm, one can envisage situations in which the senior management of headquarters holds differing values, based upon national culture, from the senior managers of subsidiaries. Thus, if senior management at the headquarters has low contribution conflict, meaning that their IT values are congruent with their group values, then this will only influence the contribution conflict in the foreign subsidiary if the senior managers in the foreign subsidiary aspire to emulate the senior management of headquarters. At an even higher level, consider the way in which technology in general is often portrayed as inherently Western such that it

supports Western values (Hill et al. 1998; Loch et al. 1999). This portrayal would suggest that Western societies experience lower contribution conflict than Eastern societies, and that as long as Eastern societies desire to maintain their distinctiveness from the West, they will experience high contribution conflict. In summary, we propose,

Proposition 2b: The lower the contribution conflict in a group to which another group aspires, the lower the contribution conflict in the aspiring group.

A discussion of contribution conflict would not be complete without examining the divergence in IT values across user groups and IT groups. Bourdieu's theory is helpful in clarifying the relationship between a user group's IT values and the IT group's IT values. Whether or not IT is perceived as a positive organizational resource will partly depend upon whether the IT group is within the "field of power." If users are seen as occupying a separate field from IT management, then the users will have more sway in legitimizing the role of IT than will IT managers because the user group is responsible for converting IT into a valuable organizational resource through use. Bourdieu gives the example of engineers who, in a manufacturing organization, hold status in operating the technologies that are a key to organizational success, but are nevertheless subservient to those responsible for converting machinery into capital (the managers). Similarly, in the context of IT, if IT is a means of obtaining desired capital (for example, if social capital is desirable and IT is valued as enabling greater interorganizational connectedness) then IT takes on a strategic role within the group using the IT to obtain capital. Because user groups' (rather than the IT group's) values take precedence in an organization, if IT is not valued as representing progress and improvement by the user groups, then strategic uses of IT are very unlikely among the user group. This holds true at the subunit, organizational, and national levels. In the latter case, if a nation's value system conflicts with the shared IT values (on a national scale), then IT is less likely to be used strategically by organizations in that nation. In summary, we propose,

Proposition 2c: The greater the contribution conflict experienced by a group, the less strategic a role that IT will play in that group.

Contribution conflict also has implications for innovation with IT. According to Bourdieu, leaders in a field are continually looking for ways to maintain their power in the field. The moment a behavior or taste becomes common, they seek the next innovation, the next undiscovered travel haven, the next brilliant restaurant, to be among the first to use the device or

frequent the destination. In this way, they are able to continually reinforce their role in defining the legitimate tastes and values within their field. In the context of IT, this suggests that if the contribution conflict is low such that IT is valued as a means of obtaining capital in a group (e.g., is of strategic importance), then the group members will continually be seeking to adopt innovative uses of the IT in order to maintain their relative position of power in the group. In the context of nations, this would suggest that organizations in countries that in general value IT as supporting their values (e.g., low contribution conflict) will more likely be innovators with IT. Thus, we propose,

Proposition 2d: The greater the contribution conflict experienced by a group, the less likely the innovative uses of IT by the group.

### **Causes and Implications of Vision Conflict**

Vision conflict occurs when the values the members of a group have with respect to technology in general conflict with the values embedded within a specific technology. As with system conflict, it is important to recognize that the values embedded in a system are those of the system champions and may not represent the using group's values. Champions of a given system will have certain general values about IT and these general IT-related values will form the boundary of the system expectations. Thus, if the user group does not share the champion group's IT values, then vision conflict is a possible outcome. Even though vision conflict results from differences in IT values among champion and user groups, the conflict is expected to be greatest in cases where the user group does not aspire to champion group status. For example, if a firm's operational employees do not aspire to management positions, then a system embedded with managerial values will not be welcomed as a means to imitate management. Bourdieu discusses the differences in how capital is used across fields. He suggests that the members of the working-class field choose to purchase items that support their values and, even if given money to spend on anything of their choice, they would choose to purchase more of the same items that they always purchase rather than purchasing something valued in the other class. For example, if provided money to dine at any restaurant, they would still choose a restaurant that served their preferred foods (such as pork) as opposed to the restaurants frequented by the large industrialists that serve delicacies such as *foie gras* that are not valued by the working class. Indeed, to spend money at the latter would seem irrational. By way of comparison, if IT is valued differently across the champion and user groups, then the IT values held by the champion group will not be legitimate to

the user group and the user group would not choose to invest their time in using a system that was part of another group's value system but not their own. We therefore propose,

Proposition 3a: The greater the difference in the IT values between the champion group and the user group, the greater the vision conflict experienced by the user group.

The involvement of users in the design of systems can partially assuage subsequent vision conflict since the greater the extent to which it is a user group's values embedded in a system, rather than values from a different group, the less the vision conflict. At least one study in our review addressed the direct effect of culture on user involvement and found that involvement itself is culturally dependent (Ishman et al. 2001). Whereas involvement helped create greater user satisfaction with the resulting system in North America, it had no such impact in Latvia. Unfortunately, this was the only study that examined user involvement. We believe that user involvement is a central issue in vision conflict. Again drawing from Bourdieu, it is evident that involvement *per se* is insufficient in predicting vision conflict, because the legitimacy of IT values will be determined by the key actors in a given group. Hence, it is the involvement of these key actors, which may or may not be transparent, that needs to be addressed in order to maximize the benefits of user involvement in development. Determining the key actors in a given group is especially challenging in international settings. One explanation for the findings by Ishman et al. (2001) could be that the Latvian professional managers (the users) involved in the systems development effort were not key actors, and hence had no real power to influence the group's interpretation of the system. Because the most powerful in a group are responsible for determining the legitimacy of using a given system, if they do not willingly adapt it as a legitimate means of obtaining capital, then vision conflict will result. Thus, we suggest that

Proposition 3b: The lesser the involvement of the most powerful within a user group in development, the greater the vision conflict experienced by the user group.

Vision conflict has implications for adoption and for IT values. First, with respect to adoption, if a group perceives that a system they are considering adopting conflicts with their IT values (for example, they value IT as enabling flexible teamwork but a new collaborative team software does not run well over the Internet such that their vision conflict is high), then the group is likely to not adopt the system if given the option. We therefore propose,

Proposition 3c: The higher the vision conflict a group has with respect to a system, the lower the adoption rate of the system by the group.

However, sometimes systems will be adopted in spite of vision conflict. This might occur if the conflict is not perceived prior to adoption or it might occur because a group responds to competitive pressures and feels that it must adopt the system in order to remain competitive. In such cases, the use of the system will lead to experiences that will help to reshape the group's IT values. Loch et al. (2003) found that exposure and experience with systems developed in other cultures was important in influencing future use of other systems. The greater the exposure to systems developed outside one's own culture, the greater the subsequent adoption and use of systems from other cultures. This suggests that experience influences subsequent interpretations of new systems. Experiences with a system embedded with values than run contrary to a group's IT values will influence the group's IT values. This is consistent with Kaarst-Brown's (1995) finding that IT assumptions are highly malleable and subject to the influence of experience. We thus propose,

Proposition 3d: The greater the vision conflict experienced by a group, the greater the potential change to the group's IT values.

