Information technology and culture: Identifying fragmentary and holistic perspectives of culture

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Abstract

In this paper, we review the literature on information technology (IT) and culture. The construct of “culture” has alternately been defined and studied by international scholars as national culture, and by organizational scholars as organizational or corporate culture. We argue that, despite the considerable amount of research activity in these areas, the two research traditions have existed as “stovepipes,” operating in parallel but not communicating effectively with each other. After reviewing how the linkage between IT and culture has been conceptualized in the literatures on national and organizational culture, we identify some gaps in these research streams, and propose a new conceptualization of culture. Grounding our framework in social identity theory (SIT), we argue that it is necessary to advance from the fragmentary perspectives that exist at present to a more holistic view of culture. We believe that this novel perspective will enable scholars to move toward a more multi-faceted view of culture as a richly layered set of forces that shape individuals’ beliefs and actions. We also identify opportunities for mutual learning, areas of challenge, and domains of possible contradiction between the two research streams as one step toward further theoretical advances.

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1. Introduction

The concept of culture has been studied by information systems (IS) researchers since the early days of the discipline (Emery & Trist, 1960; Mumford, 1979). The beliefs and values, regarding IT, that permeate societal groups have been examined from a variety of perspectives such as national, ethnic, organizational, and professional culture. Understanding the relationship between IT and organizational culture (OC), for instance, has challenged scholars from a range of disciplines for nearly three decades. Beginning with some early field studies of IT implementation (Bostrom & Heinen, 1977; Markus, 1983), researchers have identified problems with successfully leveraging IT particularly systems that work “right” technically but are resisted by their users. This issue has been labeled a lack of system/culture fit, and explained in terms of technologies having questionable “organizational validity” (Markus & Robey, 1983), despite adequate “technical validity.” Looking back on three decades of studies, implementation researchers continue to cite OC as an often overlooked factor that explains “why success didn’t take” (Walton, 1975).

In addition to research on OC, IS researchers have increasingly focused on issues of national, societal, or ethnic culture. Recently, there has been increased interest in identifying the influence of national culture (NC) on IT adoption and use, as evidenced by various special issues of academic journals (Aladwani, 2003; Davison & Martinsons, 2003; Montealegre, 1998a). Much of the recent focus on NC has centered on communication technologies (Ford, Connelly, & Meister, 2003), which appear to be imbued with greater “culture content” (Pliskin, Romm, Lee, & Weber, 1993) than other forms of IT. Researchers have examined the cultural implications of various communication technologies, including email, electronic meeting systems, group support systems (GSS), videoconferencing, and a new breed of systems offering asynchronous support for group collaboration (Clark, Downing, & Coleman, 1996). One early study that investigated the use of GSS technology with users from different cultural groups claimed that NC was a critical “fourth dimension of GSS research” (Watson, Ho, & Raman, 1994, p. 44), signaling its importance in shaping group processes and outcomes. The consensus of scholars who study cross-cultural factors in IT use is that understanding NC is critical, because many technologies are created and marketed by “Western” designers for Western audiences, and that these technologies often embody implicit assumptions about Western culture (Davison, 2002). For example:

…the designs of current GSSs are based on North American concepts of desirable group behavior. Oriental cultures have a different model of desirable group behavior [so that]…a GSS designed in North America may have unintended consequences in an Oriental setting (Watson et al., 1994, p. 45).

Researchers have increasingly recognized the importance of articulating the cultural assumptions that are embedded into IT and explicitly evaluating whether these assumptions are congruent with potential adopters in other parts of the world (Davison & Jordan, 1998; Walsham, 2002).

In sum, there is considerable interest in understanding cultural influences on IT adoption and usage – but viewed from two different perspectives: OC v. NC.
Although there are a number of other cultural perspectives (e.g., occupational/professional culture (Schein, 1996; Von Meier, 1999)), this paper will focus on national and OC due to these having the greatest amount of extant literature. While there appears to be broad recognition that culture is a factor that should not be ignored when implementing or studying IT (Davison & Martinsons, 2003), research has been fragmented. We believe that this topic requires a fresh outlook, given that prior research on IT and culture has been split into distinct “stove-pipes” separately examining issues related to IT/NC fit and IT/OC fit. Unfortunately, these two streams of work have evolved in parallel, rarely citing each other’s frameworks and contributions – and often failing to acknowledge the other’s existence. Definitions and assumptions underlying these research traditions may contradict each other without researchers taking note. Parallel findings that could help to identify some universal insights about the role of culture in shaping IT usage may have been overlooked. Finally, key contradictions between the two sets of findings may not be recognized – contradictions which, if articulated and exposed, could help researchers to build richer theories (Robey & Boudreau, 1999). We believe there are key insights that each research tradition can learn from the other, as we discuss below.

1.1. Motivation: Why study the relationship between IT and culture?

This paper has two primary objectives: first, to review the IT literature on NC and OC and identify key differences between these research traditions; second, to describe and illustrate a new conceptual framework about culture – based on social identity theory (SIT) and the virtual onion metaphor (Straub, Loch, Evaristo, Karahanna, & Srite, 2002) – which we believe will help researchers to understand the complex and rich implications of individuals’ social identity, which shape IT adoption and use.

Developing an integrated perspective of the role of culture in IT adoption and use is critical for several reasons. First, with the rise of corporate mergers, the importance of organizational and NC is increasingly central in executive decision-making, where ensuring cultural compatibility or seeking to facilitate integration of different cultures is a potential hurdle (Weber & Pliskin, 1996). The growing incidence of mergers that span national borders only exacerbates this problem (e.g., mergers between Chrysler and Daimler-Benz or Vivendi and Universal). Second, scholars have noted that the new breed of “advanced information technologies” (Huber, 1990) used to support collaborative work have greater culture content (Pliskin et al., 1993) by virtue of being social technologies (Sproull & Faraj, 1995) or socialware (Davenport, 1996). Moreover, the number of ERP systems implemented across global platforms has profound cultural implications, since these systems force standardized business processes on employees from different cultures (Markus, Tanis, & van Fenema, 2000). Given this onslaught of change on several fronts – where cultural fit is critical to achieving the benefits of IT – we believe the topic of culture and IT implementation bears a fresh examination. Walsham (2002, pp. 360, 377–378) aptly characterized the challenge as follow:
In the more globalized world of the 21st century, working with information and communication technologies (ICTs) is increasingly taking place in a cross-cultural context. This should prove to be problematic, in that there will be different views of the relevance, applicability, and value of particular modes of working and use of ICTs which may produce conflict but we are short of good theory to analyze such phenomena. Goodall (2002) argues that we are short of both rich descriptions of cross-cultural interaction and theoretical explanations of the same.

The paper is structured as follows. First, we define culture and review the various ways in which the relationship between OC and NC has been framed. This section concludes with a brief introduction to the concept of the virtual onion in culture studies. Second, we present a structured review of the IT/NC research stream, and explain two complementary typologies we used to classify each study. Third, we identify four key assumptions that are widespread within the literature on IT and NC. Fourth, we summarize how the notion of culture has been regarded in studies of IT and OC. Fifth, we review the virtual onion metaphor in greater detail, and explore its roots in social identity theory. Finally, we conclude by identifying insights that this model affords researchers and practitioners.

2. Literature review

2.1. What is culture?

Since our objective is to understand the relationship between IT and culture, we begin with the question: What is culture? Common features can be extracted from three widely cited definitions, as follows. Perhaps the most common definition employed in cross-cultural management research is Hofstede’s. To Hofstede, culture is “the collective programming of the mind which distinguishes the members of one human group from another” (Hofstede, 1980, p. 260). Celebrated anthropologist, Clifford Geertz, defined culture as “an historically transmitted pattern of meanings embodied in symbols, a system of inherited conceptions expressed in symbolic forms by means of which [individuals] communicate, perpetuate, and develop their knowledge about and attitudes toward life” (Geertz, 1973, p. 89).

Similar views are described by OC scholars including Schein (1986), who defined culture as “the sum total of all the shared, taken-for-granted assumptions that a group has learned throughout its history” (Schein, 1986, p. 29). These definitions suggest it is difficult to assess culture because it is not directly observable. Culture is concerned with values, meanings, and norms. While some manifestations of culture are observable at times (e.g., symbols and rituals), these are merely symptoms of culture, and should not be confused with the underlying culture itself. Under-

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1 Readers seeking detailed definitions of culture should read Avison and Myers (1995); Schein (1986); Straub et al. (2002).
standing a group’s culture requires an extended interval of immersion in order to
delve deeper than these surface manifestations of culture. Without such in-depth
exposure, outsiders who are not well-versed in a given culture may draw false con-
clusions about its members’ beliefs and behavior (Schein, 1994).

Several recent studies have suggested that values and practices are important ele-
ments of culture (Karahanna, Evaristo, & Srite, 2005), with values being closer to the
core how individuals think, and shared practices being more peripheral. Values are
acquired early in life through childhood socialization and education, and are often
“stable in nature but can change over time reflecting changes in culture” (Karahanna
et al., 2005). Practices develop later in life through activities such as workplace
socialization, and are more subject to change than values. Schein (1986) identifies
three “levels of awareness” at which culture operates – from the most visible to tacit
awareness. Beyond a few directly observable manifestations, such as its rituals, that
which defines a culture is invisible. Building on Schein’s “levels of awareness,” Ro-
bey and Azevedo (1994) claim that culture can be studied in three related ways, for
instance, by studying:

- visible symbols, artifacts, routines and practices
- values and beliefs that can be articulated by informants
- patterns of assumptions that are deeply held, possibly without conscious
  awareness

While there are many potential benefits to bridging the findings from the OC and
NC research streams, one should not assume that they define “culture” the same way
or focus on identical issues. Research on IT and NC has often assumed that culture
is something equivalent to national identity, based on the concept of the nation-state
(Myers & Tan, 2002). Many researchers assume that identifying the country in which
subjects live (or where they were born) is a sufficient definition of culture and, in
some cases, they neglect to mention specific cultural beliefs or practices that influence
IT-related beliefs and behavior. Tayeb (1994) labels this the residual approach to cul-
ture – meaning that researchers often blindly label as culture whatever behavior their
theories cannot otherwise explain. In contrast, researchers studying OC do not stop
short by just citing the “Microsoft culture” or “Vivendi culture,” to explain a specific
firm’s IT use practices; rather, they go beyond this generic label to describe specific
norms, values, assumptions, and social structures that shape members’ beliefs and
behaviors within these organizations.

2.2. Relationship between organizational and national culture

It is often assumed that OC is a subset of NC. This view is widespread since most
organizations operate within a given nation and employ members drawn from the
same NC. Thus, managers and researchers often consider OC as the micro-context
and NC as the macro-context in which employees operate. Due to the increased prev-
alence of multinational corporations (MNCs) and cross-border mergers, however,
some researchers have posited the reverse logic: in MNCs, the firm represents the
macro-culture, whereas the various countries in which the firm operates represent the micro-cultures. For example, in their study of IT management at Federal Express, Janz and Wetherbe (1998) coined the term “super-culture” to refer to the firm’s macro-culture, which they perceived as being comprised of many national or ethnic micro-cultures.

