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Past IS studies on culture have primarily focused on two levels of analysis: national culture and organizational culture. The gap in our knowledge of culture is in the area of occupational culture of IT professionals. Occupational culture, unlike organizational culture, is not bounded by a single organization, but rather forms itself around specific expertise, similar tasks, and a sense of itself as a distinct occupational group. In Part I, the 'strong program' of cultural sociology is used to examine and interpret the meaning of the core values of the IT occupation through the framework of shared language, shared history, and shared context. The interview results informed the creation of a survey instrument in Part II to measure six occupational values, Autonomy, Structure, Precision, Innovation, Reverence for Knowledge, and Enjoyment, and ten typical business management values. Significant differences were found between responses of IT professionals and non-IT business managers in 32 companies in the U.S. An additional executive survey measured the level of IT/Business Alignment and IT Value for each firm in Part III. A PLS model provides evidence that occupational cultural differences do significantly impact both IT/Business alignment and IT Value.

AN EXAMINATION OF IT OCCUPATIONAL CULTURE:

INTERPRETATION, MEASUREMENT, AND IMPACT

by

Timothy Jacks

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Approved by

Prashant Palvia_____
Committee Chair

To Priscilla, Lynsey, and Alec

APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of

The Graduate School at The University of North Carolina at Greensboro.

Committee Chair   ___Prashant Palvia_____

Committee Members   ___Lakshmi Iyer_____

    ___Riikka Sarala_____

    ___Sarah Daynes_____

__June 1, 2012_____
Date of Acceptance by Committee

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CHAPTER I

INTRODUCTION

Culture in Information Systems (IS) research has been an important area of study for over 25 years. Culture has many definitions and perspectives in IS studies (Kappos & Rivard, 2008). A definition widely used in IS research is "the collective programming of the mind that distinguishes the members of one group or category of people from others" (Hofstede & Hofstede, 2005, p. 4). Anthropologist Clifford Geertz describes culture as "webs of significance" (Geertz, 1973). A sociological definition of culture is "a patterned sphere of beliefs, values, symbols, signs, and discourses" (Smith & Riley, 2009, p. 2). IS research on culture has focused on two levels of analysis: national and organizational (Leidner & Kayworth, 2006). However research at the level of occupational culture has been neglected. This study focuses on the occupational culture of Information Technology (IT) professionals.

IT professionals are defined as people who work within a formal IT department or fulfill the role of IT for an organization. IT professionals include those who specialize in Systems Analysis & Design, Programming, Applications, Database Administration, Telecommunications, Infrastructure Support, Project Management, and Operations. The Bureau of Labor Statistics projects high growth for IT occupations through 2018 (BLS, 2011). This is rapid growth for a career that is still in its relative infancy.

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The IT profession is developing its own occupational culture that is distinct from organizational culture (Trice, 1993; Ramachandran & Rao, 2006; Nord et al, 2007; Gregory, 1983). Organizational culture is "the dominant pattern of basic assumptions, perceptions, thoughts, feelings, and attitudes held by members of an organization" (Schein, 1990). Occupational culture, in contrast, is not bounded by a single organization, but rather bases its culture on specific expertise, similar tasks, and a sense of itself as a distinct occupational group (Trice, 1993). Occupational culture, thus, spans across all organizations. Leidner & Kayworth (2006) point out that "what has received the least amount of attention in the literature on IT and culture is the very notion of an IT culture" (p.371). There is some confusion over the term "IT culture" as it can either refer to an individual's cultural attitudes towards Information technology or to the cultural attitudes that members of the IT occupation share (Walsh, 2011). Therefore this study will use the specific term "IT Occupational Culture" in order to refer to the latter.

The study of IT occupational culture (ITOC) is important for several reasons. First, "culture affects action" (Swidler, 1986, p. 281). Culture has a causal effect on IS behavior at different levels, including national, organizational, and occupational (Karahanna, Evaristo, and Srite, 2005). IT occupational culture, in particular, defines shared meanings and expected behaviors for IT professionals (Nord et al., 2007).

Second, cultural conflict can arise when two or more groups interact that do not share the same core set of values (Leidner & Kayworth, 2006; Nord et al., 2007). Schein (1988) defines a group as a collection of people who 1) interact with each other, 2) are psychologically aware of each other, and 3) perceive themselves as a group. Thus, when

the IT occupational group interacts with a different occupation, such as business managers, the result can be cultural conflict (Guzman, 2006; Nord et al., 2007). IT employees are typically perceived as being at odds with the rest of the organization. While there is qualitative and anecdotal evidence for this cultural conflict, there is little quantitative evidence. IS literature has repeatedly called for more measurable dimensions of IT culture (Leidner & Kayworth, 2006; Kaarst-Brown & Robey, 1999). While Hofstede (1980; 1990) and House et al. (2004) have been successful in quantitatively measuring values of both national and organizational culture, this has not yet been done within the context of IT occupational culture. Karahanna, Evaristo, and Srite (2005) say that "the role of values in attitude models in IS research has been largely ignored, possible due to the fact that most research was performed in single cultures (both organizational and national)" (p. 9).

Third, culture can impact business outcomes. These outcomes might be positive or negative. For example, IT projects frequently succeed or fail depending how well IT professionals interact with non-IT business managers within a firm (Pliskin et al., 2003; Iivari & Huisman, 2007; Leidner & Kayworth, 2008; Walsh, 2009). Such studies, however, evaluate the organizational level of analysis. Occupational culture, on the other hand, crosses the boundaries of individual organizations. Research on IT occupational culture is still in the exploratory stage where it has been identified as a phenomenon of interest, but more empirical research is necessary (Guzman et al., 2004; Guzman et al. 2006; Ramachandran & Rao, 2007; Nord et al., 2007). Examining the occupational level of culture is necessary to see why IT departments tend to experience more than their fair

share of friction with non-IT business users (Nord et al., 2007). The 'clash of cultures' between IT workers and business users continues to be a problem where "frustration remains high" on both sides (Glen, 2011, p. 44).

More specifically, occupational culture may have something important to add to the critical area of IT/Business alignment and business outcomes. IT/Business alignment is typically viewed as the level of fit between the IT strategy and the business strategy (Tallon 2007/2008; Luftman & Kempiaih, 2008). The greater the alignment, the greater the business value from IT in terms of firm performance for profitability and productivity (Tallon, 2007/2008; Chan et al., 2006). But the literature also points to potential *cultural* influences on IT/Business alignment (Chen & Reich, 2007; Farrell, 2003; Van Der Zee & De Jong, 1999). Chan & Reich (2007) make a specific call for new models with novel antecedents and new theories to help explain the cultural aspects of IT/Business alignment which this research seeks to answer. While IT/Business alignment manifests itself within specific organizations, it is actually an industry-wide issue (Luftman & Kempiaih, 2008), suggesting that the level of analysis should be different from the organizational level. Based on the literature, this study proposes that there are specific and measurable cultural factors at play in this problem that can best be addressed by examining the occupational level of analysis.