### **The Role of Managerial Intervention**

Understanding the potential conflicts involved in managing, developing, implementing, and using IT is important in understanding why IT does not lead to consistent outcomes within or across users, at almost any level of analysis. Also important, though, is to recognize that management can work proactively to shape IT values. Shaping IT values can help reduce vision and contribution conflict, which in turn can reduce system conflict. While there is little research that directly addresses the issue of managerial intervention to promote positive IT values, a few studies provide insights into the proactive shaping of IT values. A study by El Sawy (1985) examined how an academic research organization was able to diffuse IT innovations more effectively through actively working to break dysfunctional stereotypes surrounding computer use and forming positive user values regarding computer technology. Another study by Tomlin (1991) discussed the possibility of management intervention to proactively shape organizational culture to achieve closer alignment with the technology goals of the firm. Other examples of managers working to shape users values with regard to IT include Jarvenpaa and Leidner's (1998) study of an information services firm in Mexico working to pro-

actively shape their external culture to overcome resistance to an information services venture. This might be particularly important in the case of imported systems (e.g., systems that were originally designed and used in a different country). Along similar lines, Tomlin (1991) found that organizations using IT most successfully had developed strong internal information cultures and were highly committed to IT and embraced IT values. Those firms also exhibited a strong sense of leader-driven vision as to how to use IT strategically. Thus, we propose that

Proposition 4: Managers can reduce all forms of conflict by promoting shared IT values.

### **Conflict Resolution and Culture Change**

As mentioned earlier in the review, there is some evidence that structural contradictions initially encountered between technology and culture lead to emergent uses of technology and ultimately to cultural transformation (Madon 1992). Research demonstrates that IT has a role to play in facilitating organizational culture change, either intentionally or unintentionally (Doherty and Doig 2003; Doherty and Perry 2001; Walton 1989). IT is being seen to influence cultures in a variety of industries. For example, Coombs et al. (1992) give the example of a new set of values emerging in the healthcare profession as commonplace software applications promoting cost control and accountability begin to foster values associated with quality control and cost containment. Even at a national level, subtle changes in culture may occur gradually as the competitive environment demands that firms adopt successful innovations from abroad (Kitchell 1995). For example, faced with strong competition from Japan, North American firms have assumed some of the cultural norms of the Japanese, most notably reflected in the longer term goals associated with increased value placed upon research and development expenditures (Kitchell 1995).

We suggest that IT changes culture over time as the three types of IT-cultural conflicts described arise and are resolved. We have suggested that the outcomes experienced in using a specific IT that initially conflicted with the user group's IT values (high vision conflict situation) will work to reorient IT values (proposition 3d). As IT values become positive, groups are more likely to accept new IT, thereby reducing system conflict and contribution conflict.

We now take the case of a group with high contribution conflict. If a new system is introduced embedded with values that conflict with the user group values (high system conflict), then the result is that the group will be slow to adopt the

system (proposition 1c) and that the group will attempt to modify the system use such that it supports their values (proposition 1d). In modifying their use to support their values, the group reduces its system conflict. At the same time, the group experiences a system capable of supporting their values. This experience then helps reduce their contribution conflict as they generalize the experience with the individual system to IT in general. As contribution conflict is reduced, it becomes more likely that the group will subsequently use IT strategically and innovatively (propositions 2c and 2d). As IT is used strategically and innovatively to support group values, the IT values themselves become part of the user group values. It is in this very subtle way, then, that IT infuses culture. Change is more likely to begin with lower levels (e.g., organizational subunits) before progressing to higher levels such that changes at the national level to IT values and certainly to general group member values would be slow, gradual, and less drastic than changes at the lower levels (Wollin 1999). We thus propose,

Proposition 5: The emergence and resolution of the three types of conflict will, over time, result in cultural changes.

### **Research Challenges**

One of the greatest challenges in IS-culture research is in defining exactly what culture is and how one goes about measuring it (Dent and Green 1985; Pettigrew 1990; Smircich 1983). The deficiency in clear concepts and measures of culture may help explain why cultural research has been so difficult to conduct (Straub et al. 2002). Compounding this difficulty is the challenge facing IS researchers in deciding what particular level of culture one should study (Pettigrew 1990) with some even arguing that culture cannot be objectively analyzed at a single level (Martin and Siehl 1983). Thus, some believe that cultural research must consider the possible interaction of culture at one or more levels when investigating IS phenomena (Pettigrew 1990). In a similar vein, Straub et al. (2002) suggest a more realistic view of culture may be one that sees individuals as being simultaneously influenced by an array of cultural values at the national, ethnic, organizational, or even subculture levels. Thus, a Singaporean analyst working at an IBM branch in his home country could be simultaneously influenced by his own national values as well as the organizational values of IBM and those of his professional subculture (systems analyst) cohort.

These arguments suggest, for example, that a firm-level study of culture's influence on the use of an information system



should not only examine organizational culture but also its possible interactions with national or organizational sub-culture values and how these interactions potentially influence behaviors. Empirical support for such cultural interaction is found in Beck and Moore's (1985) study of executive board members in Canadian banks whose organizational values closely resembled the national values attributed to Canadian society as a whole. Other work, by Kaarst-Brown (2004) looking at IT cultures and Dubé and Robey's (1999) analysis of software development practices have yielded similar results: that culture, at any level, needs to be studied within the context of how particular outside cultural dynamics may be influencing the culture of the group under study.

Another challenge in IS-culture research is the assumption that all individuals within a given cultural unit will respond in a consistent fashion based on the group's cultural values. The potential problem with this view is it does not take into account the possibility for individual differences within the particular cultural unit that may lead to different behavioral outcomes. This notion of individual fit with culture suggests that IS-culture research may need to consider individual disposition as a factor when studying the impacts of culture on certain IT outcomes.

Added to these challenges are some unique methodological issues faced by researchers conducting IS-culture research at the national level. In addressing these issues, Karahanna et al. (2002) argue that to insure legitimate cross-cultural comparisons (equivalence), researchers must address three types of methodological biases inherent to cross-cultural IS research. The first, construct bias, occurs when a given concept is not viewed similarly across different cultures. Method bias occurs when subjects across cultures do not respond similarly to measurement scales due to factors related to demographics, administration of instrument, or language of interviewer. Finally, item bias occurs when respondents interpret questions differently due to poor translation or wording. Once such biases are addressed,<sup>7</sup> researchers can have a higher degree of certainty that differences observed across cultures are due to true differences in cultural values rather than invalid measurements.

## Conclusion

This paper set forth to review the literature on IT and culture. We encountered two separate streams of research, one at the

national level (e.g., cross-cultural studies) and one at the organizational level. In analyzing this literature, it is clear that the research questions being addressed within both streams were similar; only the values used as the means of representing culture varied. Themes 1 through 4 help illustrate that, regardless of level (organizational or national), values play a common role in determining patterns of IT development, adoption, use, and outcomes. Cultural values thus serve as a common basis for the study of culture's impacts regardless of the level of analysis. Furthermore, IT-culture research should consider the possibility of applying both organizational and national level values (Table 1) at different levels of analysis.