We believe that these popular depictions of how different cultural “layers” fit together are misleading, and reveal an underlying misconception with regard to culture—namely, that cultural beliefs and practices are hierarchically ordered. We question such attempts to hierarchically stratify different cultural attributes and instead, we elaborate on a more nuanced view of culture—the virtual onion metaphor (Straub et al., 2002). We briefly introduce this model here and then, following our review of the respective literatures on IT/NC and IT/OC, we describe the model, its origins in social identity theory (SIT), and its benefits in more detail.

2.3. The “virtual onion” metaphor of culture

The notion of culture as a virtual onion was recently introduced by Straub et al. (2002), basing their conceptualization on SIT (Tajfel, 1970, 1978). This metaphor suggests that, like layers of an onion, each individual contains different “layers” of cultural identity and experiences, but that the sequence of these layers is virtual, in the sense that they can shift, depending on time and circumstances. The theoretical basis for this conceptualization, SIT, also expresses the notion of layers of experience. SIT recognizes that people define themselves as members of an “in group” or “out group” with regard to several reference points (ethnicity, religion, occupation, nationality, gender, etc.). The layers of social identity, like layers of an onion, reflect how deeply held or superficial certain beliefs may be in shaping people’s beliefs and behavior. Rather than conceiving of culture as just NC, OC, or just any one dimension of a person’s identity, SIT considers how multiple layers of identity converge and interact for each individual. Straub et al. (2002) characterize this layering through the virtual onion metaphor because the various layers of culture, and their relative importance in shaping specific beliefs and behavior, may occur in a different sequence, depending on the subject in question and the specific point in time. For example, when introduced to any form of IT for the first time, perhaps the most important factors in shaping individuals’ responses will be their national identity and age/generational group, but that after some experience with IT, it will be their occupational group that will determine how they utilize a new technology. Thus, certain identity layers may matter more in shaping individuals’ beliefs and actions during initial exposure to IT, while other identity layers will matter more at other times.

SIT recognizes that the various identity groups with which an individual is affiliated (e.g., gender, race, generation, occupation) have relative levels of importance on different beliefs and behaviors. Certain social identity layers matter in specific circumstances, but, in general, it makes little sense to attempt to hierarchically order these layers. By eschewing such hierarchical orderings, we acknowledge that ethnic culture can span national boundaries (e.g., people of Swedish descent living in various countries), but ethnic culture may also represent a subset of individuals in a single
country (e.g., the Kurds in Turkey). Thus, there is no simple one-to-one or one-to-
many hierarchical relationship between ethnic culture and countries (Myers & Tan,
2002). The same argument can be extended to religious, linguistic, occupational iden-
tity, and other layers of culture: each of these may be a subset of NC in some situa-
tions (e.g., many religions coexist in a given country), but each cultural identity
attribute may also be a super-set of NC (e.g., people from many countries practice
a given religion). These complex connections are represented in Fig. 1.

Fig. 1 portrays each individual as a product of several identity layers, since each
person belongs to a specific ethnic, linguistic, and NC, and may also have an identity
corresponding to a specific religious, political, organizational, and occupational affil-
iation, or as a member of given hobby or recreational groups. The cultures that en-
fold each person interact to form his or her unique culture, including beliefs, values,
assumptions, and behavior. Fig. 1 shows an individual (the innermost ellipse com-
posed of a solid line) who is a product of several layers of culture interacting with
other individuals and their layers of culture (the dotted ellipses). This notion of cul-
ture is consistent with the view in critical management studies of culture as “differenti-
ated and diverse,” as proposed by Meyerson and Martin (1987):

At the individual level of analysis, a single person may be a member of several
overlapping, nested subcultures, some of which may hold opposing views. ...

Fig. 1. Adapted from Karahanna et al. (2005) The Virtual Onion Model.
[A given employee] may be a divisional manager, an engineer, a Stanford MBA, a New England Yankee, and a female. Each of these individual characteristics may be associated with membership in an organizational subculture, creating psychological inconsistency and conflict at the individual level of analysis. ... Or, subcultural identifications may be orthogonal to the dominant culture, reflecting functional, national, occupational, ethnic, or project affiliations (Meyerson & Martin, 1987, pp. 630–632).

The virtual onion metaphor is a more abstract representation of culture than those commonly used in the IS literature. It operates at the individual level to reflect the multiple, complex forces that shape individuals’ beliefs and behavior. In this manner, the model reflects that culture is a complex set of practices, which are not fixed or monolithic across groups of individuals, but which may be “contested, temporal, and emergent” as described by leading culture researchers (Kahn, 1989, p. 13). This introduction to the virtual onion metaphor and to SIT should serve as a reminder that there are other ways to conceptualize culture than the dominant mode found in the IS literature – where culture is often treated as synonymous with an individual’s national origin (Myers & Tan, 2002). Following our review of the literature on IT and NC and IT and OC, we revisit the virtual onion metaphor and describe its advantages for studying IT and culture.

3. Overview of extant literature on IT and national culture

It is impossible to discuss research on NC without mentioning the contribution of Hofstede (1980, 2001), whose findings have spurred hundreds of cross-cultural studies in both the IS and cross-cultural management literatures. He surveyed 116,000 employees of a multinational corporation (MNC), IBM. Based on analysis of these data, he identified four cultural dimensions that differentiated employees in IBM’s regional offices. His survey did not consider IT use, but he created a foundation on which many IS and management scholars have built. His four dimensions are:

• Individualism / collectivism – the importance of the individual versus the group
• Uncertainty Avoidance – discomfort with the unknown; desire to reduce ambiguity
• Power Distance – highest degree of distance across social groups (e.g., boss v. employee)
• Masculinity / Femininity – the emphasis on stereotypically “masculine” goals (power, achievement, etc.) / “feminine” goals and attributes (caring, consensus, etc.).

In subsequent work with Chinese scholars, Hofstede added a fifth dimension: short-term v. long-term orientation (also labeled Confucian dynamism) (Hofstede & Bond, 1988). This construct acknowledges that, in many Asian cultures, a longer time

2 See Appendix A for detailed definitions of Hofstede’s cultural dimensions.
horizon is considered for planning and decision-making. Although Hofstede's goal was to identify culturally neutral dimensions that could generalize to every country, whether he succeeded or not is still debated by cross-cultural scholars. Criticism of Hofstede's approach emerged from many fronts (Erez & Earley, 1993; Myers & Tan, 2002; Tayeb, 1994). One problem with his study was that it was conducted in many countries but solely with IBM employees, thus reflecting the idiosyncrasies of that firm. Hofstede's work is also grounded in the assumption that employees hired by IBM are representative of the cultures from which they come – a dubious assumption. It is possible that employees who were selected and socialized by IBM for its way of doing business differ in some ways from their peers. Despite such criticisms, Hofstede's impact on management research has been substantial (Sondergaard, 1994), and his cultural dimensions form the conceptual backbone of much cross-cultural management and IS research (Ford et al., 2003).

3.1. Description of research approach

In our review of research on NC and IT, we located articles published in both “mainstream” IS journals and specialty IS journals, whose primary focus is on international or cross-cultural management (e.g., Journal of Global Information Management), and in special issues of journals that explicitly focused on international, cross-cultural, or global IT management. We broadly defined the set of relevant papers using two screening criteria: First, the study must focus on IT – whether IT in general, the development and use of a specific IT tool or application, or issues related to managing IT professionals. Second, the study must address a cross-cultural or international issue, such as comparative studies of IT adoption, use, management, and regulatory policies, or managing IT professionals in a cross-cultural context. Since most journals we reviewed were based in North America, we excluded studies that focused exclusively on North American firms or surveys of North American respondents – unless there was an explicit international or cross-cultural focus.

Based on this definition of IT and NC research, we identified over 70 articles that met these criteria. Given such a broad literature base, we lack sufficient space to mention or discuss findings from each study. To provide an overview of the types of studies we reviewed, we employed two approaches to classify each study.

3.2. Two typologies for classifying research on IT/national culture

First we grouped the studies according to content – focusing on the type of research question posed. This bottom-up content classification resulted in four primary groups of studies. Second, we employed a classification scheme developed

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3 The “mainstream” journals that we reviewed were Communications of the ACM, Information Systems Research, Information & Management, Journal of MIS, and MIS Quarterly. We also searched for studies in European Journal of IS to incorporate a European perspective. Our definition of “mainstream” IS journals is consistent with several prior review articles. We also included papers that appeared in two special issues of Information Technology & People and a special issue of IEEE Transactions on Engineering Management.
by cross-cultural management scholar Adler (1983) to characterize the authors’ approach to studying cultural issues. We describe each classification scheme, offer some examples of each class of studies, and then draw general observations regarding the concept of culture in each set of studies.

Our first classification scheme focused on the article’s content, in terms of the type of phenomenon examined. We identified the following four categories of studies:

- Studies of IT adoption, implementation or use of a specific system or technology
- Studies of the diffusion of IT broadly defined, within an international context
- Studies comparing IT professionals and human resource practices across different countries
- “Key issues” studies of senior managers’ beliefs and practices related to IT management

These four categories accounted for over 95% of the studies we found. The other “miscellaneous” studies examined other cross-cultural dimensions of IT management and use (e.g., comparative studies of IT regulatory policies, computer crime, ethical beliefs, etc.).

Our second classification scheme was based on Adler’s (1983) typology of six approaches to cross-cultural issues in management theory and research. Adler developed her typology to characterize different management theories and research designs for investigating cross-cultural management. Her typology is widely accepted in the international business area, delineating the nature of the researcher’s approach to, and assumptions about, culture and cross-cultural management. The first category (parochial) corresponds to theories that neglect to consider NC or cross-cultural implications of a theory, whereas the remaining categories consider culture in different ways. For example, a parochial study is when a North American researcher studies IT usage within a domestic firm or a sample of respondents, and ignores issues of NC. Such studies comprise the majority of research published in mainstream IS journals, such as studies of individual IT adoption (Davis, Bagozzi, & Warshaw, 1989), IT-based change (Orlikowski & Hofman, 1997), and IT professionals in North American organizations (Couger & Zawacki, 1980). We have excluded parochial studies, because they neglect issues of NC, by definition.

The five other categories in Adler’s typology specify different ways that researchers incorporate NC into their theories – comparative, ethnocentric, polycentric, geocentric, and synergistic research. Comparative research compares respondents or organizations from various countries to identify similarities and differences. Ethnocentric studies use an existing theory that was developed in one culture and explicitly test

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4 According to the Social Sciences Citation Index, Adler’s (1983) article introducing her typology has been cited 69 times in a number of research areas. The research domains and number of citations in each field are as follows: international business (23 citations), organizational behavior (19), production/operations management (4), IS (2), marketing (6), human resource management (4), psychology (3), and business ethics (4).
it in another culture to see whether it is supported.\(^5\) Polycentric research is typified by ethnographic studies where a researcher immerses herself in a new culture and inductively develops concepts to explain its members’ beliefs and practices. Geocentric studies examine MNCs to explain the challenge of managing global organizations. Such studies are often descriptive, rather than theoretically grounded (Adler, 1983). Finally, synergistic research examines intercultural interaction within organizations, such as exchanges between Indian and Jamaican software developers within a software project (Barrett & Walsham, 1995). We classified each study both according to the study’s general content (using our four categories, defined above) and in terms of Adler’s six-part typology, as shown in Table 1.\(^6\) These classifications will allow us to draw some overarching conclusions regarding research on IT and NC and ultimately, to discuss the various perspectives on NC and OC.