One explanation for poor IT/Business Alignment may be a lack of shared occupational *values*. Shared values are the core element of any cultural group (Deal & Kennedy, 1982; Hofstede & Hofstede, 2005; Brief & Nord, 1990). This study attempts to pinpoint value dimensions at the occupational level of analysis. In order to begin this

exploration, the interdisciplinary lens of cultural sociology was used to provide a theoretical foundation. Classical sociological theorists like Emile Durkheim and Max Weber still have relevance for studying occupational culture, and they are frequently used by contemporary cultural sociologists like Gary Fine, Alexander Riley, Wendy Griswold, and Jeffrey Alexander.

Jeffrey Alexander's (2003) 'strong program' of cultural sociology at Yale University was used to guide the initial stages of this effort. There are three criteria for researchers in the strong program: 1) Culture must be an autonomous construct, i.e., an independent variable. 2) 'Thick description' hermeneutics must be used to decode narratives and symbols and avoid abstract or unmeaningful values. 3) The strong program specifically seeks empirically-supported causal clarity about the theoretical relationships between culture and action (Alexander, 2003). Alexander's strong program "represents one of the more intellectually ambitious of recent theoretical frameworks for cultural analysis" (Smith & Riley, 2009, p. 193).

This strong program is actually conducive to a blend of both positivist (for causal clarity) and interpretive (for meaningful interpretation) methods of research. Orlikowski & Baroudi (1991) affirm that both approaches are appropriate for IS research. "The existence of a plurality of perspectives allows the exploration of phenomena from diverse frames of reference" (Orlikowski & Baroudi, 1991, p.2).

A number of research gaps in the IS literature exist that this research seeks to fill. First, value dimensions of IT occupational culture are missing in the literature despite being called for (Kaarst-Brown & Robey, 1999; Leidner & Kayworth, 2006). Second,

studies of IT occupational culture have so far been interpretive with no quantitative value

measures (e.g., Kaarst-Brown & Robey, 1999; Guzman et al., 2004; Nord et al., 2007), or

quantitative value measures that examine IT culture but at different levels of analysis

than the occupational such as the organizational level (e.g., Plisken et al., 1993) or the

individual level (e.g., Walsh, 2009; Walsh, 2011). Third, studies that do focus on the

occupational level of analysis have not examined the impact on business success (e.g.,

Guzman, 2006; Kwantes & Boglarsky, 2004). The occupational culture for IT

professionals is only beginning to be explored, in part because the career is still new.

This dissertation research was conducted over two years in three parts, each of

which will address one of the research gaps. Part I was highly interpretive in the tradition

of cultural sociology and uncovers the core cultural values of IT occupational culture as

well as their deeper meaning. Cultural values are not free-floating in a vacuum but rather

part of a greater whole. The deeper meanings of IT occupational values were investigated

by putting them in their proper cultural context and establishing a nomological network

of four interrelated constructs, namely, 1) Shared Values, 2) Shared History, 3) Shared

Language, and 4) Shared Context which will be defined further below.

Part II is a positivist investigation into scale creation in the tradition of Hofstede

(1980) and House et al. (2004) and provides a new survey instrument measuring the

occupational values identified in Part I as well as typical business management values.

Business management culture is a useful occupational culture for comparison because of

the frequent friction between IT professionals and business managers within an

organization (Nord et al., 2007). Where IT professionals are the ones who make IT work,

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business managers are the ones who use IT (Markus & Bjorn-Andersen, 1987; Grindley, 1992). The differences between IT professionals and business managers represent a 'cultural chasm' (Ward & Peppard, 1996) that is worth exploring in detail. Note that the creation of a set of cultural value dimensions that would cover all occupations is beyond the scope of this dissertation. The goal is depth, not breadth. It should be possible to create a parsimonious set of meaning-*full* value dimensions conducive to measurement that have specific relevance to the IT occupation.

Part III is a positivist investigation of the impact of these occupational cultural differences between IT employees and non-IT business managers on the critical area of IT/business alignment. Greater occupational cultural differences, measured as Euclidian distance by the survey instrument in Part II, was expected to lead to lower IT/Business alignment. IT/Business alignment has been defined as the interaction or fit between IT strategy, including mission, objectives and plans, and business strategy (Tallon, 2007/2008; Reich & Benbasat, 1996). This type of alignment is important because the greater the alignment, the greater the business value from IT in terms of firm performance (Tallon, 2007/2008; Chan et al., 2006). Business value from IT is referred to more simply as 'IT value'. IT/Business alignment leads to greater IT value because it enables firms to successfully compete on a global level (Pankratz, 1991). Moreover, IT value is important because it leads to increased profits for an organization and is significantly correlated with business performance (Chan & Reich, 2007). Both IT/Business Alignment and IT Value were measured based on survey responses from executives at 32 different companies in the U.S. for Part III.

Parts I, II, and III are part of a greater whole, namely a unified and in-depth examination of IT occupational culture. Research questions for this dissertation include the following:

1. *Part I: What are the core values of IT occupational culture and how have they developed out of shared history, shared language, and shared context?*

2. *Part IIa: What are the measurable dimensions of IT occupational culture?*

3. *Part IIb: Is IT occupational culture significantly different from business management culture and, if so, how?*

4. *Part III: What is the impact of occupational cultural distance on IT/business alignment and IT value?*

The contribution of Part I is an interpretive portrait of IT occupational culture that proposes a set of meaningful values within a framework based on cultural sociology. The use of cultural sociology for IS research is, in itself, a novel contribution. The contribution of Part II is the development of a validated instrument as well as a comparison of IT occupational culture with business management culture. The contribution of Part III is to offer empirical evidence of the impact of IT occupational culture on IT/Business alignment and IT value. The overall contribution of the completed dissertation will be new and enhanced knowledge about IT occupational culture.

The sections of this dissertation are outlined as follows: Section 2 conducts a thorough literature review of the theoretical foundations used to guide the analysis. Section 3 proposes the specific research objectives and a research model for the entire study based on the initial pilot. Section 4 describes the steps involved in the specific

methodology for each Part. Sections 5, 6, and 7 discuss the results of each Part. Finally,

Sections 8, 9, 10, and 11 address the contributions to knowledge, future research,

limitations, and conclusions respectively.