Second, the empirical IT-culture literature has been largely biased toward examining the one-way impact that cultural values have on IT outcomes (Themes 1 through 4). These four themes, which include the bulk of IT-culture research, tend to view culture as being relatively stable, difficult to change, and homogenous across organizational or national boundaries. While this line of research is fairly comprehensive, we have suggested minor gaps within the four themes. These minor gaps emerge as new IT and new managerial forms arise that present new opportunities to study the role of culture.

In contrast to Themes 1 through 4, only a handful of articles consider the impact that IT can have on culture (Theme 5) and even fewer consider the notion of an IT culture itself (Theme 6). Our analysis of the literature includes the intriguing notion of IT values, defined as general values people have about information technology. To date, the idea of IT values has been largely ignored in the empirical IS literature. And while the notion of cultural fit has emerged as an important concept in determining how individuals reconcile their own values with values pertaining to IT, it too has received scant theoretical attention. We thus provide a framework that explains the inherent conflicts among values that may accompany the introduction of IT. We argue that through the reconciliation of these conflicts, IT subtly exerts pressures on the values inherent in the conflict resulting in a reorientation of values. It is via this reorientation of values that IT, over time, influences culture.

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<sup>7</sup>See Karahanna et al. (2002) for specific detection and prevention strategies to overcome these biases.

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**About the Authors**

**Dorothy E. Leidner** is the Randall W. and Sandra Ferguson Professor of Information Systems at Baylor University. She has broad international experience, having previously served as associate professor at INSEAD and as visiting professor at ITESM in Monterrey, Mexico, at the University of Caen, France, and at the University of Mannheim, Germany. She has published in a variety of journals, including *MIS Quarterly*, *Information Systems Research*, and *Organization Science*. Dorothy is currently serving as coeditor-

in-chief of the journal *Data Base for Advances in Information Systems*. She also is serving as an senior editor for *MIS Quarterly* and *Journal of Strategic Information Systems*, associate editor for *Decision Sciences* and *Decision Support Systems*.

**Tim Kayworth** is an associate professor of Management Information Systems in the Hankamer School of Business at Baylor University. He has prior industry experience in information systems consulting and has also held positions as MIS director and operations manager for private sector firms. Tim's research interests center on the management of IT in organizations. Recent research projects have included such topics as leadership in global virtual teams, the impact of organizational culture on knowledge management practice, and the role of culture in information systems research. His work has been published in *European Management Journal*, *Journal of Management Information Systems*, *The Data Base for Advances in Information Systems*, and *Information Resources Management Journal*, as well as in such international conferences as the Americas Conference on Information Systems, the International Conference on Information Systems, and the Strategic Management Society.

# Appendix A

## Empirical Studies: National Culture Information Systems Literature

Citation	Methodology and Measure of National Culture	Independent Variables*	Dependent Variable Moderating Variable	Relevant Finding(s)
Information Systems Development				
Dagwell and Weber 1983	Survey of systems designers from U.S., UK, Australia, and Sweden • culture not measured	System designers' perceptions of users	Systems design approach  <i>National culture</i>	Study found that Australian and Swedish systems designers favor a Theory Y orientation (people oriented) in assessing user's needs whereas UK and U.S. designers favor a Theory X (process and efficiency oriented) approach in evaluating user needs.
Hunter and Beck (2000)	Field study interviews (using Repertory Grid Analysis) of 70 Canadian and 17 Singaporean respondents • Hofstede's Cultural Indices**	National culture (IC, PD, UA, MF)	Perceptions of excellent systems analysts	Differences found across cultures in how excellent systems analysts are perceived. Excellent analysts from Singapore (high collectivism, low UA) are perceived to follow a more technocratic, dominant approach to clients while Canadian analysts (high individualistic, moderate-low UA) follow a more participative approach.

\*National culture is treated as an independent variable (1) in quantitative studies, where either explicitly or implicitly national culture is treated, as an independent variable, or (2) in qualitative studies, where national culture is treated as a primary determinant or key influence variable of some specific outcome variable (e.g., IT adoption and diffusion). In all other situations, national culture has been classified as a moderating variable.

\*\*Hofstede's (1980) indices include the dimensions of power distance (PD), uncertainty avoidance (UA), individualism versus collectivism (IC), masculinity versus femininity (MF), time orientation (TO), and communication context (CC).



Citation	Methodology and Measure of National Culture	Independent Variables*	Dependent Variable Moderating Variable	Relevant Finding(s)
Keil, Tan, Wei, Saarinen, Tuunainen, and Wassenaar (2000)	Matching lab experiments in Finland, Singapore and Netherlands • Hofstede's Cultural Indices	Risk propensity, sunk cost, risk perception	Decision maker's willingness to continue a troubled IT project <i>National culture (UA)</i>	Cultures low in uncertainty avoidance (Singapore) exhibited greater tendencies to continue with troubled IT projects since their perceived risk was lower than with high uncertainty avoidance cultures.
Kumar, Bjørn-Andersen, and King (1990)	Field survey of 72 Danish and 132 Canadian systems designers • England's (1967) Personal Values Questionnaire	Designer's personal values (technical, economic, socio-political)	IS design choices	System designers' values vary across cultures. In the IS development process, Danish designers (socialistic culture) were found to be (1) more concerned with people issues, (2) less concerned about cost issues, and (3) less concerned about technical issues than their Canadian (capitalistic culture) counterparts.
Peterson and Kim (2003)	Survey of U.S., Japanese, and Korean IS developers • culture not explicitly measured	Level of user involvement and designer experience	Perceptions of IS risks and failures <i>National culture</i>	Lack of user involvement and a lack of experienced IS personnel were perceived as greater risk factors in Korea than both Japan and the United States.
Tan, Smith, and Keil (2003)	Matching lab experiment in Singapore and U.S. • Hofstede's cultural indices	Organizational climate, information asymmetry	Predisposition to report bad news <i>National culture (IC)</i>	Individualistic cultures amplify the impact of organizational climate on predisposition to report bad news (compared to collectivism) whereas collectivism strengthens the impact of information asymmetry on predisposition to report bad news (compared to individualism).
Walsham (2002)	Structurational analysis of two IS development projects • culture not specifically measured (KVI)	Structure (meaning, forms of power relations, sets of cultural norms)	Conflict and contradiction in software production and use	Analysis explains how structural differences (e.g., cultural norms) of systems developers led to conflict and contradiction among developers in the software development process. However, findings also suggest that, over time, the respective cultural values of developers were dynamically shaped through the software development process.
<b>Interorganizational Relationships</b>				
Matheson and Tarjan (2001)	Case study of U.S.-Japanese software venture • culture not explicitly measured	Effectiveness of information flow	Software Venture Success <i>National culture</i>	Study revealed that certain aspects of Japanese culture (hierarchical management, collectivism) led to information impacted-ness (restriction of flow of information between venturing group and governing stakeholders) that had a negative impact of software venture success.
Steensma, Marino, Weaver, and Dickson (2000)	Five country survey of SMEs • Hofstede's Cultural Indices	National Culture (UA, MF)	Propensity to form technical alliance between firms <i>National Culture (IC)</i>	The tendency for SMEs to form technology alliances with others is greatest in countries that rate high in uncertainty avoidance and high in femininity (e.g., Mexico). SMEs in countries with collectivist values (Indonesia, Mexico) are more likely to form technology alliances involving equity ties than SMEs in more individualistic countries (Australia).
<b>IT Adoption and Diffusion</b>				
DeVreede, Jones, and Mgaya (1998)	Grounded theory field study of 11 African GSS projects • culture not measured	Adoption factors: TMT endorsement, satisfaction with use, computer literacy, referent power, oral communication preference	Technology (GSS) acceptance	Study indicates GSS acceptance is rated positively or negatively based upon several dimensions of African culture: high preference for oral communication (negative), high referent power (negative), and high power distance (positive).