3.3. Studies of IT adoption, implementation or use of a specific system or technology

This was the dominant type of study, accounting for over half of the total papers. Here, researchers examined cultural issues related to IT adoption, implementation, or use within one or more cultural contexts, such as studies comparing GSS usage within different cultural contexts (Davison & Jordan, 1998; Davison, 2002; Tan, Wei, Watson, & Walczuch, 1998; Watson et al., 1994). One early study that investigated the use of GSS technology in different cultures posited NC to be a critical “fourth dimension of GSS research” (Watson et al., 1994, p. 44), which is necessary to understand how GSS influences group processes and outcomes. Studies have also examined the comparative adoption rate of specific technologies among potential adopters in various countries, including e-mail and fax (Straub, 1994; Straub, Keil, & Brenner, 1997). Since this was the dominant category, we examine some issues related to these studies in greater detail in the section titled ‘Evaluation of the IT and National Culture Studies’.

3.4. Studies of IT diffusion in an international context

These studies examined how rapidly IT diffuses throughout one or more geographical regions. These are sometimes labeled as studies of “technology transfer,”

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\(^5\) Ethnocentric studies may reach one of two conclusions: either the theory is supported in the new culture and is considered generalizable across cultures, or it fails to receive support, and is judged to be culturally specific. This is a win-win scenario: no matter which conclusion is reached, the results are judged as a contribution to knowledge.

\(^6\) There is some potential for overlap between Adler’s categories. Thus, we employed the following guidelines to ensure consistency. If researchers conducted primary data collection only in their native country and omitted any cross-cultural analysis, we coded the study as parochial. If they conducted in-depth primary research in a country other than their native country, we coded it as polycentric. The authors’ country of origin was thus relevant in distinguishing between parochial and polycentric studies. We coded a study as comparative if the researchers collected data from more than one country themselves and then conducted a cross-cultural analysis. Finally, we coded a study as ethnocentric if researchers collected data in one country, and then used prior data and frameworks published in other studies to compare their findings.
<table>
<thead>
<tr>
<th>Author and Year</th>
<th>Source</th>
<th>Theoretical framework or cultural dimensions</th>
<th>Type of IT examined and research method</th>
<th>Cultural group(s) examined</th>
<th>Adler’s class</th>
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<tbody>
<tr>
<td>Category 1: Studies of Implementation or Use of a Specific Information Technology</td>
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<td>Chau et al. (2002)</td>
<td>CACM</td>
<td>No cultural dimensions, Advertising research on marketing communications (Lastovicka 1983)</td>
<td>Automobile websites Laboratory experiment</td>
<td>US, Hong Kong $(n = 270$ students)</td>
<td>Comp.</td>
</tr>
<tr>
<td>Chung and Adams (1997)</td>
<td>JGIM</td>
<td>No dimensions used</td>
<td>Survey Research</td>
<td>Korea, US</td>
<td>Comp.</td>
</tr>
<tr>
<td>Lai et al. (1996)</td>
<td>JGIM</td>
<td>No cultural dimensions used</td>
<td>ISDN adoption</td>
<td>Primary data from Germany</td>
<td>Ethno.</td>
</tr>
<tr>
<td>Mejias et al. (1997)</td>
<td>JMIS</td>
<td>Individualism/Collectivism, Uncertainty Avoidance, Power Distance, and Masculinity/Femininity</td>
<td>GSS Laboratory experiment comparing GSS and non-GSS groups</td>
<td>US, Mexico</td>
<td>Comp.</td>
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<tr>
<td>Robey and Rodriguez-Diaz (1989)</td>
<td>I&amp;M</td>
<td>Culture in General</td>
<td>IT implementation Case Study</td>
<td>Chile, Panama</td>
<td>Comp. - Synerg.</td>
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<td>Authors</td>
<td>Journal</td>
<td>Methodology</td>
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<td>Rose et al. (2003)</td>
<td>IEEE TEM</td>
<td>Cultural perspective on time (monochronism vs. polychronism)</td>
<td>US, Finland, Peru, and Egypt</td>
<td>Comp.</td>
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<td>Tan et al. (1998)</td>
<td>JMIS</td>
<td>Hofstede (1980)</td>
<td>GDSS</td>
<td>US., Singapore</td>
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<td>Watson and Brancheau (1991)</td>
<td>I&amp;M</td>
<td>Individualism/ Collectivism, Uncertainty Avoidance, Power Distance, and Masculinity/Femininity</td>
<td>Secondary Data Analysis</td>
<td>Australia, Europe, Singapore, US</td>
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<th>Adler’s class</th>
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<tr>
<td><strong>Burn (1995)</strong></td>
<td>JGIM</td>
<td>No cultural dimensions used. Examines role of Confucian values</td>
<td>EDI technology Conceptual Essay, based on secondary data (no primary data)</td>
<td>Secondary analysis of data from prior studies (Singapore, China, Korea Taiwan)</td>
<td>Poly.</td>
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<td><strong>Ein-Dor et al. (1993)</strong></td>
<td>JGIM</td>
<td>Economic, Demographic, &amp; Socio-Psychological Literature Review (no new empirical data collected)</td>
<td>General</td>
<td>Comp.</td>
<td></td>
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<tr>
<td><strong>Hasan and Ditsa (1994)</strong></td>
<td>JGIM</td>
<td>Hofstede's dimensions (all 5) plus 3 other attributes: monochrony v polychrony, context, polymorphic v monomorphic IT adoption in general, field studies of 10 firms in West Africa and Middle East, compare with Australian culture</td>
<td>10 firms: 3 in West Africa (Ghana), plus 7 firms from various Middle Eastern countries Compare to Australian culture</td>
<td>Comp.</td>
<td></td>
</tr>
<tr>
<td><strong>Janczewski and Targowski (1994)</strong></td>
<td>JGIM</td>
<td>No dimensions used</td>
<td>Conceptual Study</td>
<td>US, Western Europe, Eastern Europe, Far East, Australia</td>
<td>Comp.</td>
</tr>
<tr>
<td><strong>Milberg et al. (1995)</strong></td>
<td>CACM</td>
<td>3 of Hofstede's dimensions. Also creates a typology of 5 types of regulation National approaches to IT regulation. Survey of 900 members from 30 countries (only used data from 9 countries)</td>
<td>9 countries incl. US, UK, Canada, Australia, France, Japan, India, New Zealand, Thailand</td>
<td>Comp.</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Journal</td>
<td>Study Type</td>
<td>Research Focus</td>
<td>Countries</td>
<td>Methodology</td>
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<tr>
<td>Montealegre (1998b)</td>
<td>IT&amp;P</td>
<td>No cultural variables</td>
<td>Internet diffusion</td>
<td>4 Latin American countries (Ecuador, Brazil, Chile, Peru)</td>
<td>Comp.</td>
</tr>
<tr>
<td>Rose and Straub (1998)</td>
<td>JGIM</td>
<td>TAM (Davis et al., 1989)</td>
<td>IT in general</td>
<td>5 Arab countries</td>
<td>Ethno.</td>
</tr>
<tr>
<td>Straub et al. (2001)</td>
<td>JGIM</td>
<td>Develops and tests a new model (based on cultural influence modeling and technological cultivation)</td>
<td>IT adoption in general (&quot;technology transfer&quot;)</td>
<td>5 Arab countries: Develops a new theory and tests it with data from 5 Arab countries</td>
<td>Poly.</td>
</tr>
<tr>
<td>Trauth and Thomas (1993)</td>
<td>JGIM</td>
<td>Inductive theory development</td>
<td>EDI regulatory policy</td>
<td>European Union vs. US EDI and telecom policy</td>
<td>Comp.</td>
</tr>
<tr>
<td>Trauth (1999)</td>
<td>JGIM</td>
<td>Theory development, model is labeled as &quot;Influence-Impact Model of Society-Tech. Interaction&quot;</td>
<td>Examines development of IT industry in Ireland, cross-cultural IT human resource issues; Ethnography and archival analysis</td>
<td>Irish regional offices of various multinational firms</td>
<td>Poly.</td>
</tr>
<tr>
<td>Wetherbe et al. (1994)</td>
<td>JGIM</td>
<td>No dimensions used</td>
<td>Survey Research</td>
<td>Europe, North America</td>
<td>Comp.</td>
</tr>
<tr>
<td>Category 3: Studies Comparing IT Professionals in Two or More Countries</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Burn et al. (1993)</td>
<td>JGIM</td>
<td>4 Hofstede dimensions:</td>
<td>Survey Research</td>
<td>Primary data: H.K. Secondary data: 6 other countries</td>
<td>Poly.</td>
</tr>
<tr>
<td>Burn et al. (1995)</td>
<td>JGIM</td>
<td>Motivating factors (based on Job Preferences Index scale)</td>
<td>Survey Research</td>
<td>US, Hong Kong IT professionals</td>
<td>Comp.</td>
</tr>
<tr>
<td>Cheney and Kasper (1993)</td>
<td>JGIM</td>
<td>No dimensions used The article focused on the curriculum in IS education. No cultural issues are addressed.</td>
<td>Secondary Data Analysis</td>
<td>North America, Europe</td>
<td>Comp.</td>
</tr>
</tbody>
</table>