CHAPTER II

THEORETICAL FOUNDATIONS

2.1 What is Culture?

Culture is commonly understood as 'the way things are done around here', but this is an oversimplification (Schein, 1999). Culture can consist of the categories and plans for action shared by a group as well as the shared understandings people use to coordinate their activities (Harper & Lawson, 2003). Hofstede defines culture as "the collective programming of the mind that distinguishes the members of one group or category of people from others" (Hofstede & Hofstede, 2005, p. 4), and this is one of the most popular definitions in IS literature (Leidner & Kayworth, 2006). Despite the obvious appeal for an IS audience, Hofstede emphasizes that people are not "programmed" in the same way that computers are.

Hofstede's definition succinctly highlights the collective element of culture at a group level, however it may underemphasize the deeper meanings of culture. To contrast with Hofstede, Clifford Geertz, the noted anthropologist, says "The concept of culture I espouse. . . is essentially a semiotic one. Believing, with Max Weber, that man is an animal suspended in webs of significance he himself has spun, I take culture to be those webs, and the analysis of it to be therefore not an experimental science in search of law but an interpretative one in search of meaning" (Geertz, 1973, pp. 4-5). This definition highlights the perspective that culture is more important than simply differentiating one

group from another. Culture is paramount because it provides meaning in our day-to-day lives and cultural sociologists tend to use Geertz' definition of culture (Griswold, 2002). "Geertz, and Weber before him, took culture to involve meaning… how people in social contexts create meaning" (Griswold, 2002, pp.12-13). Culture is "an historically transmitted pattern of meanings embodied in symbols, a system of inherited conceptions expressed in symbolic forms by means of which men communicate, perpetuate, and develop their knowledge about and attitudes toward life" (Geertz, 1973, p.89).

Culture may be broken down into various components depending on the framework used. Ferrante's framework (2003) divides culture into material and nonmaterial components. Material components are physical objects to which people have attached meaning while nonmaterial components are intangible and include beliefs, values, and norms (Ferrante, 2003). Schein's framework (1985; 1999) divides culture into three levels: artifacts, espoused values, and unconscious assumptions, with values being the easiest to identify because they are readily verbalized. Artifacts may be thought of as material components with values and assumptions being nonmaterial. Other frameworks are less categorical and simply identify lists of cultural components. Hofstede & Hofstede (2005) identify culture as symbols, heroes, rituals, values, and practices. Deal & Kennedy (1982) identify values, heroes, rites and rituals, and the environment as elements of culture. Culture can consist of "beliefs, ritual practices, art forms, and ceremonies, as well as informal cultural practices such as language, gossip, stories, and rituals of daily life" (Swidler, 1986, p. 273). Different authors emphasize many different elements of culture including "artifacts, norms, customs, habits, practices, rituals, symbols, categories, codes,

ideas, values, discourse, worldviews, ideologies, or principles. And this list is not exhaustive; any list of cultural 'things' will necessarily be incomplete" (Spillman, 2001, p. 4). While there are numerous conceptualizations of culture in the literature, a concise sociological framework of culture that is useful for this study, because it accommodates in a parsimonious way the different frameworks above, is that culture can be studied as "a patterned sphere of beliefs, values, symbols, signs, and discourses" (Smith & Riley, 2009, p. 2).

2.2 Values are the Core of Culture

The common element that exists in every cultural framework or every list of cultural elements is the idea of "values". Values are shared conceptions of what is good/bad, right/wrong, and important/unimportant with regard to human behavior (Ferrante, 2003). Values are broad tendencies towards certain states of affairs over others that address what is evil versus good, forbidden versus permitted, and abnormal versus normal (Hofstede & Hofstede, 2005). "The core of culture is formed by values" (Hofstede & Hofstede, 2005, p. 8). Deal & Kennedy (1982) and Brief & Nord (1990) also specifically identify values as the core of any culture. Cultural values are important because cultural practices and behaviors are based on values (Hofstede & Hofstede, 2005). Because values are considered the core of culture, most IS research related to culture at the national and organizational level has focused on dimensions of cultural values (Leidner & Kayworth, 2006). This study also attempts to pinpoint specific value dimensions, but at a new level of analysis, that of the occupation.

Before leaving the topic of values research, it should be noted that the approach of attempting to measure cultural values is not without its critics. While finding measurable values is useful for empirical research, the measurable values perspective is sometimes avoided in favor of more meaningful research through interpretation and literary criticism (Swidler, 1986). Despite this objection, Swidler (1986) goes on to say that "values remain the major link between culture and action" (p. 273). Swidler observes that values play a more significant role in "settled lives" than "unsettled lives". In settled lives, culture is integrated with action based on values. Unsettled lives, on the other hand, are periods of social transformation when people are learning new forms of collective action, practicing unfamiliar habits, and developing new strategies for action. "In unsettled lives, values are unlikely to be good predictors of action, or indeed of future values" (Swidler, 1986, p. 282). In order to address this issue, one could argue that the IT occupation has matured past its initial unsettled period of the 1980s and 1990s and has entered into a more settled period of occupational stability, one in which measured values are all the more relevant and timely to examine.

2.3 Sociological Literature

To fully address what occupational culture entails and how it should be studied requires a brief genealogy of sociological literature. This genealogy will not only inform the theoretical foundation but the appropriate methodological approaches to studying occupational culture. Sociology studies the attitudes and behavior of groups at a collective level (Timasheff, 1967). Sociologists of occupation have examined police,

industrial workers, prostitutes, airline stewardesses, doctors, car salespeople, and

paralegals (Harper & Lawson, 2003), lawyers, clergy, musicians, teachers, (Pavalko,

1972), architecture, accountancy, and nursing (MacDonald, 1995). An excellent example

of a cultural sociological approach to studying an occupation is Fine's (1996)

ethnography of restaurant workers. To date, such a sociological exercise has not been

done for the IT occupation. The roots of studying occupation run deep in sociology,

beginning with the 19th century founders of modern sociology, Emile Durkheim and Max

Weber. Durkheim and Weber form the base of a pyramid of theoretical foundations that

build on each other as shown in Figure 1 below.
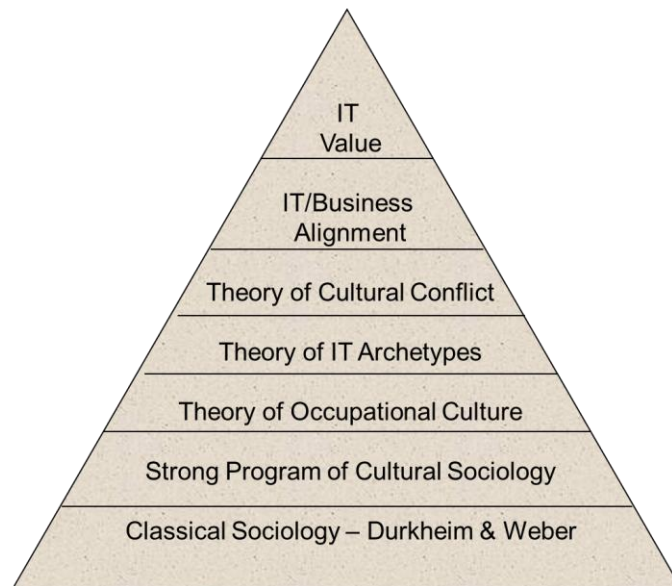
Figure 1. Theoretical Foundations