Citation	Methodology and Measure of National Culture	Independent Variables*	Dependent Variable <i>Moderating Variable</i>	Relevant Finding(s)
Galliers, Madon, and Rashid (1998)	Single site case study of government agency in Pakistan • culture not explicitly measured	National culture	Rate of technology adoption	Found that implementation efforts were thwarted by prevailing cultural values (e.g., low uncertainty avoidance, poor culture for information use for decision-making). Some anecdotal evidence that, over time, newly introduced ITC influences certain cultural values related to honesty and information use.
Garfield and Watson (1998)	Descriptive case study (content analysis) of government NII archives across 7 countries • Hofstede's cultural indices	National culture (UA, PD)	Structure of national information infrastructure (NII)	National culture plays a significant role in the development of a NII. Seven-country study suggests that countries will follow similar NII development models (family, village market, pyramid of people, or well-oiled machine ) based upon similar cultural values related to uncertainty avoidance and power distance.
Griffith (1998)	Laboratory experiment comparing U.S. and Bulgarian student GSS teams • Hofstede's culture indices	National culture (PD)	Satisfaction with GSS	Findings demonstrate that Bulgarian students (lower power distance) were more likely to report being dissatisfied with the GSS outcome than were the U.S. students (with higher power distance).
Hasan and Ditsa (1999)	Interpretive field study of 10 organizations in Middle East, Africa, and Australia • Hofstede's culture indices	National culture (UA, PD, IC, MF)	Technology transfer outcome	Study reveals that (1) IT is less readily adopted in risk-averse cultures (uncertainty avoidance) since technology is perceived as inherently risky, (2) successful adoption of IT is more likely where IT staff are able to give advice to IT managers (low power distance), (3) adoption of group-oriented IT (e.g., GSS) is more favorably disposed to collectivist vs. individualistic cultures, and (4) patterns of IT adoption may vary according to level of masculinity (technology focus) vs. femininity (focus on people and end-users) of culture
Hill, Loch, Straub and El-Sheshai (1998)	Multimethod study (focus groups, interviews, field research) using surveys and interviews • culture not explicitly measured	Cultural factors that impede or support transfer of IT to host country	Technology transfer success	IT transfer is hindered when certain aspects of culture embedded in information technology do not mesh with the prevailing Arab culture. Facets of Arab culture that strongly influenced IT transfer are preference for face-to-face interaction , allegiance to family and kin group, concept of time, religion, and gender relations.
Hussain (1998)	Qualitative field study of 5 Japanese-Brunei joint ventures • culture not explicitly measured	National culture (open vs. closed)	Technology transfer success	The extent of cultural openness (accommodation of each other's culture) has a strong positive influence on the degree to which the technology transfer is successful.
Jarvenpaa and Leidner (1998)	Single site case study (semi-structured interviews) of Mexican firm • Hofstede's culture indices	Resource-based competencies (information culture, information infrastructure)	Information services industry diffusion  <i>National culture (IC, UA)</i>	Mexican information services company succeeded despite presence of certain cultural barriers (e.g., high uncertainty avoidance and collectivism). Results show how managerial actions to shaped resource-based competencies led to shaping/recreating an information culture receptive to the information services industry. This transformation of culture led to greater levels of diffusion/acceptance of company's information services products.

Citation	Methodology and Measure of National Culture	Independent Variables*	Dependent Variable Moderating Variable	Relevant Finding(s)
Loch, Straub, and Kamel (2003)	Multimethod study (survey with follow-up interviews) of Arab respondents • social norms (self-developed Likert scale)	Technical culturalization, social norms	Level of Internet usage	The level of technical culturalization (the level of cultural exposure and experiences that individuals have with technology developed in other countries) and acceptability of computers (a social norm) positively influences the level of Internet usage in an Arabic country.
Png, Tan, and Wee (2001)	Multinational survey of 153 businesses in 23 countries • Hofstede's culture indices	Organizational size, national culture (UA, PD)	IT infrastructure adoption (frame relay)	Results show that (1) businesses from higher uncertainty avoidance countries were less likely to adopt information technology infrastructure (frame relay) and (2) power distance was not significantly correlated with adoption of frame relay technology.
Srite (2000)	Field study of foreign students from 33 countries • Hofstede's culture indices	Willingness to innovate, trust in technology, subjective norms	Technology Acceptance <i>National culture (UA, PD, IC, MF)</i>	Individuals from high power distance countries were found to be less innovative and less trusting of technology.
Straub (1994)	Multimethod study (field interviews, survey, policy capturing) comparing U.S. and Japanese respondents • Hofstede's cultural indices	Perceived usefulness, ease of use	Media use (e-mail and fax) <i>National culture (UA)</i>	Cultural differences between the U.S. and Japan account for differences in the diffusion rate of email technology. Japanese workers are less likely to adopt and use email since their high uncertainty avoidance culture prefers more information rich, socially present forms of communication.
Al-Ghatani (2003)	Survey of 1200 Saudi managers and govt. officials • culture not explicitly measured	Perceived attributes of technology	Rate of technology adoption <i>National culture</i>	Study validated use of Rogers' (1995) five perceived attributes of technology (relative advantage, complexity, trialability, compatibility, and observability) as predictors of technology adoption in a non-Western cultural context.
Shore and Venkatachalam (1999)	Case study • Hofstede's culture indices	Competitive environment, task congruency	IT transfer success <i>National culture (PD, UA)</i>	National culture has an influence on the success of information technologies transfer from host to recipient countries.
Straub, Keil, and Brenner (1997)	Survey of airline employees from U.S., Japan, and Switzerland • Hofstede's culture indices	Perceived usefulness, perceived ease of use	Information systems use <i>National culture (IC, UA, PD, MF)</i>	Results indicate that TAM holds for both U.S. and Switzerland, but not for Japan (high PD, high UA, collectivist, more assertive). This suggests that TAM may not be universally applicable across cultures.
Thatcher, Srite, Stepina and Liu (2003)	Survey of U.S. college students • Cultural indices by Hofstede	National culture (UA, IC, PD, MF), Qualitative and quantitative work overload (mediating)	Personal innovativeness with information technology (PIIT)	Results suggest that individuals high in uncertainty avoidance and power distance may be less willing to innovate or experiment with information technology
<b>IT Management and Strategy</b>				
Burn, Saxema, Ma, and Cheung (1993)	Delphi study of 98 senior IT managers in Hong Kong • Hofstede's cultural indices	National culture (UA, IC, PD, MF)	Perceptions of critical concerns for IT managers	Findings suggest that cultural values may influence the types of IS issues perceived to be most critical by IT managers.
Cougar (1986)	Comparative survey of Singaporean and U.S. analysts • culture not explicitly measured	Nationality (Singapore vs. U.S.)	Need for growth strength, job motivating potential score.	Similar patterns found among two nationalities for growth need strength. The job's motivating potential score was significantly lower for Singaporean analysts and programmers than for their U.S. counterparts.