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<table>
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<tr>
<th>Author and Year</th>
<th>Source</th>
<th>Theoretical framework or cultural dimensions</th>
<th>Type of IT examined and research method</th>
<th>Cultural group(s) examined</th>
<th>Adler’s class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Couger (1986)</td>
<td>MISQ</td>
<td>Comparison to prior research results by Couger and Zawacki (1980)</td>
<td>Survey of IS analysts and programmers from Singapore (n=1180)</td>
<td>US, Singapore Compare job motivation of IT professionals</td>
<td>Comp.</td>
</tr>
<tr>
<td>Dagwell and Weber (1983)</td>
<td>CACM</td>
<td>Theory X v Theory Y IT designers’ mental models of users</td>
<td>Survey of Australian IT professionals</td>
<td>Primary data from Australia, Secondary data from comparison with US, UK Sweden. Focus on values of designers</td>
<td>Ethno.</td>
</tr>
<tr>
<td>Kumar and Bjorn-Andersen (1990)</td>
<td>CACM</td>
<td>Personal Value Questionnaire (England 1967)</td>
<td>Survey</td>
<td>Comparison of values of 72 Danish and 132 Canadian IT designers from a total of 21 firms</td>
<td>Comp.</td>
</tr>
<tr>
<td>Category 4: Studies of Key Issues as Perceived by Senior Managers (Delphi studies or surveys)</td>
<td>I&amp;M</td>
<td>No cultural dimensions used</td>
<td>Delphi study of IT managers</td>
<td>Slovenia (comparison to US based on secondary data)</td>
<td>Comp.</td>
</tr>
<tr>
<td>Dekleva and Zupancic (1996)</td>
<td>I&amp;M</td>
<td>No cultural dimensions used</td>
<td>Survey Research</td>
<td>Taiwan (comparison to US managers)</td>
<td>Comp.</td>
</tr>
<tr>
<td>McLeod et al. (1997)</td>
<td>JGIM</td>
<td>Individualism/Collectivism, Uncertainty Avoidance, and Power Distance</td>
<td>Delphi study of IT managers</td>
<td>Hong Kong (comparison to US and Taiwan, based on secondary data)</td>
<td>Comp.</td>
</tr>
<tr>
<td>Moores (1996)</td>
<td>I&amp;M</td>
<td>No cultural dimensions used</td>
<td>Delphi study of IT managers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Journal</td>
<td>Cultural Dimensions</td>
<td>Methodology</td>
<td>Countries/Geos</td>
<td>Type/Context</td>
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<tr>
<td>Moynihan (1990)</td>
<td>MISQ</td>
<td>No dimensions used</td>
<td>Field Study – Interviews with senior IT and functional mgrs</td>
<td>Ireland only</td>
<td>Parochial</td>
</tr>
<tr>
<td>Tai and Phelps (2000)</td>
<td>EJIS</td>
<td>No cultural dimensions</td>
<td>CEO v. CIO attitudes about business value of IT</td>
<td>US, Hong Kong</td>
<td>Comp.</td>
</tr>
<tr>
<td>Thanasankit (2002)</td>
<td>EJIS</td>
<td>Replication of prior study (Moynihan, 1990)</td>
<td>Requirements analysis process</td>
<td>CEO and CIO pairs</td>
<td></td>
</tr>
<tr>
<td>Watson et al. (1997)</td>
<td>JMIS</td>
<td>Hofstede (1980) Uncertainty Avoidance Power Distance (creates 2x2 matrix based on these dimensions)</td>
<td>Exploratory survey of IT managers (secondary data analysis, based on 11 prior Delphi studies - no primary empirical data collected)</td>
<td>10 countries: Australia, Estonia, Europe, Hong Kong, India, Slovenia, Taiwan, UK, US, and the Gulf Cooperative Council</td>
<td>Comp.</td>
</tr>
<tr>
<td>Miscellaneous Studies (these do not fit into the categories above)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barrett and Walsham (1995)</td>
<td>JGIM</td>
<td>No cultural dimensions Structuration theory (Giddens, 1979)</td>
<td>Software development Longitudinal Case Study</td>
<td>Jamaica, India (Indian software developers in Jamaican insurance company)</td>
<td>Synerg.</td>
</tr>
<tr>
<td>Cummings and Guynes (1994)</td>
<td>JGIM</td>
<td>All 4 of Hofstede’s dimensions</td>
<td>Survey Research – Interviews</td>
<td>US, non-US</td>
<td>Geo.</td>
</tr>
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<table>
<thead>
<tr>
<th>Author and Year</th>
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<th>Cultural group(s) examined</th>
<th>Adler’s class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ford et al. (2003)</td>
<td>IEEE TEM</td>
<td>Review of all IS studies that cite Hofstede and his cultural dimensions</td>
<td>Conceptual review and citation analysis</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Gordon (1993)</td>
<td>JGIM</td>
<td>No cultural dimensions</td>
<td>Case Study of general IT</td>
<td>US multinational</td>
<td>Geo.</td>
</tr>
<tr>
<td>Ives and Jarvenpaa</td>
<td>MISQ</td>
<td>No cultural dimensions (Descriptive study; no theory is tested)</td>
<td>Field Study – exploratory interviews with 25 senior IT mgs from 19 firms</td>
<td>US multinational corporations</td>
<td>Geo.</td>
</tr>
<tr>
<td>(1991)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Jarvenpaa et al. (1998)</td>
<td>JMIS</td>
<td>No cultural dimensions. Examines influence of team-building processes on three types of trust</td>
<td>Repeated measures study of cross-cultural virtual student teams using IT support</td>
<td>Descriptive study of student teams (incl. analysis of messages)</td>
<td>Synerg.</td>
</tr>
<tr>
<td>Roche (1993)</td>
<td>JGIM</td>
<td>No dimensions used</td>
<td>Secondary data analysis</td>
<td>General</td>
<td>Geo.</td>
</tr>
<tr>
<td>Shore (1996)</td>
<td>JGIM</td>
<td>No dimensions used</td>
<td>Case Study</td>
<td>12 EU Countries</td>
<td>Geo.</td>
</tr>
<tr>
<td>Wan and Lu (1997)</td>
<td>JGIM</td>
<td>No dimensions used</td>
<td>Secondary Data Analysis</td>
<td>China</td>
<td>Poly.-Parochial</td>
</tr>
</tbody>
</table>
and they differ from the prior category because the focus is at a “macro” level – for example, country-level studies of IT adoption. Some relevant examples include Burn’s (1995) study of EDI adoption within four “Asian Tiger” countries, Trauth and Thomas’s (1993) study of the influence of technology policy on IT diffusion in Ireland, and a program of research examining IT diffusion across several Arab countries (Hill, Loch, Straub, & El-Sheshai, 1998; Rose & Straub, 1998; Straub, Loch, & Hill, 2001). Research in this category typically examines the role of government policy, or social and legal institutions in facilitating or constraining technology diffusion. For example, the research on IT diffusion in Arab countries (Hill et al., 1998; Rose & Straub, 1998; Straub et al., 2001) identified technology policy, as well as social factors that facilitate or inhibit IT diffusion (e.g., adopters’ degree of non-Arab exposure) and culture-specific beliefs (e.g., the notion of time as polychronic). These studies are mostly comparative in terms of Adler’s typology, with a few polycentric and parochial studies.

We acknowledge that the body of technology transfer research is much larger than what is reflected in Table 1. Whereas our literature search was conducted in eight “mainstream” IS journals plus one journal focused on international IS issues (Journal of Global Information Management), there are other venues dedicated to publishing research on technology transfer, including public policy journals and specialty journals (e.g., Information Technology for Development).7

3.5. Studies comparing IT professionals from different countries

A third set of studies, which recognize the increasing globalization of the IT workforce, feature comparisons of IT professionals from two or more countries. Many of these build on early studies of IT personnel (Couger & Zawacki, 1980), such as research examining the career motives of IT professionals in Hong Kong (Burn, Tye, & Ma, 1995) and Singapore (Couger, 1986), as well as studies on the values of Swedish programmers (Kumar & Bjorn-Andersen, 1990), and mental models of software developers in Australia and the UK (Dagwell & Weber, 1983). In these studies, researchers often collect primary data from respondents in one country and then compare their findings with prior results from subjects in North America. In Adler’s scheme, these are comparative studies, with researchers often explaining the observed differences among IT employees in various countries using Hofstede’s dimensions (Burn, Saxena, & Cheung, 1993). In some cases, however, the authors simply noted the observed differences among subjects from different countries and label them as “cultural differences,” without linking their findings to any specific cultural beliefs or values and without citing a specific theory of culture.

7 We note the existence of a professional society specifically focused on studying technology transfer (IFIP 9.4 “Social Implications of Computing in Developing Countries”). Through its conferences and creation of a new journal, this association promotes research on technology transfer, much of which is not available to readers of the mainstream IS journals in Table 1 IFIP 9.4 is concerned with social issues related to IT in developing countries (see http://is.lse.ac.uk/ifipwg94). Recently an electronic journal was founded to address these issues, The Electronic Journal of Information Systems in Developing Countries.
3.6. “Key Issues” studies of senior IT managers or line managers

With the increasing globalization of business, it is not surprising that the “key issues” genre of research has moved beyond studies of IT managers from a single country to seek an international perspective on issues of concern. There have been several “key issues” studies seeking input from senior IT executives globally, using the Delphi method. Most of these studies are descriptive and atheoretical – they do not develop or test any cultural theory or analyze specific cultural constructs. Most studies collect primary data from managers in a single country and compare their findings with those from North American IT executives. Examples include Delphi studies from Hong Kong (Moores, 1996), Taiwan (Harrison & Farn, 1990), Slovenia (Dekleva & Zupancic, 1996), or a host of countries (McLeod et al., 1997). While most studies are descriptive only, one exception is a Delphi study that proposed a framework based on two of Hofstede’s dimensions (power distance, uncertainty avoidance) and used it to analyze key issues data from IT managers in ten countries (Watson, Kelley, Galliers, & Brancheau, 1997). In terms of Adler’s typology, all of these studies are comparative.8

These four classes of studies accounted for over 95% of the studies on IT and NC we located. Of the remaining studies, most were descriptive or prescriptive studies of IT management practices in MNCs (Gordon, 1993; Ives & Jarvenpaa, 1991), or studies of virtual collaboration among team members from different countries (Jarvenpaa, Knoll, & Leidner, 1998). By definition, all studies of MNCs were geocentric and all cross-cultural virtual team studies were synergistic. Overall, we found the following studies corresponding to Adler’s categories: parochial (10), comparative (28), ethnocentric (6), polycentric (11), geocentric (7), and synergistic (4). Next, we summarize general patterns that we identified across all of these studies.

3.7. Assumptions about IT and culture in cross-cultural IS research

We were able to extract some general observations across the four sets of studies described above. In analyzing these studies, we were interested in how researchers conceptualized NC in terms of the following questions: (1) Do researchers perceive NC to be a fixed set of beliefs and practices, or do they acknowledge that culture may adaptable or malleable? (2) Do researchers assume that individuals are homogeneous within a given group, or is potential diversity acknowledged within the group?9 (3) Do researchers perceive cultural groups as mutually exclusive entities (i.e., individuals belong only to a single cultural group) or can membership in different cultural groups overlap? (4) Do researchers consider the specific forms of IT being examined

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8 We classified one “key issues” study of Irish CIOs (Moynihan, 1990) as a parochial study, both because it lacked a comparative analysis with data from other countries, and because it lacked any mention of the potential influence of Irish culture.
9 For example, if researchers were studying how Hofstede’s notion of uncertainty avoidance influences Korean’s IT adoption, did they allow for the possibility that uncertainty avoidance may vary among Korean adopters?
as fixed or do they regard them as potentially malleable, based on how users appropriate them?

Our literature review suggests that, in many studies, NC is conceived in fairly simple terms—people are assumed to belong to a single cultural group only, and these groups are assumed to be static, homogeneous, and mutually exclusive. Moreover, in many studies, the meaning of culture and how specific beliefs, values, and norms influence IT usage or the attributes of IT managers and employees was not directly addressed; rather, individuals were assumed to represent different cultures (e.g., American v. Chinese) simply because they came from different countries. Tayeb criticizes this approach—labeling it *residual* approach to culture (Tayeb, 1994, p. 432): “researchers simply compare a group of managers and observe some differences in [their beliefs]... then, in the absence of non-cultural explanations for these differences, attribute them to culture.” For example, in the cross-cultural studies of IT professionals, culture was either *not* explicitly mentioned or was employed as a conceptually shallow construct—a nominal category.