2.3.1 Durkheim and Weber

Durkheim's doctoral dissertation on *The Division of Labour* (1893) dealt with issues of social cohesion in a time of increasingly rapid social and economic change (Grint, 1991). Where 19th century thinkers were deeply concerned with social changes and the potential breakdown of social cohesion due to changes in occupation brought about by urbanization of life, Durkheim asserted that social cohesion was being reconstructed into new forms based on the increasing division of labor (Grint, 1991) and new occupational social groups (MacDonald, 1995). Where early society was relatively homogeneous, i.e., everyone had a similar occupation such as farming, social ties were based on similarity not differences (Durkheim, 1984). Durkheim called this "mechanical" solidarity. But with industrialized society came greater division of labor into different areas of specialization. Durkheim associated this type of society with "organic" solidarity. Organic solidarity refers to a metaphor of the human body that requires different parts, i.e., eyes, hands, organs, etc., in order to successfully function. Organic solidarity arises because we need each other's talents and skills in order for society to survive (Durkheim, 1984). He saw occupations as an important stabilizing element of society in times of change in that they preserve and pass on cultural traditions (MacDonald, 1995) New occupations represented new cultural differences between people (Harper & Lawson, 2003). However, no social group functions purely in a mechanical or organic mode, but rather a blend of the two (Durkheim, 1984). If we extrapolate Durkheim's analysis of the benefits of "organic" solidarity to the IT occupation, we might say that it is necessary for IT to work within the larger social

"body" of which they are a part in order to function smoothly. The organic metaphor resonates strongly with the idea of IT/Business alignment if one imagines an IT department as a social structure within a larger social structure of an organization.

Durkheim also had specific methodological instructions for sociology. Durkheim asserted that any social group consisted of social facts that can be studied scientifically. "A social fact is any way of acting, whether fixed or not, capable of exerting over the individual an external constraint, or which is general over the whole of a given society whilst having an existence of its own, independent of its individual manifestation" (Durkheim, 1982, p. 59). These social facts lie outside of individual consciousness and "are the beliefs, tendencies and practices of the group taken collectively" (Durkheim, 1982, p. 54). The approach of studying social facts is important because it represents a positivist view of reality. Social facts provide objective data that can test laws and hypotheses (Smith & Riley, 2009).

Collective representations are one type of social fact. Durkheim used the term 'collective representations' rather than 'culture' when talking about shared moral awareness and shared social life (Smith & Riley, 2009; Peacock, 1981; Korczynski, 2006). For Durkheim, social facts, and by extension collective representations, have an objective reality as much as objects in the physical world (Korczynski, 2006). Society was a moral phenomenon for Durkheim, held together by religious collective representations of the "sacred" and "profane" which ensure the survival of a smoothly functioning society by keeping the sacred separate from the mundane realm both in time and space (Durkheim, 1965; Smith & Riley, 2009). The sacred, for Durkheim, involved

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feelings of awe, fear, and reverence and were contrasted with the profane, or routine, aspects of life (Durkheim, 1965; Smith & Riley, 2009).

Durkheim's language of the sacred and profane aspects of social life is still used to describe and decode contemporary cultural symbols from TV talk shows (Gameson, 1998) to video games (Riley, 2010) to music (Daynes, 2010). Princeton's Robert Wuthnow (1987) asserted that the sacred aspects of society need not be limited to religion alone and anthropologist Mircea Eliade's (1959) book entitled *The Sacred & The Profane* points to the potential sacrality of work. While it may be counterintuitive to be discussing what is sacred in a study about IT occupational culture, there are actually close ties between computer usage and the language of the sacred in terms of the 'god-like' power of computers and those who can master them (Alexander, 1990; Roszak, 1994). Furthermore, the dynamic of reverence and fear may be relevant to the way IT workers and business users approach technology. Durkheim's approach is still relevant today and has even been useful in analyzing organizational culture in businesses (Korczynski, 2006).

Weber was also interested in the relationship between work and culture. In *The Protestant Ethic and the Spirit of Capitalism* (first published in 1904), he focused on the interplay between religion and work. With the rise of Protestantism, and Calvinism in particular, economic success became a sign of heavenly salvation (Smith & Riley, 2009) while wastage of time became the deadliest of sins (Brief & Nord, 1990). Work had a very special significance for the Puritans due to their sense of calling (Weber, 1992). In Weber's view, that sense of calling -- the transcendent *meaning* of work -- was

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transitioning in modern society towards increasing rationality and bureaucracy (Smith & Riley, 2009). Meaningless bureaucracy in work life was described vividly as an 'iron cage' of rationality (Weber, 1992). In this view, people are no more than cogs in a machine that limits their creative freedom resulting in disenchantment (Weber, 1992). This disenchantment in general, and the metaphor of being a cog in a machine in particular, will be seen again in the interview transcripts for Part I. Chillingly, Weber prophesized about the coming cultural rationality:

> Where the fulfillment of the calling cannot directly be related to the highest spiritual and cultural values, or when, on the other hand, it need not be felt simply as economic compulsion, the individual generally abandons the attempt to justify it at all. In the field of its highest development, in the United States, the pursuit of wealth, stripped of its religious and ethical meaning, tends to become associated with purely mundane passions, which often actually give it the character of sport. No one knows who will live in this cage in the future… (1992, p. 182).

Evidence in the interviews from Part I will provide some evidence that members of the IT occupation may be living in such a cage.

For Weber, occupational "status groups" became more important in explaining social action than Marxist "classes" (Weber, 1947; Grint, 1991). Where class is described as merely an economic descriptor, occupational status is a social descriptor (Weber, 1947). Status groups have a common 'style of life', shared customs, conventions, and training which grant them prestige (Weber, 1947; Smith & Riley, 2009). Weber's work on forms of rational control and bureaucracy are still applied today to organizational cultural studies (Grint, 1991; Korczynski et al., 2006; Orlikowski, 1991). The prestige

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aspect of certain occupational status groups, such as the IT occupation, may be extremely relevant if the IT occupation can be shown to have a common "style of life".