Citation	Methodology and Measure of National Culture	Independent Variables*	Dependent Variable Moderating Variable	Relevant Finding(s)
Einings and Lee (1997)	Survey of Chinese and U.S. students • culture not explicitly measured	Attitudes toward ethical issues (privacy, access, property, and accuracy)	Assessment of IT-related ethical dilemmas  <i>National culture</i>	Significant differences found between Chinese and U.S. students in how they assess certain information-related ethical dilemmas pertaining to privacy, access, property, and accuracy. Example: Chinese students placed more emphasis on relationships (as opposed to rules and regulations) in addressing certain ethical dilemmas.
Husted (2000)	Archival data analysis from Business Software Alliance (BSA) • Hofstede's culture indices	National culture (IC, UA, PD, MF)	Level of software piracy	Results indicate that software piracy is less prevalent in more individualistic (as compared to collectivist) cultural settings.
Kettinger, Lee, and Lee (1995)	Survey of IS users from Korea, Hong Kong, U.S., and Netherlands • Hofstede's culture indices	National culture (IC, UA, PD, MF, TO)	Information service quality (SERVQUAL)	Study found that the service quality dimensions of the IS function differs across national cultures. Specifically, valid SERVQUAL dimensions for Hong Kong and Korean were significantly different than for the U.S. and the Netherlands.
Milberg, Burke, Smith, and Kallman (1995)	Survey of 900 IS audit and control respondents across 30 countries • Hofstede's cultural indices	National culture (UA, IC, PD)	Regulatory approaches to privacy, nature of privacy concerns	Found variance across nationalities of information privacy concerns. Study also identified significant differences in modes of government privacy regulation based upon cultural values. Countries exhibiting higher levels of UA and PD exhibited higher levels of government involvement in privacy regulation. Countries exhibiting higher levels of individualism exhibited lower levels of government privacy regulation.
Shore, Venkatachalam, Solorzano, Burn, Hassan, and Janczewski (2001)	Survey of students from New Zealand, Hong Kong, Pakistan, and U.S. • Hofstede's culture indices	Gender, usage, age, and experience	Attitudes toward intellectual property rights  <i>National culture (IC, UA, PD, MF)</i>	Findings suggest that cross-cultural values influence attitudes toward intellectual property rights. Students from high power distance countries perceived less of an ethical issue with softlifting (copying software for personal use). Students from high masculinity and individualistic cultures perceived more of an ethical problem with software piracy violations while those from high UA countries did not.
Slaughter and Ang (1995)	Longitudinal content analysis of IS job listings in Singapore and U.S. • Hofstede's Cultural Indices	National culture (IC, PD)	Information systems employment structures	Cultural values influence the choice of employment structures. Cultural norms (collectivist, loyalty, family orientation) in Singapore favor internal IS employment structures while U.S. culture (individualistic) favors more externalized IS employment structures.
<b>IT Use and Outcomes</b>				
Calhoun, Teng, and Cheon (2002)	Survey of Korean and U.S. professionals • Cultural indices by Hofstede (1980), Hofstede and Bond (1988), and Hall (1976)	Intensity of IT use	Decision making activity  <i>National culture</i>	High context culture respondents (Korea) experienced much higher levels of information overload from IT use on operational decisions as compared to respondents from a low context culture (U.S.).
Chau, Cole, Massey, Montoya-Weiss, and O'Keefe (2002)	Multimethod • Experimental study and follow up survey of Hong Kong and U.S. undergraduate students • culture not explicitly measured	Purpose of internet use (social communication, hobby, e-commerce, information search)	Consumer attitudes toward web sites  <i>National culture</i>	Differences between Hong Kong (characterized by respect for relationships and shared loyalty) and U.S. (characterized by focus on personal competence and loyalty to oneself) subject's use of the Internet (Hong Kong—social communication; U.S.—information search) results in differing attitudes toward web sites. Results suggest that web developers must tailor interface to be culturally relevant.

Citation	Methodology and Measure of National Culture	Independent Variables*	Dependent Variable Moderating Variable	Relevant Finding(s)
Choe (2004)	Survey of Korean and Australian firms • Hofstede's culture indices	Use of Advanced Manufacturing Technology (AMT), type of information	Production performance <i>National culture (IC, UA, PD, MF, CD)</i>	Under a high level of AMT, the positive effects of AMT and information (nonfinancial performance and advanced cost-control information) on the improvement of production performance is greater in Korean than in Australian firms.
Chow, Deng, and Ho (2000)	Multimethod (interviews and surveys) study collecting data from U.S. and Chinese managers • Hofstede's cultural indices and Chinese Cultural Connection (Bond 1987)	Nature of knowledge recipients relationship with knowledge sharer	Employee's propensity to share knowledge with coworkers <i>National culture (collectivism, CD, concern with face)</i>	Chinese professionals are much less willing to share knowledge with out-group members (e.g., those not part of immediate social group) than U.S. counterparts. With knowledge sharing that involves a trade-off between self and collective interests, Chinese respondents are more likely to share knowledge since this is consistent with their collectivistic value system.
Chung and Adams (1997)	Comparative survey of U.S. and Korean business firms • Hofstede's cultural Indices	Group decision-making characteristics	Group decision-making process and outcomes (success) <i>National Culture (IC, PD, UA, MF)</i>	Comparison of respondents from significantly different national cultures (Korea and U.S.) resulted in no significant differences in group decision making behaviors attributable to Hofstede's four dimensions of culture.
Downing, Gallagher, and Segars (2003)	Interpretive field study of Japanese and U.S. organizations • Hofstede's culture indices	National culture (IC, UA, PD, MF)	Choice of IT for employee empowerment	Japanese companies (high uncertainty avoidance and collectivist) tend to select more information rich, socially present forms of media (face-to-face, fax, and phone) to facilitate empowerment whereas U.S. companies (low uncertainty avoidance and individualistic) tend to select more lean (efficient) forms of electronic media (e-mail, groupware, intranets) to facilitate empowerment.
Gamble and Gibson (1999)	Qualitative study of 18 Hong Kong hotel managers and respective financial controllers • Culture measured through discourse analysis	Executive values (Confucian vs. Protestant values)	Transmission of financial information	Chinese controllers tended to distort (e.g., cover up or hide bad performance numbers) information in order to maintain harmony in relationships and loyalty to their managers. Implication: cultural values may influence the "objective outputs" of information systems.
Ishman, Pegels, and Sanders (2001)	Comparative survey of North American and Latvian professional managers • culture not explicitly measured	User involvement, user participation, perceived equity	User information satisfaction (UIS) <i>National culture</i>	User involvement and participation have a positive impact on UIS for North American respondents only. Perceived equity is positively associated with UIS for both North American and Latvian respondents.
Johns, Smith, and Strand (2003)	Survey of 78 MNCs • Hofstede's culture indices	National culture (IC, UA)	Patterns of IT utilization	MNCs with lower uncertainty avoidance cultures are more likely to embrace new technologies and to encounter fewer impediments to international data flow.
Kambayashi and Scarbrough (2001)	Survey of managers from 1400 firms in the UK and Japan • culture not explicitly measured	Cultural dimension of IT use (control vs. individual oriented IT use)	Managerial preference for IT use	Japanese managers exhibit a greater preference for hierarchical use of IT (e.g., IT used for purposes of control) while British managers use IT more for the purposes of individual support (individualistic use).
Leidner et al. (1999)	Survey of Swedish and Mexican senior managers • Hofstede's cultural indices	Executive information (EIS) system use	Senior management perceptions of EIS use outcomes <i>National culture (IC, UA, PD, MF, TO, CC)</i>	Survey found significant differences (as predicted by national cultural factors) in the impact of EIS use on senior management perceptions of EIS use outcomes. For example, Mexican managers perceived faster decision-making speed with EIS use whereas Swedish managers did not. Overall, these findings suggest that EIS may be best suited in countries with low to moderate uncertainty avoidance and power distance values.