In analyzing our results, based on Adler’s typology (Adler, 1983), we found that most studies were at the “lower” end of her continuum. We classified most studies as *comparative* or *ethnocentric*; in contrast, we found relatively few *synergistic* or *polycentric* studies. One reason is that ethnocentric and comparative studies are easier to design and conduct than polycentric or synergistic studies (Tayeb, 1994). The latter are time-consuming and demanding for researchers, requiring them to have adequate time to study another culture in depth (polycentric studies) or access study to multicultural teams as members interact (synergistic studies). Nevertheless, we believe that IT researchers are ready to conduct the sorts of more sophisticated analyses that a deeper understanding of IT and NC research requires. This claim is based on our observation, first, that this style of research is becoming more common (e.g., specifically synergistic studies of cross-cultural virtual teams), and second, the methodology for conducting such studies is well-developed, since anthropologists and sociologists have been using these approaches for decades.

### 3.8. Evaluation of the IT and national culture studies

Based on Table 1, it is apparent that there is considerable interest in the cultural issues surrounding IT use and IT management. Nevertheless, certain assumptions appear to be dominant throughout much of the research on IT and NC. Since the majority of studies corresponded to the first category of Table 1 (studies of IT adoption, implementation, and use of a specific technology) and since researchers’ treatment of culture was articulated most clearly in these studies, we examined them in greater detail. Table 2 shows our analysis of the four questions for the studies in the first category. Based on our detailed analysis, we offer several observations

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10 Table 1 omits parochial studies because there are thousands of such IS studies (i.e., studies that overlook NC).

11 Although we would like to provide further analysis of these studies, space limitations prevent us from doing so.
These general patterns do not characterize every study that examined IT and NC, yet we believe the following patterns to be broadly descriptive of such studies.

3.8.1. Assumption #1: properties of cultural groups are fixed

These studies often assume that culture can be represented by a specific set of numeric scores – usually derived from Hofstede’s four dimensions – with power-distance and uncertainty avoidance appearing most often. Such numeric scores reflect the assumption that cultural beliefs and practices are enduring. Moreover, rather than researchers actually measuring their subjects on these dimensions (by administering Hofstede’s survey instruments), subjects are assumed to exhibit the same cultural traits that Hofstede identified among IBM workers over 30 years ago. Although the independent variable in most studies is one (or more) of Hofstede’s dimensions, in effect, the independent variable defaults to a categorical variable – the respondents’ country of origin. Specific numeric scores are assumed and attributed to subjects for each cultural dimension, based on their country of origin, rather than researchers explicitly measuring subjects on these cultural dimensions. For example, Watson et al. (1994) attributed the differences between the results observed when a GSS was used in Singapore versus the US to two of Hofstede’s dimensions (power distance...
and individualism), although data were not actually collected from subjects on these measures. Instead, the researchers assumed, based on Hofstede’s (1980) original study, that subjects from Singapore would score high on power-distance and low on individualism. Similarly, Straub’s (1994) study of fax and e-mail adoption cited uncertainty avoidance as the primary explanation for the observed differences between American and Japanese respondents, but data were not collected from his subjects to measure uncertainty avoidance. Instead, numeric scores generated by Hofstede (1980) were assumed to adequately represent Straub’s American and Japanese subjects.

By defining culture in nominal national categories (e.g., US v. Japan), such studies assume that culture is monolithic and unchanging. We recognize that cultures are generally stable in the short-term (Pliskin et al., 1993), however, cultural change does occur, due to immigration, the influence of global media, and other social and technological trends—albeit over a period of time. It may be that Hofstede’s interpretation of culture, based on now-obsolete data from IBM, does not capture the beliefs of some cultural groups very well—particularly in societies undergoing rapid change (Baskerville, 2003; McSweeney, 2002; Myers & Tan, 2002). In the closing editorial to a special journal issue on IT and culture, Martinsons and Davison (2003) challenge this assumption of cultural stability:

Is it reasonable to assume that each of the countries surveyed by Hofstede... back in the 1960s and 1970s... would today have similar scores on each of the cultural dimensions? Even if we accept that cultural values are deeply embedded, the economic development and political changes that have taken place in regions like East Asia and Eastern Europe are likely to have significantly affected the cultural values of the societies living there. This suggests a need to more explicitly determine the culture values of a sampled group, ideally using direct measurement, rather than assuming that [the subjects under investigation]... are representative of the host society (and its historical score on Hofstede’s survey) (Martinsons & Davison, 2003, p. 115).

Along these lines, Walsham (2002, p. 377) urged more use of “theories that reflect change as well as stability and that are attuned to shifts in attitudes and actions as well as their continuance.”

3.8.2. Assumption #2: cultural groups are homogeneous

A second feature that many studies assume is cultural homogeneity within the groups studied. Using the arithmetic mean values of country-level data that Hofstede published for his cultural dimensions may not adequately represent the variation that exists within a given country. The possibility for divergent subcultures or subgroups within the larger culture is ignored. This assumption that cultures are homogeneous reflects one popular view of culture that focuses on what members have in common. Such a view of culture as “integrated” (Meyerson & Martin, 1987), assumes that the shared beliefs and norms that characterize a group of people overshadow any differences that exist among them. While common in the management and IS literatures, this view of culture as “integrated” is not the only possible perspective. Other authors regard culture as “differentiated” or “fragmented” (Robey
A third assumption is that individuals belong to only a single cultural group. Since culture is commonly defined by the individual’s country of origin, then many scholars assume that cultural groups are mutually exclusive. However, it is possible, in principle, for an individual to identify with multiple cultural groups. Consider a woman who was born in Japan, educated in the UK, and who now works in Germany. Although she was born and socialized in Japan, educational influences may have shaped her beliefs and values to align more closely with those of other citizens of the UK. Moreover, her years of working in Germany may have also altered certain beliefs and values that she holds. Thus, the assumption that individuals belong to only a single cultural group, based on their national origin, is overly simplistic. A more realistic (but less common) treatment is one found in recent studies by Straub and colleagues (Hill et al., 1998; Rose, Evaristo, & Straub, 2003; Straub et al., 2001), which recognizes the possibility that professional workers from Arab countries may be exposed to Western values during their education and work experience overseas. This perspective allows for individuals to be affiliated with multiple cultural groups, assuming that they may internalize some Western influences which, in turn, alter their attitudes toward work and IT. The latter perspective, allowing for multiple group affiliations, diverges from the studies summarized in Table 2, where cultural groups are assumed to be mutually exclusive.

3.8.4. Assumption #4: IT is a fixed artifact

In many studies of IT and NC, the technology under investigation is assumed to be a fixed artifact – or at least to embody a specific, fixed form as deployed in a given setting. Many of these studies (especially positivist studies) neglect to consider the possibility that the IT may be modified and changed during the process of use. As a consequence, if some cultural belief or norm is regarded as being incongruent with the technology, then such a “misfit” is assumed to be a permanent problem, rather than a temporary hurdle that is amenable to change through users’ appropriation, modification, or selective use of the IT (Orlikowski, 1992).

Taken together, these four assumptions provide a static view of how IT and culture either “fit” each other or represent a “mis fit”. While this stable characterization of “fit/mis fit” may be true for some technologies and for some cultures that are unusually resistant to change, it is also useful to consider the possibility that changes in both technology and culture may occur over time. In the OC tradition of research (described in the next section), such changes to the technology or social system have been
alternately labeled as mutual adaptation (Leonard-Barton, 1988), reinvention (Johnson & Rice, 1987), improvisation (Orlikowski & Hofman, 1997) or drift (Ciborra, 2000). Given enough time and a technology that is flexible in terms of how users appropriate it, what may initially appear to be a poor IT/culture fit may later drift (Ciborra, 2000) or mutually adapt (Leonard-Barton, 1988) to achieve a better fit.

In summary, studies of IT and NC often treat NC as a nominal variable, assuming it to be a fixed set of beliefs and practices that characterize all individuals from a given country (Myers & Tan, 2002). Such studies often posit unmeasured but assumed levels of specific cultural attributes (based on Hofstede’s dimensions, 1980) as the underlying reason for any observed differences among cultural groups. Furthermore, most studies assume that both the culture and the technology in question are fixed and thus not amenable to change. These assumptions about IT and NC have determined specific choices regarding research methodologies and are, in turn, shaped by the choice of methods employed. Cross-sectional studies employing surveys or experimental methods are most common in the studies of IT and NC that we reviewed, and these approaches are congruent with (and reinforce) the set of assumptions described above. In contrast, ethnographies and longitudinal field studies are much less common (Tayeb, 1994), but they enable different assumptions about IT and NC.

Although one explicit goal of many researchers who study IT and NC is to provide normative guidelines for IT managers, the assumptions underlying these studies means that the range of options available to managers is fairly narrow. For example, when a “misfit” exists between IT and a given culture, the only options available to managers are: (a) reject the IT and, instead to seek one that is more compatible with the culture; (b) to redesign the technology before implementing it; or (c) to proceed with adoption, but accept the fact that problems will occur, including user resistance, avoidance, and ironic appropriation (use that is inconsistent with designers’ intentions) (Gallivan, 1997). The possibility for the culture or the IT to adapt in order to yield a better fit is rarely acknowledged. For example, Davison and Jordan (1998) describe the few alternatives that are available when GSS technology is incompatible with accepted behavior in a given culture: “If a group is forced to accept the new form of information [technology use], a form developed in an entirely different cultural environment, it is likely that it will be rejected or else used in ways not intended by the software developers.”

We have shown that, in general, the research on IT and NC features four key assumptions: culture is a fixed set of beliefs, diversity is not acknowledged within a given cultural group, subjects are assumed to belong to a single cultural group only, and IT is a fixed artifact. The next section reviews research on IT and OC to illustrate different assumptions, in terms of how culture is conceptualized and studied.

4. Research on IT and OC

Research on the IT and OC has a longer history than that of IT and NC. Ever since researchers began studying the factors shaping the outcomes of IT adoption
and use, they have focused on the importance of people’s beliefs, values, assumptions, and behavioral norms (i.e., culture). A variety of terms have been employed to refer to this domain of study, such as sociotechnical systems (Bostrom & Heinen, 1977), social factors, the social system, social structure, as well as culture.\textsuperscript{12}

Since early research conducted in the 1970s (Lucas, 1976; Markus, 1983; Mumford, 1979), studies that examine the links between IT and the values, beliefs, and norms of the adopting group have progressed through a set of stages, whereby increasingly rich and complex models have been employed to explain the relationship between IT and OC. It is generally acknowledged that the level of sophistication and insight provided by researchers studying the intersection of IT and organizations has evolved through several stages over time. Next, we review four stages of development. Since the first two stages have been critiqued by several scholars (Markus, 1983; Markus & Robey, 1988; Orlikowski & Barley, 2001; Orlikowski, 1992), we only briefly mention them here.