In terms of methodology, Weber emphasized a different approach to social reality to that of Durkheim. Where Durkheim emphasized the objective nature of external social reality, Weber advocated the interpretation of socially-constructed reality. In other words, culture can be studied, but only from the inside, not the outside. The interpretive method of *verstehen* (deep explanatory understanding) is necessary for studying collective ideas because sociologists are faced with thinking subjects, not inanimate objects (Weber, 1968; Grint, 1991). "Verstehen" means the observer must attempt to reconstruct the subjective meanings out of social action, including cultural values and shared histories and not just its measurable qualities alone (Weber, 1968; Smith & Riley, 2009). Weber's approach to studying culture as well as occupation is key to understanding how occupational groups provide meaning to life. Occupational groups can define people, drive them to work harder, and increasingly take over their lives (Harper & Lawson, 2003).

Maurice Halbwachs, a student of both Durkheim and Weber's The Protestant Ethic, emphasized the role that collective memory has in shaping culture (Halbwachs, 1925). Collective memory is not literal history, but the shared *interpretation* of history that was experienced and lived by a social group (Halbwachs, 1925). He used the Durkheimian view of collective representations and wanted to identify how people mythologize their own pasts (Coser, 1992). Collective memory is a cohesive force for a social group because it identifies the group's heroes and group origins (Coser, 1992).

Collective memory, for Halbwachs (1925), is specifically transmitted through language. Language affects culture by articulating its beliefs and values. A social group can only endure if its institutions are based on powerful collective beliefs and values (Halbwachs, 1992). For Halbwachs (1925), the estrangement experienced between different social groups is due to their not sharing enough collective memories. If two groups do not share common experiences, they will not interpret the meaning of the past or the present in the same way (Coser, 1992). Furthermore, this disparity in meaning will be passed on to each generation as they continually reshape their collective memories (Smith & Riley, 2009).

Occupational groups, among others, have their own memories that their members have constructed over a long period of time (Coser, 1992). The shared memory of a group is an important aspect of the culture of a social group (Connerton, 1989). While it is individuals who are doing the remembering, not groups or institutions, those individuals are part of a specific group context and use that context to both remember and re-interpret their past (Coser, 1992). This approach of studying the relationship between shared memory, language, and culture is still used today in sociology (Daynes, 2010). Based on Halbwach's analysis, one can surmise that the IT/Business alignment problem may be related to a lack of shared language, shared history, and/or shared context.

Talcott Parsons was an important champion in sociology of both Weber and Durkheim and the first to synthesize their work in the 1930s and 1940s (Smith & Riley, 2009; Timasheff, 1967). Parsons theorized that values had to be the central component of social action in order for groups to stay cohesive (Alexander, 2003). Parsons' General

Theory of Action had three systems including the social system, personality system, and cultural system (Parsons,1951). The cultural system was made up of cognitive symbols, expressive symbols, and values (Smith & Riley, 2009). Parsons proposed that by internalizing values and norms, people *align* their actions with those of others (Smith & Riley, 2009). Parsons is also the first sociologist to address different dimensions of values that can be analyzed by themselves outside of their context (Smith & Riley, 2009). Groups at any level of society are able to differentiate themselves through key value patterns including: particularism vs. universalism, affectivity vs. affective neutrality, collectivism vs. individualism, diffuseness vs. specificity, and ascription vs. achievement (Parsons, 1951). Parsons' strong influence can be seen in contemporary quantitative measures of national cultural values that have achieved popularity including Hofstede & Hofstede (2005), House et al. (2004), and Trompenaars (1993). Parsons agreed with Durkheim that modernity has not eroded meaning in society, in contrast to Weber's dim view (Smith & Riley, 2009). While Parsons was an early champion of values research Parsons, he has been criticized for not explaining the meaning of his values system in any hermeneutic depth (Alexander, 2003). Parsons functionalism was "denuded of musicality" and "without a counterweight of thick description, we are left with a position in which culture has autonomy only in an abstract and analytic sense" (Alexander, 2003, p. 16). Clifford Geertz was a student of Parsons who pursued this 'thick description' of culture (Smith & Riley, 2009) with notable success in the 1970s and 1980s.

Anthropologist, Clifford Geertz takes a more interpretive turn with culture. "Believing, with Max Weber, that man is an animal suspended in webs of significance he

himself has spun, I take culture to be those webs, and the analysis of it to be therefore not an experimental science in search of law but an interpretative one in search of meaning" (Geertz, 1973, pp. 4-5). Geertz moved away from Parsons' stiff views of values and norms in favor of richer descriptions of the complexities of culture. He "came to understand culture as an incredibly complex texture of signs, symbols, myths, routines, and habits that cried out for a hermeneutic approach" (Smith & Riley, 2009). Doing thick description requires the writer to capture a wealth of cultural detail and draw in the reader with a sense of being there both intellectually and emotionally (Smith & Riley, 2009). Critics of Geertz have said that his approach is too literary and not scientific enough (Smith & Riley, 2009). Yet Geertz' method has attracted followers like Jeffrey Alexander and the 'Yale Strong Program' which blend elements from Durkheimian theory and structuralism with Geertz' emphasis on narrative (Smith & Riley, 2009).

2.3.2 The Strong Program of Cultural Sociology

Alexander's strong program of cultural sociology suggests that structuralism and hermeneutics can "be made into fine bedfellows" (Alexander, 2003, p. 26). Alexander and his colleagues reject examining cultural content through structure alone, but incorporate rationality of social life with 'eruptions of the sacred' to form a meaningful explanation (Smith & Riley, 2009). Alexander has examined issues of why we work so hard and why we are so obsessed with technology in particular and shows how cultural issues are at play here (Alexander, 2003). "We need myths if we are to transcend the banality of material life. We need narratives if we are to make progress and experience

tragedy. We need to divide the sacred from the profane if we are to pursue the good and protect ourselves from evil. Technology is not only a means. It is also an end, a desire, a lust, a salvationary belief" (Alexander, 2003, p. 4). This strong program of cultural sociology has three criteria for researchers. First, culture must be an autonomous construct, i.e., an independent variable. Second, Geertzian thick description hermeneutics must be used to decode narratives and symbols and avoid abstract unmeaningful values (whereas "the weak program fails to fill these empty vessels with the rich wine of symbolic significance." Alexander, 2003, p. 13) And third, the strong program seeks empirically-supported causal clarity about the theoretical relationships between culture and action (Alexander, 2003). Alexander's strong program "represents one of the more intellectually ambitious of recent theoretical frameworks for cultural analysis" (Smith & Riley, 2009, p. 193) and therefore has been selected as the next layer in the pyramid of theoretical foundations.