Citation	Methodology and Measure of National Culture	Independent Variables*	Dependent Variable Moderating Variable	Relevant Finding(s)
Mejias, Shepherd, Vogel, and Lazaneo (1996/97)	Matching labs experiments of U.S. and Mexican student-based GSS teams • Hofstede's Cultural Indices	National culture (IC, UA, PD), supporting technology (GSS vs. non-GSS), identification features	Group consensus, satisfaction, and participation equity	In GSS supported environments, Mexican teams (low individualism, high power distance) experienced higher levels of group consensus, satisfaction and participation equity than their U.S. counterparts with main effects due to national culture and experimental treatment.
Quaddus and Tung (2002)	Matching labs experiments of Australian and Singaporean student decision groups • Hofstede's Cultural Indices	GDSS use (manual vs. decision conferencing tools)	Level of group conflict, conflict management strategy  <i>Culture (IC, UA, PD, MF)</i>	Australian groups rated high in masculinity and individualism tended to generate more conflict than their Singaporean counterparts who rated high in collectivism and lower in masculinity. Australian groups also tended to generate more issue-based conflict and to rely less on conflict resolution strategies than the Singaporean groups.
Rose, Evaristo, and Straub (2003)	Matching lab experiment • Hall's indices of polychronic vs. monochronic cultures	Web-site download delay	Attitude toward (web-site) download delays  <i>National culture (poly vs. mono)</i>	Subjects from polychronic cultures (Egypt and Peru) were significantly less concerned with website download delays than subjects in monochronic (U.S. and Finland) cultures.
Tan, Wei, Watson, and Walczuch (1998)	Matching lab experiment of Singaporean and U.S. student decision groups • Hofstede's Cultural Indices	National culture (PD, IC), task type, communication medium (supported vs. unsupported)	Group status influence	(1) CMC is useful for reducing the harmful effects of group status influence irrespective of national culture. (2) CMC may be more helpful in reducing negative status influence affects in high power distance, collectivist cultures (Singapore) as opposed to lower power distance, individualistic cultures (U.S.).
Tan, Wei, Watson, Clapper, and McLean (1999)	Matching lab experiment of Singaporean and U.S. student decision groups • Hofstede's Cultural Indices	Communication medium (unsupported, face-to-face CMC, dispersed CMC)	Majority influence (group think)  <i>Culture (IC), task type</i>	The impact of CMC on majority influence is moderated by national culture. In the individualistic culture (U.S.), majority influence was stronger in the unsupported setting than in CMC settings. There were no corresponding differences in the collectivist culture (Singapore).
Watson, Ho, and Raman (1994)	Matching labs experiments of U.S. and Singaporean student decision groups • Hofstede's Cultural Indices	National culture (UA, PD), type of decision support, level of pre-meeting consensus (control)	Post meeting consensus, equality of influence	Cultural differences between Singapore and the U.S. contributed to differences in post-meeting consensus and equality of influence. (1) U.S. groups using GSS experienced greater degree of change in consensus than their Singaporean counterparts. (2) In Singaporean groups, a GSS led to unequal influence in groups with a high level of agreement before the meeting.
Yoo and Torrey	Field study (single site) • Interviews with Korean and U.S. consultants • Hofstede's cultural indices	National culture (IC, UA, PD, MF, TO)	KM behaviors: creating, seeking, sharing, and knowledge preservation	Study found significant differences (as predicted by national culture) in the manner that Korean and U.S. consultants create, seek, share, and preserve knowledge in their respective organizational settings. For example, Korean consultants rely more on existing social networks to seek out knowledge whereas their U.S. counterparts are more likely to engage in external searches for knowledge and information.

# Appendix B

## Empirical Studies: Organizational Culture Information Systems Literature

Citation	Methodology and Measure of Organizational Culture (OC)	Independent Variable(s)	Dependent Variable Moderating Variable	Relevant Finding(s)
Information Systems Development				
Dubé and Robey (1999)	Interpretive case (single site) study drawn from interviews with 38 developers • Integration, differentiation, fragmentation (Martin 1992)	Alignment of developer's values with values embedded in new software development practices (SDP)	Software development process improvement	Implementation of new SDP may evoke a wide variety of cultural interpretations from organizational participants. The success of new SDP will be influenced by the degree to which these cultural interpretations fit with prevailing notions of organizational and sub-culture values. These results suggest that managers should anticipate conflict among various sub-groups in new SDP implementations and seek to understand the consequences of cultural ambiguity.
Dubé (1998)	Single site case study of 38 interviews with systems developers at commercial software development firm • not explicitly measured	Introduction of new software development method (concurrent approach)	Software development process improvement <i>Organizational culture and history</i>	A good fit between the values embedded in the software development process and the overall organization's values will lead to a more successful (and easier to implement) software development solution.
Ngwenyama and Nielsen (2003)	Content analysis of longitudinal data (archival) from three SEI software process improvement initiatives (SPI) • Competing Values Framework (CVF) (Quinn and McGrath 1985)	Degree of cultural "contradiction" embedded in SPI methodology	Software Process Improvement Initiative (SPI) Success	Results suggest that contradictory sets of cultural assumptions "embedded in a particular SPI initiative (e.g., SW-CMM) may lead to implementation problems. Implication is that cultural assumptions embedded within SPI methodologies should be culturally consistent.
IT Adoption and Diffusion				
Cabrera, Cabrera, and Barajas (2001)	Single site case study of Turkish bank • Hofstede et al.'s (1990) six dimensions of work values	Organizational culture, structure, technology	Technology assimilation	Successful technology innovations require that either the technology be designed to fit the organizational culture or structure or that culture and structure be designed to fit the behavioral requirements of the technology.
El Sawy (1985)	Longitudinal study in an academic research organization • culture not specifically measured	Organizational sub-culture	IT diffusion effectiveness	Study shows how organization was able to more effectively diffuse IT innovations throughout the firm through proactively creating an organizational subculture with values that foster the diffusion of IT innovations. Values include continuous learning, role clarification of individuals and computers, and values which break dysfunctional stereotypes of computer users.
Hoffman and Klepper (2000)	Three case studies of client-server projects • Sociability and solidarity (Goffee and Jones 1996)	Organizational culture type (networked, communal, fragmented, mercenary)	Information technology assimilation	Findings suggest a link between OC type and success with new technology assimilation. Specifically, mercenary cultures (low sociability and high solidarity) were found to be more supportive of new technology assimilation than were more networked organizational cultures (high sociability and low solidarity).