4.1. Stage 1: Technological determinism: IT “impacts” organizations and their cultures

Early studies of IT implementation adopted a “technological determinist” stance – assuming that IT exerts specific “impacts” on organizations, thus “causing” changes in OC, norms, structure, performance, and other business attributes in a deterministic manner. Although this view is now largely rejected by most IS scholars as overly simplistic, one can finds vestiges of deterministic thinking in practitioner-oriented studies. For example, in recent studies of groupware adoption, some authors have employed deterministic logic to explain how groupware “impacts” employee communication, collaboration, and productivity. We regard these studies as deterministic, since they assume that certain outcomes (usually favorable ones) will necessarily follow IT adoption, without considering managers’ or employees’ motives or their actions in shaping how the IT is used (Clark et al., 1996; King, 1996). Like earlier determinist studies, these authors assume that IT will have a pre-determined effect on the people and organizations adopting it, largely independent of the context in which it is adopted, how it is used or the specific intentions and actions of its users.

4.2. Stage 2: The organizational imperative to change organizations and their cultures

A second set of beliefs about the relationship between IT and OC is that IT is a tool that can be leveraged to achieve whatever changes in organizational practices managers desire (Markus, 1983). Other terms for organizational imperative are strategic choice (Markus, 1983) and managerial imperative (Orlikowski, 1992). In such

\textsuperscript{12} We acknowledge that the set of studies we review in this section have not always labeled the phenomena that they examine as OC. For example, some authors use the label social issues (Markus & Robey, 1983), the social system, or social structure (Barley, 1986) to describe the phenomena. Upon closer examination, however, the authors’ detailed description of the phenomena reveals that their focus is on beliefs, assumptions, values, and practices that are collectively held among members of a given group or organization – which is identical to the definition of OC.
studies, the authors assume that managers and system designers have broad latitude to determine the changes to OC, structure, processes, and performance that they want to achieve with IT. Through deliberate choices that managers make about which IT to adopt or how systems are designed, researchers from this tradition assume that managers can achieve whatever outcomes they seek. These studies are consistent with a particular view of OC that became popular in the 1980s, which assumed that managers can deliberately manipulate corporate culture as they wish, to make it more cooperative, customer-focused, quality-focused, etc. Often labeled as the management and control (Pliskin et al., 1993), functional or instrumentalist approach to OC, this approach has incited considerable debate in the management literature – in part because it ascribes strong power to managerial agency and because it conflicts with anthropologists’ belief that culture is something to be interpreted and understood through immersion in it, but not something to be consciously controlled (Pliskin et al., 1993). Robey and Azevedo (1994, p. 26) challenged the “rationalistic bias” in the assumption that managers can directly manipulate culture.

Studies with this rationalistic bias in the IS literature assume that managers can leverage IT to achieve desired changes in behavioral norms, strategy, structure, and performance. For example, in recent studies of GSS adoption, there is a common view that managers can adopt “collaboration technology” (i.e., GSS) in order to deliberately achieve a more collaborative culture, a view that is challenged by Karsten (1999), and by various empirical studies of failed or problematic GSS initiatives (Orlikowski, 1993; Vandenbosch & Ginzberg, 1996/1997). Perhaps most troubling about the organizational imperative view is the unfortunate fact that the outcomes of IT adoption are not entirely controllable and, whether an organization achieves its goals will have as much to do with the motives and human agency of employees – not to mention chance events – as with decisions that are within managers’ sphere of control.13 The organizational imperative is now rejected by many IS scholars as being too simplistic (Markus & Robey, 1988; Orlikowski, 1992) since it does not allow for user agency, chance events (Markus & Robey, 1988), or the possibility that the ways in which IT is used in practice will “drift” over time (Ciborra, 2000).

4.3. Stage 3: the interactionist view of IT and culture

Interactionist researchers have argued that IT and OC may interact to produce various outcomes. Among such outcomes may be acceptance and effective use of IT (if there is a “fit” with the OC) or, alternatively, user resistance, rejection, or sabotage (if there is some “mis fit” between IT and OC). Beginning in the 1980s, IS researchers increasingly focused on understanding how users’ values, assumptions, and other aspects of OC “interact” with IT features and functionality to produce either effective or problematic IT implementation (Markus, 1983; Markus & Robey, 1983). Along these lines, Romm, Pliskin, Weber, and Lee (1991) argued that most forms of IT have

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13 Studies in the organizational imperative tradition assume that IT implementation will achieve managers’ goals on the basis of three caveats: that the IT is properly implemented; that managerial goals are clearly communicated to employees; and that prospective users are properly trained and supported.
cultural assumptions embedded in them that may conflict with a given firm’s values, beliefs, and norms. They claimed that such embedded assumptions render technologies as “culture bound” (Romm et al., 1991), and that it is necessary to perform a “cultural analysis” to anticipate the likelihood of fit or misfit between a prospective IT and an organization’s culture. Where such misfits occur, the likely outcome will be user resistance, rejection, or outright sabotage. The interactionist perspective assumes that both the IT and the OC are fixed in the short run. Researchers have thus cautioned managers to consider OC as a “binding constraint” when implementing IT (although some consider culture to be potentially malleable over the long run (Robey & Azevedo, 1994). The “binding constraint” view is illustrated by advice offered by Pliskin et al. (1993, p. 150), who warned managers against trying to change a firm’s culture:

Cultures, in the short run, are “constant.” Therefore, [systems]... must be designed and adjusted to fit the OC... It is virtually impossible to improve the fit... by altering the culture... since, in the short run, culture is a binding constraint in [IT] implementation. Cultures are not built overnight, nor can they be changed overnight.

Given these constraints, Pliskin et al. advise managers to conduct a cultural analysis, and if a likely “culture clash” is anticipated, their options are: (1) to withdraw the technology altogether; (2) to “take corrective action” – altering the technology’s design and functionality before it is implemented; or (3) to charge ahead, acknowledging the likely problems that will occur (Gallivan, 1997; McKersie & Walton, 1991). What might also be identified as a fourth option – allowing users to modify or “reinvent” (Johnson & Rice, 1987) the IT to make it more compatible with the firm’s culture – is not considered by interactionist researchers.

Orlikowski’s (1993) insights regarding the misfit between groupware IT and the culture at Alpha Corporation, a management consulting firm that was a pioneer in adopting Lotus Notes, clearly illustrate this perspective. In this study, Orlikowski described Alpha’s CIO as suitably impressed by the potential of groupware IT that he mandated that literally thousands of copies of Notes be purchased and installed on the consultants’ desktops, with little advance warning or training, and no rudimentary cultural analysis. Most employees resisted using Notes because in their competitive culture, they believed that “information is power” – a resource not to be shared with other employees. Perhaps if the CIO had recognized that Notes had a high level of “culture content,” he would have initiated a cultural analysis to anticipate the

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14 In a subsequent study, the same authors identified seven possible dimensions on which the cultural assumptions of the technology may or may not match the OC (Pliskin et al., 1993). These dimensions include the firm’s innovation and action orientation; approach to risk-taking; performance orientation; reward orientation; decision-making autonomy; integration and lateral interdependence; and top management consideration contact.

15 Interactionists posit the need for fit between OC and the cultural assumptions embedded in the technology. Other types of “fit” theories have been proposed as well, such as Goodhue’s (1995) task-technology fit. The latter posits the need for fit between the nature of the task and the specific technology employed. Where task-technology fit is poor, users will either shun the technology, or use will lead to ineffective results.
misfit between the firm’s culture and the technology. Such an intervention may have saved Alpha countless hours and millions of dollars, by anticipating the “culture clash and by suggesting culturally appropriate ways to implement Notes.

4.4. Stage 4: IT-culture fit as an emergent process

The key difference between the interactionist view and emergent perspective is that the former assumes that culture is fixed, whereas the emergent perspective allows more degrees of freedom, since both IT and culture are considered malleable. While this view was first articulated in both an early conceptual paper (Markus & Robey, 1988) and in an empirical study of the adoption of CASE tools (Orlikowski, 1992), the emergent view is perhaps best articulated in a study that examined the evolving use of Lotus Notes in a software products firm (Orlikowski, 1996). A variety of metaphors have been used to describe the gradual manner in which technological and cultural change occur – such as improvisation (Orlikowski & Hofman, 1997), mutual adaptation (Leonard-Barton, 1988) or structuration (Giddens, 1979). The structural view of the interplay between IT and OC and norms has gained many adherents among IS scholars. Karsten (1995, 1999) conducted studies on groupware adoption in various companies, where she affirmed the merits of a structurational approach. She observed that employees may alter their usage of the technology over time, and that sometimes cultural changes ensue; however, she cautions that changes in culture are rarely predictable or deterministic. For instance, organizations that adopt groupware technology do not necessarily become more collaborative over time (thus refuting the claims of the technological and organizational determinists, above), nor is it absolutely necessary for an organization to have a collaborative culture before-hand in order to adopt groupware technology (thus rejecting the claims of the interactionists or “fit” theorists). Thus, emergent changes in OC may occur and can often be analyzed and explained after the fact, but such changes cannot be controlled or predicted a priori (Karsten, 1999; Markus & Robey, 1988). Consistent with the tenets of structuration theory, researchers who ascribe to the emergent perspective often employ longitudinal studies. While such researchers usually adopt an interpretive epistemology and intensive research methods, a variant called adaptive structuration theory (AST) has been advanced by positivist researchers, who conduct laboratory studies of GSS (DeSanctis & Poole, 1994). While increasingly popular, this school has been criticized by purists as inconsistent with the tenets of Gidden’s original theory (Giddens, 1979).

Both structuration theory and AST researchers recognize that the way in which a given IT is used can change over time and that users do have “agency” and volition to modify their patterns of use (i.e., appropriation). Recently, other scholars have advanced views that are consistent with, and seek to build upon structurational principles, including Ciborra’s notion of technological drift (Ciborra, 2000; Holmstron & Stalder, 2001) and actor-network theory (Callon, 1993). The emergent perspective recognizes that, while designers and managers may set specific goals for IT adoption and use, the actual outcomes of IT adoption are non-deterministic and emergent; thus, even under the best of circumstances, outcomes are not predictable or controllable.
The effects of IT are non-deterministic, because technology is “interpretively flexible,” given the variety of meanings that it may have for different individuals. The same technology will be understood differently by different users, depending on their specific beliefs, assumptions, and values (i.e., culture). For example, Robey and colleagues (Robey & Sahay (1996); Robey & Boudreau (1999)) showed that, due to the multiple ways that different users may “socially construct” a given technology, it is a futile effort for managers to seek to control its impacts. Gopal & Prasad (2000) reached identical conclusions in their study of GSS use, claiming that for researchers to seek fixed laws or regularities in terms of how IT will “affect” users’ behavior is to pursue an elusive goal. Instead, usage outcomes will depend on the symbolic meanings that a given form of IT has for a given user. Gopal and Prasad’s conclusions echo those of other studies by Barley (1986) and Robey & Sahay (1996), although the actual technologies examined differed across these studies. In each case, the authors conclude that the symbolic meanings that a given IT has for individuals will shape their understanding of it, and hence their patterns of behavior in idiosyncratic ways that may change over time.