To summarize this sociological literature review, both positivist and interpretive approaches may be simultaneously appropriate for studying group culture. Orlikowski & Baroudi (1991) affirm that both approaches are appropriate for IS research as well. "The existence of a plurality of perspectives allows the exploration of phenomena from diverse frames of reference" (Orlikowski & Baroudi, 1991, p.2) Where positivist studies are based on a priori structural relationships and the assumption of an objective social world independent of humans, interpretive studies are based on symbolic meanings and the assumption of a subjectively-created social world reinforced through action and interaction (Orlikowski & Baroudi, 1991). For culture scholars like Weber, Geertz and

Schein, studying culture relies on interpretive methods. Yet the majority of IS studies are positivist in the Durkheimian tradition, focusing on objective espoused values from cultural dimensions such as Hofstede & Hofstede (2005), House et al. (2004), and Trompenaars (2003). Value dimensions, like Durkheim's social facts, have a certain lawlike regularity and can be measured, but the meaning of those values themselves must be interpreted in order to achieve any real understanding, according to Weber (1992) and Geertz (1973). The strong program of cultural sociology reinforces this hybrid, interdisciplinary approach.

2.4 Theory of Occupational Culture

Geert Hofstede, the popularizer of national culture studies, mentions briefly that such a thing as occupational culture might be investigated but as yet there are no dimensions for measuring such a phenomenon (Hofstede, 1990). Edgar Schein, the popularizer of organizational culture studies, also points to the possibility of occupational culture having a strong influence in the workplace (Schein, 1999). Gallivan & Srite (2005) and Karahanna, Evaristo, and Srite (2005) identify organizational culture and national culture together as the two major streams of culture research, although they likewise acknowledge the existence of occupational culture and its potential impact on group behavior.

More recently, Walsh and Hefi (2008) and Walsh (2009) have popularized a "spinning top" metaphor to help explain the different levels of analysis of culture. The spinning top is used to emphasize the dynamic nature of culture where sometimes some layers "spin up" to be more influential than others. The center of the top represents

individuals with successive layers of culture spinning around them. National culture is

shown as closest to the individual in the center while organizational culture is further away

from the individual. Note that occupational culture is closer to the individual than

organizational culture in this model shown in Figure 2.
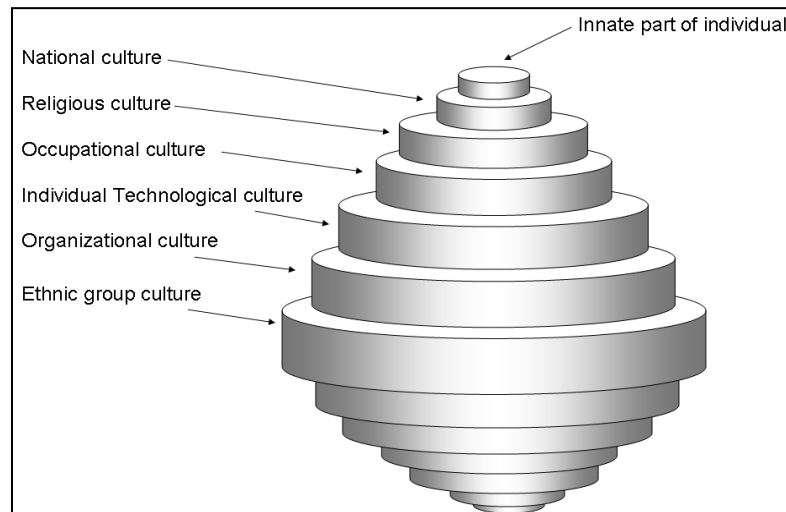
Figure 2. 'Spinning top' model of culture (adapted from Walsh and Kefi, 2008)

Occupational culture consists of values, norms, and symbols where values are the

most basic beliefs (Greenwood, 1957). Trice (1993) explores the defining characteristics of

occupational cultures in detail with his Theory of Occupational Culture. In this framework,

occupational cultures exist apart from organizational culture and can become a source of

conflict due to occupational cultural differences. Seven characteristics that separate out an

occupational culture are identified as 1) Esoteric knowledge and expertise, 2) Extreme or

unusual demands, 3) Consciousness of kind, 4) Pervasiveness, 5) Favorable self-image and

social value in tasks, 6) Primary reference group, and 7) Abundance of cultural forms (Trice,

1993). This framework has been used in more recent IS literature to verify that there is, indeed, the existence of such a thing as 'IT occupational culture' because it conforms to these seven characteristics (Guzman et al., 2004; Guzman & Stanton, 2004; Guzman et al. 2006; Ramachandran and Rao, 2007). For example, esoteric knowledge and technical jargon are prime examples of what separates IT people from other people in an organization. While the core area of values is absent from Trice's conceptualization of occupational culture, it serves as a useful description of the shared context of occupational groups.

2.5 Theory of IT Archetypes

In the late 1980s, the idea of IS or IT having its own professional culture was not a possibility given Orlikowski and Baroudi's (1989) assertion that IS is not a 'profession' but rather an occupational group. This idea was reinforced by Duliba & Baroudi (1991) who claimed that IS personnel form a weak occupational community, if they can be said to form an occupational community at all. Weak occupational communities have a lower sense of group identity than strong occupational communities. In other words, if there is no sense of community, there can be no sense of *shared* culture.

A pioneering exploration of the shared values and beliefs of IT culture empirically is by Kaarst-Brown & Robey (1999) with their Theory of IT Archetypes. Five archetypes of IT culture are developed from their ethnographic case study of two organizations using the metaphor of magic to explain differences in IT cultures within firms. The Theory of IT Archetypes identifies five different archetypes that describe possible attitudes within an IT department which include 1) "Revered", 2) "Controlled", 3) "Fearful", 4)

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"Integrated", and 5) "Demystified" (Kaarst-Brown & Robey, 1999) and focused on the relationships between IT departments and business departments. There are advantages and disadvantages to each of the five cultural archetypes which leads to the idea that some IT cultures are more disposed to organizational success than others (Kaarst-Brown & Robey, 1999). The study is highly interpretative and does not explicitly address what measurable dimensions of IT culture might look like, although they do call for such a quantitative measure as an area for future research. They emphasize that "rather than dividing the construct of IT culture into distinct dimensions, our approach is to describe them as coherent wholes through the use of metaphor." (Kaarst-Brown & Robey, 1999, p.213) This study is a useful foundation to build on for studying IT Occupational Culture. Without describing each archetype in detail, it is merely necessary to point out the direct connection between their use of the terms "Revered", "Fearful," and "Demystified" (being the opposite of "awe"). These terms harken back to Durkheim's definition of the sacred as that which inspires reverence, fear, and awe. Furthermore, the "Integrated" archetype describes an ideal form of partnership between IT and the business which would today be termed "IT/Business Alignment".