Citation	Methodology and Measure of Organizational Culture (OC)	Independent Variable(s)	Dependent Variable Moderating Variable	Relevant Finding(s)
Huang, Newell, Galliers, and Pan (2003)	Exploratory case analysis (interviews, observation, documentation) of bank MNC • Differentiation perspective of organizational sub-culture (Martin 1992)	Organizational sub-culture inconsistencies	Adoption of component-based development (CBD)	Clashing values among organizational sub-cultures hindered information sharing and collaboration needed to effectively implement an integrative technology like CBD. These findings point to the potential contradictory consequences of IT implementations due to competing sets of cultural values among organizational stakeholder groups.
Kitchell (1995)	Multimethod (surveys and interviews) of 110 firms • Self-developed measures of OC	Organizational culture (flexibility, open communication, risk-taking, long-term orientation)	Propensity to adopt advanced manufacturing technologies	Organizational cultures characterized as being flexible/open and having a long-term orientation evidenced a greater propensity to adopt advanced manufacturing technologies.
Madon (1992)	Longitudinal case study of IS for rural development project in India implementation • culture not explicitly measured	Organizational culture (bureaucracy, hierarchy, political decision-making, paternal leadership, secrecy of information)	Adoption of rural planning (CRISP) IS	Over 3-4 year period, a range of cultural factors inhibited the adoption of the CRISP rural planning system (cultural persistence). However, at the same time, structural contradictions initially encountered between technology and culture have led to emergent uses of the technology, which over time, has led to some degree of cultural transformation. Study provides some support for idea that adoption of IT, over time, may transform culture.
Ruppel and Harrington (2001)	Survey of U.S. information systems managers • CVF (Quinn and Rohrbaugh 1981)	Organizational culture (developmental, rational, hierarchical, group, ethical)	Intranet implementation (level of adoption)	Intranet implementation is facilitated by a culture that emphasizes organizational values related to trust and concern for others (ethical culture) and flexibility and innovation (developmental culture).
Von Meier (1999)	Case study interviews (71) across 6 utility companies • Differentiation perspective of organizational sub-culture (Martin 1992)	Organizational sub-cultures (operator vs. engineer)	Level of conflict in evaluations of process innovations	Case studies reveal that two different organizational subgroups (operators and engineers) have differing cultural interpretations of proposed technologies. Variance in these sub-group's value orientations leads to intra-organizational conflict and resistance to some technology innovations.
IT Culture				
Kaarst-Brown and Robey (1999) based upon Kaarst-Brown (1995)	Ethnographic study of 2 large insurance companies • Culture not explicitly measured	Underlying assumptions about IT	IT management and use	Ethnographic analysis reveals five basic assumptions about IT in organizations that will influence how IT is both managed and used. Using magic as a metaphor, the five cultural archetypes of IT culture are: revered, controlled, demystified, integrated, and fearful IT cultures.
Kaarst-Brown (1995)	Ethnographic study of 2 large insurance companies • culture not explicitly measured	Underlying assumptions about IT	IT management and use	Ethnographic analysis reveals five basic assumptions about IT in organizations that will influence how IT is both managed and used. Using magic as a metaphor, the five cultural archetypes of IT culture are: revered, controlled, demystified, integrated, and fearful IT cultures.
IT Management and Strategy				
Grover, Teng, and Fiedler (1998)	Survey of 313 senior IT executive's investment priorities • Culture not explicitly measured	Technology diversity, IS versus user influence, policy committee, integration with TMT agenda	Prioritization of IT investments	Findings demonstrate that a planning organizational culture at the top of the organization facilitates recognition of the importance of strategic systems investments.
Kanungo, Sadavarti, and Srinivas (2001)	Nationwide survey of 72 public sector units in India • Wallach (1983)	Organizational culture (innovative bureaucratic, and supportive)	Type of IT strategy	Drawing from Wallach's (1983) three classifications of culture, innovative type cultures are found to be most closely associated with firms having a delineable IT strategy.



Citation	Methodology and Measure of Organizational Culture (OC)	Independent Variable(s)	Dependent Variable Moderating Variable	Relevant Finding(s)
Tomlin (1991)	Responses from 800 IT executives • Culture not explicitly measured	Organizational culture	Competitive use of IT	Organizations using IT most successfully have developed strong internal information cultures that are strongly committed to IT and embrace its value. These cultures typically exhibit a strong sense of leader-driven vision as to how IT will be strategically used in the organization.
IT Use and Outcomes				
Baltahazard and Cooke (2003)	Survey of over 60,000 organizational culture inventory respondents • Organizational Culture Inventory	Organizational culture (constructive, passive/defensive, aggressive/defensive)	Individual and organizational outcomes promoting KM success	Findings show that different types of organizational cultures (e.g., constructive, passive/defensive, aggressive/defensive) lead to differential individual and organizational outcomes that may either hinder or facilitate knowledge management success outcomes.
DeLong and Fahey (2000)	Multisite case (50) analysis of chief knowledge officers • Culture not explicitly measured	Organizational culture (knowledge-related values)	Knowledge-related behaviors (creating, sharing, using)	Organizational knowledge-related values shape subsequent knowledge related behaviors. Example: values embracing organizational ownership of knowledge facilitate knowledge sharing while those that embrace individual ownership of knowledge don't. Also, differing values among subcultures about the importance of knowledge may lead to conflicting strategies in knowledge management practice.
Gold, Malhotra, and Segars (2001)	Survey of 323 senior executives • Trust and openness (von Krogh 1998)	Organizational culture, structure, technology	Knowledge infrastructure capability	Findings show that supportive, encouraging organizational cultures are a key component (along with technology and structure) that determines a firm's KM infrastructure capability (absorptive capacity) and subsequent effectiveness at KM practice. Culture is important since it determines the social setting through which knowledge is transmitted.
Harper and Utey (2001)	Surveys and interviews of IT personnel in 18 companies • Organizational Cultural Profile (OCP) by O'Reilly et al. 1991.	Organizational culture (productivity versus people orientation)	IT implementation success	Results show that people-oriented cultures (characterized by autonomy, trust, team-oriented work, flexibility, and free-flow of information) were more positively correlated to IT implementation success than were production-oriented cultures (characterized by rules, compliance, carefulness, preciseness, and predictability).
Jarvenpaa and Staples (2001)	Survey of university employees • Solidarity vs. sociability (Goffee and Jones 1996); employee vs. job orientation, democratic vs. autocratic (Hofstede et al. 1990)	Self ownership, propensity to share, organizational culture, information culture, task interdependence, demographics	Perception of organizational ownership of information	Organizational cultures rated high on solidarity (tendency to pursue shared objectives) and need for achievement will have a greater perception of organizational ownership of information and knowledge produced by its individuals. This perception will lead to great levels of knowledge sharing.
Kangungo (1998)	Field survey of 173 users across 8 organizations • Organizational Culture Inventory survey instrument (Cooke and Lafferty 1983).	Degree of computer network use	Satisfaction with network use  <i>Organizational culture (task vs. person oriented)</i>	Computer network use was found to have a stronger positive impact on user satisfaction with network use in more task-oriented (as opposed to people-oriented) organizational cultures.
McDermott and Stock (1999)	Survey of 97 manufacturing firms • Competing Values Framework (Quinn and Spreitzer 1991)	Organizational culture (developmental, group, hierarchical, rational)	AMT Outcomes (satisfaction, competitive success)	Study found that (1) Group-oriented organizational cultures (high flexibility and internally focused) are positively related to managerial satisfaction with advanced manufacturing technology implementation (AMT) and (2) Rational-oriented cultures (low flexibility and external orientation) were positively related to competitive success in AMT implementation.