4.5. Summary of IT and OC research tradition

In summarizing the literature on IT and OC, we conclude with the same four questions we asked about research on IT and NC. In terms of the first question, we believe that most IS researchers who study IT and OC perceive culture to be potentially malleable, with the exception of the “interactionist” perspective (stage 3) scholars, who regard culture as fixed. These are the same researchers who believe it is critical to conduct a cultural analysis of a prospective IT, in order to ensure that it fits with the organization’s culture – otherwise a “culture clash” may occur. Most other IS researchers believe that culture can change, although they differ in their beliefs about the causes and pace of change, and the level of determinism.

In terms of the second question (whether OC is homogeneous), most researchers who study IT adoption and use in organizations assume the perspective of culture as an “integrated” (Meyerson & Martin, 1987) or “unifying force” (Robey & Azevedo, 1994), although some “emergent perspective” researchers (stage 4) allow for different subgroups with varying beliefs, values and norms within a given organization – the notion of culture as “fragmented” (Meyerson & Martin, 1987). This is particularly the case for researchers who study the responses of various occupational sub-groups to the same technology (Schein, 1996; Von Meier, 1999).

In terms of the third question (whether individuals can belong to more than one cultural group), we believe that IS researchers generally perceive different social
groups as mutually exclusive entities, since they usually study individuals within organizations (i.e., individuals who work for only a single firm, or work within only a single occupational group). Few IS researchers have considered the possibility of individuals identifying with multiple subcultures within the firm, although this is possible for employees who transfer between departments (Markus, 1983). In terms of the last question (whether researchers consider IT to be fixed), technological determinists treat IT as a fixed object; “organizational imperative” and “interactionist” researchers consider IT as malleable during the design and development processes, but fixed thereafter; finally, “emergent” theorists regard IT as malleable during design and development, as well as during subsequent use and appropriation.

The only one of these issues over which there is substantial disagreement is regarding the issue of homogeneity within a given organization. While most IS researchers subscribe to the “integrated” perspective of culture, there are some voices, such as Prasad (1993) & Gopal & Prasad (2000), who recognize that understanding culture requires the more nuanced view that individuals bring a multiplicity of experiences, interpretations, and perceptions of a given IT. Using this view of cultures as “differentiated,” Prasad acknowledges that individuals can belong to multiple subcultures in an organization, due to differences in their occupational roles, gender, ethnic groups, educational levels, etc. Hence, their reactions to a given technology will vary depending on the specific subgroups or subcultures with which they identify.

The prior section identified four stages and modes of theorizing that characterize the research on IT and OC. There exists considerable variety in the types of theoretical formulations that researchers studying the relationship between IT and OC have employed – as well as strong signs of conceptual development over the past two decades.

5. Toward a synthesis of culture: national, organizational, and other facets of culture

We believe that NC and OC are just two of the many possible dimensions that shape individuals’ beliefs, behavior, and identity. Rather than perceiving these two facets of culture as existing in a subordinate/superordinate relationship to each other (e.g., as in Janz and Janz & Wetherbe’s (1998) notion of a super-culture (organizational) and a micro-culture (national), or vice-versa), we believe there are many attributes that individuals use to identify themselves. Hofstede (1980) noted that there are many layers of “cultural programming” that influence people’s behavior, including national, ethnic, religious, and generational groups, etc.

In order to develop a more integrated view of culture, we consider what the national and organizational cultural perspectives have in common, and why, taken separately, they provide a limited perspective on the contribution of culture to understanding human behavior and, specifically, IT-related beliefs and behaviors. We now return to the notion of social identity theory (SIT), which we introduced

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17 Of course, the obvious exception is individuals who move around to different companies – such as contractors or consultants. However, researchers studying IT and OC have not considered this scenario.
earlier and which posits that individuals have many different layers with which they identify themselves. National origin and organizational membership may be two of the most firmly rooted identities for some individuals, however, there are other identity layers that shape individuals’ beliefs, values, and behavior to a greater or lesser extent within specific scenarios. If we attempt to list the various identity layers that shape a person’s beliefs for different scenarios (e.g., a new IT, a new car, a new style of music), we would find different sequences, in terms of which identity layers are more-or-less influential in shaping various beliefs and behaviors.

SIT explains how individuals engage in the processes of categorization, identification, and social comparison (Tajfel, 1978). Drawing from recent conceptual development by Straub et al. (2002), we believe SIT is useful for resolving the problems associated with the simplistic manner in which NC has been studied with regard to IT. Such studies of IT and NC have been limited by the naïve definitions of culture. This point is articulated by Straub et al. (2002):

In IS research, the culture of [IT users] . . . is problematic because it is typically an overly simplistic categorization . . . Researchers frequently examine the issue of culture and how it affects the international deployment of IS . . . But IS research nearly always assumes that an individual living in a particular place and time belongs to a single “culture,” (e.g., someone living in Egypt is automatically classified as being a member of the Egyptian culture) . . . Cross-cultural studies are rife with problems, some of which hinge, seemingly, on the inability . . . to operationalize “culture” . . . As a result cross-cultural IS research, in general, remains in a state of infancy (Straub et al., 2002, p. 13).

Given this state of affairs, we believe there is a need for a more holistic approach to defining culture and understanding how it shapes individual and group behavior. Fig. 1 reflects the various forms of social identity that may shape an individual’s behavior although, in the “virtual onion” model, there is no consistent ordering of “layers” that is appropriate in all circumstances. Instead, the ordering of these layers (in terms of which identity layers are closer to the core and which are more superficial) will vary, depending on the particular scenario or behavior in question. A simple illustration is the fact that an individual’s national identity (i.e., country of origin) is more critical in shaping his or her ongoing beliefs about international political events; whereas occupational culture and specific workgroup cultures are likely to shape beliefs about IT. The key issue is that there are various sequences of identity layers that shape individuals’ beliefs about different reference objects.

SIT is an alternate premise to traditional theories of OC and NC. Rather than emerging from cultural anthropology, SIT has its roots in social psychology – notably, research on intergroup relationships (Tajfel & Turner, 1979). In developing a self-identity, people think of themselves as both individuals (i.e., their personal identity) and as members of certain groups (i.e., their social identity). SIT explains three sets of processes with regard to how individuals identify with certain groups and how this shapes their attitudes and behavior: categorization, identification, and comparison. First, individuals categorize objects and people in order to simplify their understanding of reality; second, they identify with certain groups and not with others; lastly,
they engage in *comparison* processes, by evaluating their *in-groups* (i.e., groups with which they identify) relative to *out-groups* (i.e., groups with which they do not identify). During the latter two processes (identification and comparison), individuals emphasize the attributes for which they perceive their in-group to be superior to various out-groups, and conversely, they de-emphasize the attributes on which their in-group may be judged inferior to others. For example, IT professionals – who often identify strongly with their occupational group – may focus on the importance of traits, such as analytical intelligence and logical problem-solving abilities in evaluating their self-worth, while de-emphasizing the importance of social skills or fashion flair – personal attributes which are often considered to be lacking in IT professionals.

In social psychology, studies have shown that the three processes (categorization, identification, and comparison) lead to several benefits, in terms of group cohesion, satisfaction with one’s in-group, and performance, although there may be possible downsides. According to *Nass, Fogg, & Moon* (1994) individuals who relate strongly to a group identity: (a) perceive themselves to be more similar to each other; (b) are more likely to act cooperatively; (c) feel a stronger need to agree with the group’s opinion; and (d) perceive information received from in-group sources to be of higher quality than information from external sources. Conversely, SIT also explains why some individuals so readily conform in both beliefs and behavior (e.g., *groupthink* (*Janis, 1972*)), relative to others who do not identify so strongly with the group. The three processes comprising SIT also serve to explain the cognitive processes that underlie discrimination against out-group members.

Although SIT has been widely employed in social psychology, it has received limited exposure in management research and – with the exception of a recent conceptual paper by *Straub et al.* (2002) – it has been largely neglected in IS research. Among the few management studies that have explored SIT, one study (*Brunetto & Farr-Wharton, 2002*) examined Australian police officers’ job satisfaction as a function of identification with their in-group (other police officers) rather than with the constituents they serve; a second study compared the level of identification that temporary and permanent employees had for members of their in-group and out-group (*Chattopadhyay & George, 2001*). Related to IT use, *Nass et al.* (1994) explored computer users’ trust in information they received via e-mail, examining levels of social influence depending on whether the message source was an in-group or out-group member.

In proposing how SIT and the virtual onion model may be used in IS research, we argue that research on users’ interpretations and behaviors regarding IT cannot focus on a single dimension of users’ social identity alone (e.g., NC or OC), since this may overlook other identity layers that influence their beliefs and actions even more strongly (e.g., gender, age, ethnicity, social class, occupational, or linguistic group). Moreover, we believe that whichever dimensions are posited to influence behavior, data corresponding to these constructs must be explicitly captured and analyzed with regard to the beliefs or behavior in question. For instance, if *uncertainty avoidance* or *power distance* are the attributes believed to shape individuals’ IT usage behavior, researchers should explicitly measure these constructs for the subjects, rather than make assumptions about subjects’ scores on these constructs, based on numeric results derived from prior research. To automatically ascribe certain beliefs or attitudes
to research subjects, based on prior research with other subjects, is to promote an “ecological fallacy” (Straub et al., 2002)—to assume that all individuals of a given national, occupational, or OC will exhibit the same attitudes and behaviors that have been observed in other members of what is presumed to be a homogenous group. To overcome this hurdle, our approach to studying the so-called “impact” of IT and culture must change. Researchers must explicitly hypothesize which beliefs or attributes explain the focal behavior and then measure them—rather than just attributing subjects’ behavior to being “of the Chinese culture.”

There have been signs of progress in research on IT and NC recently. Firstly, several recent studies (Ford et al., 2003; Myers & Tan, 2002; Walsham, 2002) have critiqued the emphasis on Hofstede’s cultural dimensions in IS research—in particular, the assumption that culture equates with the country or “nation-state” in which an individual was born or raised. Second, researchers have criticized the over-reliance on comparative studies, instead suggesting that such studies have been helpful in initially highlighting the importance of cultural factors, but that future research should employ more incisive models regarding the influence of culture on individuals’ IT beliefs and behavior. In their introduction to a special issue on IT and culture, Davison & Martinsons (2003, pp. 3, 5) stated that:

Culture may usefully be compared to an iceberg: we can observe directly only the small part that lies above the water’s surface. More difficult to understand... are the reasons for and meaning of that behavior.... [When] analyses of different context have been undertaken, there has been a tendency to compare and contrast IT-related phenomena in ... [a few] countries and then attribute the differences to a rather imprecise “culture.” Relatively few researchers have probed the invisible part of the iceberg in an attempt to understand the reasons for the observed differences....

Similarly, in their closing editorial essay, Martinsons & Davison (2003, p. 113):

argue for the need to move beyond simple comparative research... in conducting and reporting cross-cultural research. Many of our reviewers noted that simply contrasting the behavior or attitudes in different cultural contexts no longer provides a substantial contribution.