2.6 Theory of IT-Culture Conflict

A twenty-five year period of cultural studies within IS research is comprehensively reviewed and synthesized in Leidner and Kayworth (2006). They identify 6 broad themes of cultural research in IS: 1) Culture and IS Development, 2) Culture, IT Adoption and Diffusion, 3) Culture, IT Use and Outcomes, 4) Culture, IT Management and Strategy, 5)

IT's Influence on Culture, and 6) IT Culture (Leidner & Kayworth, 2006). They directly identify as a research gap this last theme of IT culture saying that "what has received the least amount of attention in the literature on IT and culture is the very notion of an IT culture. By IT culture, we mean the values attributed to IT by a group" (Leidner & Kayworth, 2006, p.371). Leidner & Kayworth (2006) provide a table of 21 possible dimensions of IT values based on prior literature, but call for more empirical studies.

Leidner & Kayworth (2006) propose a Theory of IT-Culture Conflict which identifies three different types of values, 1) Group member values, 2) Values embedded in a specific IT, and 3) IT values which can interact at the national, organizational and subunit levels to create three different types of conflict: 1) system conflict, 2) contribution conflict, and 3) vision conflict. Differences in cultural values, if left unchecked, can negatively impact organizational outcomes through continual conflict as evidenced by their many examples. Their framework is shown in Figure 3.
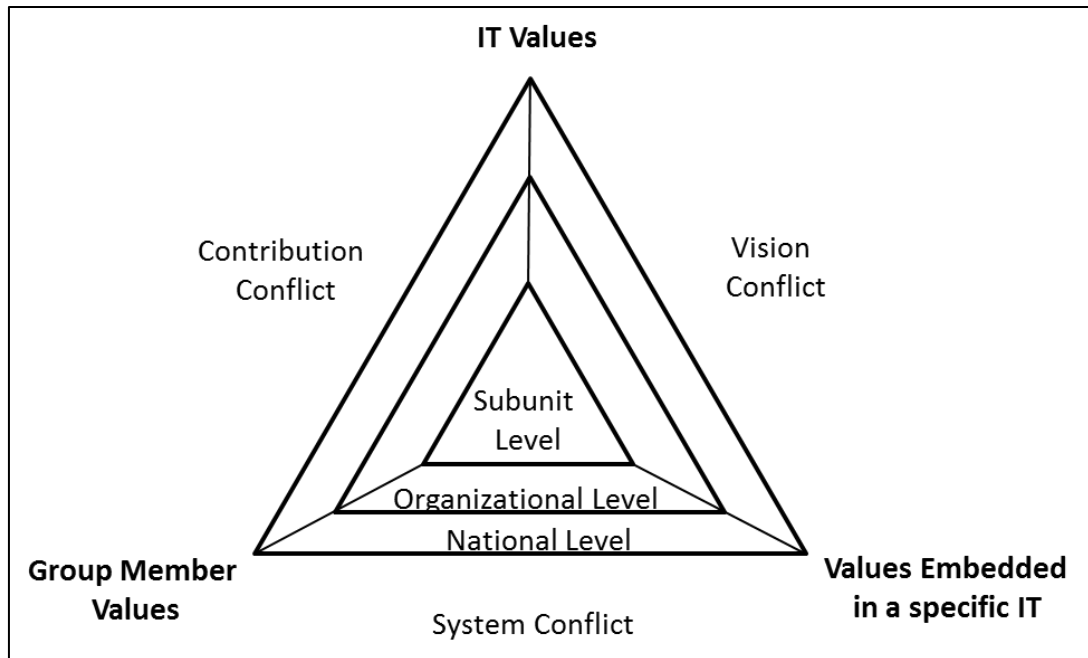
Figure 3. IT-Culture Conflict (Leidner & Kayworth, 2006)

Note that differing group member values between different subunits falls within their framework of cultural conflict. Leidner & Kayworth (2006) go on to say that while there has been much research on IT/Business Alignment, there has been very little research on the specific role of culture, at any level, in achieving IT/Business Alignment.

2.7 IT/Business Alignment and IT Value

The strategic necessity of having IT aligned with the business has been a top concern for business and IT executives (Luftman & Kempaiah, 2008). Early definitions of alignment referred to the strategic planning element of alignment alone, for example as "the interaction or fit between IT and business strategy" (Tallon, 2007/2008). Reich & Benbasat (1996) define alignment as the degree to which the mission, objectives, and

plans contained in the business strategy are shared and supported by the IT strategy. The greater the alignment, the greater the business value from IT in terms of firm performance (Tallon, 2007/2008; Chan et al., 2006). Furthermore, alignment between the firm's strategy, organizational structure, and information technology is the key to competing successfully on a global level (Pankratz, 1991). IT alignment is a management concern primarily because of its potential impact on firm performance. Strategic IT alignment leads to increased profits for an organization and is significantly correlated with perceived business performance (Chan & Reich, 2007).

Alignment has also been described more broadly than just including strategic planning. Strategic alignment of IT exists when an organization's goals and activities and its supporting information systems stay in harmony (McKeen & Smith, 2003). Good alignment means that the organization is applying IT in appropriate ways that are congruent with business strategy, goals, and needs (Luftman & Brier, 1999). Even more broadly, alignment is the business and IT working together to reach a common goal (Campbell, 2005) or simply everyone rowing in the same direction (Abraham, 2006). Alignment is also sometimes referred to as linkage, harmony, integration, fit, and fusion (Tallon, 2007/2008; Chan & Reich, 2007).

Organizational structure of IT is a common factor examined in the alignment literature in terms of whether the IT group is centralized, decentralized or federated (Chan & Reich, 2007; Luftman, 2000; Papp & Brier, 1999; Pankratz, 1991). There is a relationship between IT organizational structure and alignment in that organizations with

a federated IT have shown significantly higher alignment than those with highly

centralized or decentralized structures (Luftman & Kempaiah, 2007).

There are many points of alignment between business and IT in addition to

strategic planning and organizational structure. The cultural aspect, however, has not

been examined closely enough. "In the MIS literature, several dimensions of alignment

are clearly apparent: strategic/intellectual, structural, social, and cultural" Chan & Reich

(2007, p. 300). The social aspects are explored in Reich & Benbasat (2000) where

alignment is affected by four factors: 1) shared domain knowledge between business and

IT executives, 2) IT implementation success, 3) communication between business and IT

executives, 4) connections between business and IT planning processes. Van Der Zee &

de Jong (1999) echo the social theme of communication in discussing the lack of a

common 'language' between business and IT executives. The cultural aspects have been

explored as the idea of a 'culture gap' between IT and business people in implementation

failures (Taylor-Cummings, 1998). Pyburn (1983) points out the importance of cultural

fit between business and IT as a precondition for successful IS planning. None of these,

however, have looked at the need for shared values between IT and business leaders.

Farrell (2003) asserts that that there are several culturally-specific antecedents to

alignment. Van Der Zee & De Jong (1999) suggest that a future research challenge is to

explicitly understand the prerequisites for IT/management integration in cultural terms.

Watson et al. (1997) also observe that alignment has a strong cultural and social

component. Finally, Chan & Reich (2007) make a specific call for new models with

novel antecedents and new theories to help explain the cultural aspects of IT/Business alignment which this research seeks to answer.