Citation	Methodology and Measure of Organizational Culture (OC)	Independent Variable(s)	Dependent Variable Moderating Variable	Relevant Finding(s)
Robbins (2000)	Exploratory study (interviews) of respondents of 2 subunits within each of 7 school districts • Culture not specifically measured	Level of cultural integration between information services and instructional technology	Technology performance in school districts	When integration (e.g., similarity in cultural values) among two subcultures is higher, this relates to higher levels of technology performance in school districts. Study results suggest that more favorable technology outcomes may be derived through effectively managing conflicting value systems of those groups using the technology.
Robey and Rodriguez-Diaz (1989)	Single site case study of MNC • Not explicitly measured	Organizational culture differences, technology characteristics	Effectiveness of technology transfer	Implementation of accounting information system at Chilean subsidiary experienced significant difficulty due to significant differences in organizational cultures of the host (U.S.) and adopting units. In contrast, close cultural fit between the U.S. and Panamanian subsidiary resulted in fewer implementation difficulties.
Tolsby (1998)	Case study of Norwegian Army IS implementation • Culture not explicitly measured	Organizational culture	IT implementation success	Findings indicate that norms and practices of military organization fostered a culture where participants failed to take ownership of IT projects, thereby hindering efforts to introduce IT.
YiHua, Pearson, and Crosby (2003)	Survey of 352 knowledge workers across 20 companies • Organizational Culture Scale by Glaser and Zamanou (1987)	Organizational culture	Computer self-efficacy	Research shows that an organizational culture characterized by a spirit of teamwork is positively related to computer self-efficacy. Thus, firms seeking to increase computer self-efficacy of its employees should seek to build a more collaborative and team-oriented culture.
IT Impact on Culture				
Doherty and Doig (2003)	Interpretive study of multiple case sites (8) of companies implementing data warehouse application • Competing Values Framework	Availability and quality of organizational information	Organizational culture	Content analysis results suggest that improvements in the quality and availability of information (as engendered by newly implemented data warehousing capabilities) led to changes in the customer service (Hofstede 1998), flexibility (Cooper 1994), and empowerment and integration (Pliskin et al. 1993) values of the firm. Findings support notion that information technology can effect cultural transformation over time.
Doherty and Perry (2001)	Semi-structured interviews from multiple case site • Dimensions of OC taken from Pliskin et al. (1993) and Willmot (1993)	Workflow IS implementation	Organizational culture	Found that implementation of a workflow management system in financial services sector strengthened organizational culture values related to customer orientation, flexibility, quality focus, and performance orientation. Results suggest that IT has the potential for use in organizational cultural reengineering efforts.
Organizational Impacts of IT				
Hult, Ketchen, and Nichols (2002)	Survey of internal supply chain customers, buyers and suppliers for single firm • Competing Values Framework (Quinn and Kimberly 1984)	Cultural competitiveness (entrepreneurship, innovativeness, and learning)	Supply chain success (order fulfillment cycle time)	Results indicate that similar values and beliefs (cultural competitiveness) among supply chain members (values embracing entrepreneurship, innovation, and learning) experience greater levels of supply chain success as measured by order fulfillment cycle time.
Weber and Pliskin (1996)	Multi-industry survey of companies engaged in merger and acquisitions • Cultural difference instrument by Chatterjee et al. 1992	Information systems, integration in mergers and acquisitions	Merger effectiveness <i>Organization culture</i>	The positive impact of IS integration (in IT-intensive industries) on merger effectiveness outcomes is dampened by high levels of organizational culture differences among the respective top management team participants.

# Appendix C

## The Distribution of Papers Across Journals

Journal Name	# Articles from Sample
Academy of Management Executive	1
Academy of Management Journal	2
Accounting Forum	1
Accounting, Management, and Information Technologies	1
Behavior and Information Technology	1
Communications of the ACM	7
Computers in Human Behavior	1
Decision Sciences	2
Engineering Management Journal	1
European Journal of Information Systems	1
IEEE Transactions on Engineering Management	8
IEEE Transactions on Professional Communication	1
Information and Management	4
Information Resources Management Journal	1
Information Systems Management	1
Information Systems Research	3
Information Technology for Development	2
Information, Technology, and People	3
Interacting with Computers	1
International Journal of Information Management	1
International Journal of Social Economics	1
Journal of Business Ethics	1
Journal of Computer Information Systems	1
Journal of Global Information Management <sup>1</sup>	6
Journal of Information Systems	1
Journal of Information Technology	2
Journal of Management Accounting Research	1
Journal of Management Information Systems	6
Journal of Management Studies	1
Journal of Operations Management	1
Journal of Research on Computing in Education <sup>8</sup>	1
Journal of Strategic Information Systems	5
Journal of the Academy of Marketing Science	1
Management Science	1
MIS Quarterly	4
Technology in Society	1
The Services Industries Journal	1
The Strategic Management of Intellectual Capital and Organizational Knowledge	1
TOTAL	79

<sup>8</sup>Given that this journal is dedicated entirely to publishing IT studies involving multiple countries (e.g., global), it should not surprise the reader that many of the studies had some mention of national culture. However, only those studies that had culture as a central focus and that were going well beyond existing knowledge (rather than replicating known findings in a different cultural context) were included in the study