While understanding the role of NC as it relates to IT usage and associated management practices is important, the value of simple country-level comparisons may be limited to IT-related practices that derive from legal, political, and regulatory environments (King et al., 1994). Examples of topics where it may make sense to adopt a country-specific approach are for studying various approaches to IT regulation (Milberg, Burke, Smith, & Kallman, 1995), examining the evolution of the “high-tech” sector in a given country (Gangopadhyay, 1996; Trauth, 1999), or analyzing national differences in users’ trust in online shopping (Chau, Cole, Massey, Montoya-Weiss, & O’Keefe, 2002), which are themselves shaped by institutional sources of trust. Examining the behavior of individuals along the lines of NC can make sense when the behavior in question is likely to be influenced by such country-specific policies, infrastructures, and other legal, political, regulatory, and institutional factors (King
et al., 1994; Zucker, 1986). When the phenomena in question are not predominantly shaped by country-level institutional forces, then simple comparisons of respondents by nation are unlikely to reveal insights about the determinants of individual behavior. In such cases, a more comprehensive approach grounded in SIT can help to expose the multiple identity layers that shape individuals’ beliefs and behavior. By adopting the virtual onion model (with its roots in SIT) to study individuals’ IT-related beliefs and behavior, IS researchers can progress from simple, one-dimensional approaches for comparing subjects from different countries to develop more incisive theories that encompass the multiple spheres of influence on subjects’ behavior.

5.1. Applying SIT to study IT and culture

The virtual onion model we propose is applicable to both positivist and interpretive research. Positivist researchers might collect data using large-scale surveys, measuring different variables that they believe may influence individuals’ IT-related beliefs and behavior (e.g., social class, occupational group, level of education, etc. (Hill et al., 1998)). For example, one prior study examined the influence of NC (comparing Greek and American managers) (Ferratt & Vlahos, 1998), while also considering the influence of managerial level, a covariate which the researchers found to shape managers’ beliefs about the value of IT in their firms. While positivist researchers could plan large-scale surveys with specific measures corresponding to different identity layers, interpretive researchers can employ the virtual onion model through a more *emic* (as opposed to *etic*) research perspective (Myers & Tan, 2002; Tayeb, 1994). Interpretive researchers can closely engage with their informants, asking them about the strength of their affiliation with various social groups, and then identifying the importance of various identity group affiliations on subjects’ IT-related beliefs and practices. For example, in one study that used focus groups to study Egyptian business professionals (Straub et al., 2001), researchers asked subjects to explain how closely they identified with different social identity layers (e.g., as an observant Muslim, as a rural or urban resident, or as a member of the upper social class, etc.). Qualitative, interpretive researchers can try to “tease out” the importance of different identity groups through analyzing the meanings that their informants reveal.

Certain research questions lend themselves to study with the virtual onion model. For example, the acceptance and use of a newly introduced ERP system in a MNC could be influenced by a host of factors at both the national, organizational, and work-group levels. Researchers could assess the strength of subjects’ in-group affiliations and try to identify variations in beliefs and behavior that are associated with nation-, organization-, and workgroup-level factors. Another example is in the virtual teams arena with teams composed of diverse members (who might vary based on nationality, language, or occupational group). Knowledge management and transfer can also have many cultural implications when the researcher seeks to gather data from both headquarters and from subsidiaries in different geographic locations. Knowledge that is readily understood in one location may be interpreted very differently in other cultural contexts.
Despite differences in the “age” of the two research streams that we reviewed above (with research on IT and OC being a decade older), we can identify various insights that each set of researchers can learn from the other. NC researchers may learn from OC researchers that both IT and culture are malleable, at least to a degree and that, when studied over longer periods of time, many important cultural changes that occur. OC research can also offer the insight that cultures can be fragmented and differentiated, and that individuals may have overlapping affiliations with multiple subgroups. Alternatively, OC researchers may learn from NC researchers that culture is something to be studied and interpreted, but not something to be consciously manipulated and controlled. This insight is useful because one stream of OC research assume that culture is amenable to deliberate managerial control (Deal & Kennedy, 1982) – a view that is contested elsewhere (Robey & Azevedo, 1994). There is reason for optimism. In the past, the two research streams that we reviewed have each offered a partial and fragmented perspective on culture. Moving forward, however, we believe that researchers can meld a better understanding of culture through the virtual onion metaphor – one that is more holistic, based on SIT. With the virtual onion framework, there are many opportunities to examine the influence of various identity layers on a person’s IT-related beliefs and behaviors.

5.2. Implications for practice

Practitioners can also benefit from the insights that we offer. In an increasingly global milieu, issues of NC and OC require conscious attention. Managers who are sensitive to the cultural implications of IT within a specific context can better use these tools to their firm’s advantage. Although managers with experience working in diverse national and company cultures may intuitively grasp the significance of having cultural sensitivity, all managers need to recognize the role of cultural issues, as they affect employees’ performance in the workplace. Such awareness may shape managers’ approach to planning, design, and implementation of new forms of IT. Cultural awareness should become part of the learning process for IT designers, managers, and consultants.

5.3. Future directions

The virtual onion model (Straub et al., 2002), has not yet been empirically validated. Obviously, some theory-testing will be required; however, testing the model in full may be problematic, given its complexity. A more expedient path may be to examine interactions between just two levels of social identity at a time (e.g., NC and OC, or NC and occupational culture). This would be a natural progression based on the ideas here. Given that IT research on NC is still in its early stages – having begun just over a decade ago (Ein-Dor, Segev, & Orgad, 1993; Robey & Rodriguez-Diaz, 1989; Straub, 1994; Watson et al., 1994) – it is not surprising that many studies have employed what Adler (1983) considers to be less sophisticated models of culture (i.e., comparative, and ethnocentric) and less complex research designs (e.g., cross-sectional surveys and laboratory studies). Nonetheless, globaliza-
tion means that the cultural issues faced by IT and other business managers are related to MNCs, global outsourcing, and distributed, cross-cultural teams (Jarvenpaa et al., 1998). More polycentric (ethnographic), geocentric (studies of MNCs), and synergistic (studies of intercultural exchange) designs are needed to ensure that IS managers and scholars can benefit from the full range of insights available from studying the interaction between IT and NC. Another option for advancing theory in this area is for researchers to employ the “process approach” to theory-building and testing (Markus & Robey, 1988). To date, this approach has received little attention in research on IT and NC, although it is widely used in OC research. In contrast, most studies of IT and NC have employed a “variance approach” to theory-testing (Markus & Robey, 1988), seeking to maximize amount of variance explained in the outcome variable (IT acceptance or use), while minimizing other possible distractions – in the form of additional theoretical complexity. As a research community, we should be ready to incorporate process theories and a more nuanced view of culture, and these will help in making further progress. In this regard, we believe that the advice offered by cross-cultural researcher, Tayeb (1994), can serve as a timely rallying call for research on IT and culture:

We live in an increasingly shrinking world, where internationalization is bringing us into closer contact with one another. Understanding other peoples and developing sensitivity to their ways of life are very crucial to the success of our social and business interactions. … Our discipline has long gone past its infancy and adolescence, and there can be no excuse for avoidable imperfections and amateurism … Cross-cultural studies have made a major contribution to our understanding of organizations, but they have still a long way to go. Some of the problems … are being recognized and tackled, while others have been swept under the carpet. We must pull the wealth of our accumulated collective experience together, approach [cross-cultural] research with more care and develop holistic and coherent ways of translating our enthusiasm for understanding organizations into meticulous, academically sound research (Tayeb, 1994, p. 446).

6. Conclusion

This paper has reviewed the literature streams of IT/NC and IT/OC, describing the virtual onion model, adapted from SIT, as an analytical lens for integrating both streams of research. We note that, in many cases, the literature on IT/OC has evolved through a set of stages similar to those through which the IT/NC research tradition appears to be evolving. Although it is not our intention to assert the superiority of one research tradition over the other, we acknowledge that the stream of research on IT and OC has a 10-year lead on IT and NC research. The former has struggled with many of the same challenges and opportunities that we perceive are now being confronted by the latter stream of research. Rather than asserting the supremacy of one view over the other, however, we wish to underscore what they hold in common,
and identify how they can learn from each other’s insights and challenges. If researchers were to explicitly capture data on and analyze the specific cultural attributes that are assumed to be responsible for the observed differences between groups, several benefits would occur, including greater statistical power and a clearer link between the social identity attributes of the subjects studied and their values and/or behavior. In the existing body of research, specific cultural dimensions are often attributed to the study subjects, rather than measured explicitly. We have described the benefits of the virtual onion model, derived from SIT, as an alternate conceptualization that we believe will encourage researchers to be explicit about the many social identity layers that shape individuals’ beliefs and behavior. Of course, like all metaphors, our model is imperfect: by explicitly focusing our attention on certain ways of “seeing” culture (i.e., the multiple identity layers), we are less able to “see” other manifestations of culture (Morgan, 1986).

Distinguished statistician, George Box, is well-known for arguing that “all models are wrong; some models are useful” (Box, 1979, p. 202). We hope that our virtual onion model can serve as a first step toward more holistic and coherent ways of representing the diversity of human behavior, as individuals within and outside of organizations confront new forms of IT and integrate them into their working and social lives.

Appendix A. Definitions of Hofstede’s cultural dimensions

*Individualism v. collectivism* reflects the way members emphasize their own needs over the group’s needs. Individualism can be seen as a concern for one’s self as opposed to a concern for the group to which one belongs. In individualistic cultures, people think of themselves as “I”, classify themselves by their individual characteristics, and expect to receive recognition for their own accomplishments. Conversely, in collectivistic cultures, the needs of the group or clan are more important than a single individual’s needs. In collectivistic cultures the group is seen as the major source of identity, loyalty, and achievement (Hofstede, 1980).

*Power distance* is the extent to which large differentials of power and therefore inequality are accepted in a given culture. Power distance will condition the extent to which employees accept that their boss has considerably more power than they do. High power distance implies that employees will accept that their boss’s decisions and opinions are correct because he or she is the boss – and not because his or her opinions are qualitatively or quantitatively good. Employees in low power distance cultures accept that the boss has more power and is right only when they know the best way to do something or have the correct answers. Countries with high power distance emphasize hierarchical symbols while countries with low power distance are more egalitarian (Hofstede, 1980).

*Uncertainty avoidance* is the level of risk accepted by a culture, which can be shown by the emphasis on rule obedience, ritual behavior, and labor mobility. This dimension examines the extent to which people feel threatened by ambiguous situations. Cultures with low levels of uncertainty avoidance have greater tolerance for
ambiguity and less need for formal rules. The opposite will hold true for high uncertainty avoidance cultures (Hofstede, 1980).

Masculinity/femininity refers to culture differentiation on the basis of gender and activity. For instance, in masculine cultures gender differentiation is quite pronounced, whereas in feminine cultures both sexes are more likely to engage in all types of professions or activities. Masculine cultures tend to emphasize work goals such as earnings, advancement, and assertiveness. On the other hand, feminine cultures tend to emphasize personal goals such as friendly atmosphere, getting along with the boss and others, and a comfortable work environment (Hofstede, 2001).

Finally, short-term v long-term orientation concerns the length of the time horizon that individuals consider in their actions and decision-making. In general, western cultures have a greater focus on immediacy in decision-making (e.g., the expectation of meeting quarterly business targets), compared to eastern cultures (e.g., China), where there is a greater concern for tradition, and the long-term implications of decisions and organizational performance (Hofstede & Bond, 1988).

References