2.8 Motivation for Research

IT/Business Alignment is, at least in part, a cultural phenomenon. It has previously been examined as an internal issue, i.e., one of organizational culture. However, it is a pervasive issue throughout many organizations in many industries in different size organizations. It seems reasonable to assert that there is some factor – a factor *external* to any individual organization – that is driving misalignment. While it manifests itself within specific organizations, it actually is an industry-wide issue, suggesting that the level of analysis should be higher than the organizational level. This research proposes that there are cultural factors at play in this problem that can best be addressed by examining the occupational level of analysis. The functional areas of IT and business are comprised of distinctly different occupational groups. The IT occupational group, with its own values, history and language, forms a subculture within the organization that impacts the degree of alignment. Lack of alignment may be directly related to core values of different groups being too divergent.

Based on the literature review in Table 1, a number of gaps exist that this research seeks to fill. First, the value dimensions of IT occupational culture are missing in the literature despite being called for (Kaarst-Brown & Robey, 1999; Leidner & Kayworth, 2006). Second, studies of IT occupational culture have so far been interpretive with no quantitative value measures (e.g., Kaarst-Brown & Robey, 1999; Guzman et al., 2004;

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Nord et al., 2007) or quantitative value measures that examine IT culture at different

levels of analysis than the occupational (e.g., Plisken et al., 1993; Walsh, 2009). Third,

studies that focus on the occupational level of analysis have not examined the impact on

business success (e.g., Guzman, 2006; Kwantes & Boglarsky, 2004). The occupational

level of analysis for IT professionals is only beginning to be explored as evidenced in

Table 1.

Table 1. Summary of Relevant Culture Articles in IS Literature (Sorted by Level)

Author(s) *Italics = Conference Proceeding*	Major Findings	Level of Analysis	Type of research
Karahanna et al (2005)	There are different levels of culture, including professional. Professional culture may dominant national cultural differences for workplace behavior that involves strong competence values. A theoretical model is proposed.	Multiple levels	Theoretical
House et al. (2004)	9 dimensions of national culture; draws heavily on Hofstede's dimensions	National	Positivist
Leidner & Kayworth (2006)	Comprehensive literature review; Calls for more research on IT Culture in particular	National and organizational	Theoretical
Kappos & Rivard (2008)	Conceptualizations of culture differ among IS researchers and no single view is sufficient to capture the complexity of culture. A three-way conceptualization is proposed.	National and organizational	Theoretical
Leidner (2010)	Identifies 3 waves of cultural research in IS: identifying differences, explaining differences, and managing differences.	National and organizational	Theoretical
Sarala (2010)	Organizational cultural differences are related to organizational conflict. Conflict is measured by 4 areas.	National and organizational	Positivist
Schein (1992)	Identifies 3 levels of cultural analysis: artifacts, espoused values, and underlying beliefs	Organizational	Interpretive
Hofstede et al. (1990)	Identifies lack of literature on occupational culture as a layer between national and organizational	Organizational	Positivist
Trice (1993)	Occupational subcultures exist apart from organizational culture; Identifies 6 characteristics of subculture	Occupational	Theoretical
Guzman et al.	Uses Trice's subculture characteristics to	Occupational	Interpretive

(2004); Guzman et al. (2007)	identify IT subculture areas; calls for more structured measures		
Johnson et al. (2009)	Occupational culture of Managerial Accountants explored quantitatively	Occupational	Positivist
Kwantes & Boglarsky (2004)	Organizational culture preferences vary between six different occupational groups (including MIS). MIS identified as significantly different from other occupations in preferences.	Occupational	Positivist
Joseph et al (2007)	Turnover of IT professionals and understanding job satisfaction remains a critical issue in IS studies in this MISQ review article.	IT Organizational	Theoretical
Kaarst-Brown & Robey (1999)	Identifies 5 archetypes of IT Culture using metaphor of magic; calls for measureable dimensions	IT Organizational	Interpretive
Pliskin et al. (1993)	Identifies 5 dimensions of culture of an information system; applied in failed MIS implementations	IT Organizational	Positivist
Scholz (1990)	Identifies theoretical elements of IT culture but calls for empirical study.	IT Organizational	Theoretical
Ramachandran & Rao (2006)	Uses Trice's subculture characteristics to identify IT subculture areas; contrasts IT subculture with managerial culture; speaks of 'professional' culture	IT Occupational	Interpretive
Guzman (2006); dissertation	IT occupational culture impacts occupational commitment of new information technologists	IT Occupational	Positivist
Orlikowski & Baroudi (1989)	IS is not a "profession" but an occupational group	IT Occupational	Theoretical
Duliba & Baroudi (1991)	IS personnel form a weak occupational community, if they can be said to form an occupational community at all.	IT Occupational	Theoretical
Nord et al. (2007)	Reviews seven models for assessing organizational culture and chooses cultural web model with 6 categories; Identifies areas of culture conflict between IT groups and business groups. IT has its own definite culture separate from the organization.	IT Occupational	Interpretive
Walsh & Hefi (2008); Walsh (2009)	Instrument for measuring individual IT Culture of users with regard to adoption of technology; Uses Spinning Top metaphor; 'Professional' culture is between National and Organizational	IT Individual	Positivist

IT occupational culture is a relatively new area of study where good progress has been made in qualitatively identifying the existence of an IT occupational culture but simultaneously calling for more measurable value dimensions of that culture. The purpose of this study is to address the research gaps identified in the literature review and to 1) build

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a set of meaningful value dimensions of IT occupational culture based on literature and

qualitative interview data and to interpret those values according to the strong program of

cultural sociology, 2) develop an instrument to measure IT occupational cultural values, 3)

offer evidence of the significant differences between IT occupational values and business

management values, and 4) provide empirical evidence showing the impact of occupational

differences on IT/Business alignment and IT Value within organizations.

CHAPTER III

OVERALL RESEARCH MODEL AND RESEARCH OBJECTIVES

3.1 Overview

As indicated in the literature review, IS research on culture over the last 25 years has focused on two levels of analysis, national and organizational, while research at the level of occupational culture has been minimal. Furthermore, there is very little research on IT occupational culture as evidenced by Table 1, and none that empirically examine occupational values. The proposed research addresses the occupational culture of the IT profession. Occupational culture is a specific culture shared by members of the same profession who have similar values, jargon, and behaviors (Trice, 1993). The research approach, in keeping with the pluralism encouraged by the literature review above, will be in three parts and based on a pilot which was completed earlier.

Appropriate methodologies for cultural research include interviews, content analysis, ethnography, and surveys (Reed & Alexander, 2009). The methods of qualitative interviews and content analysis for interpretation of meaning and a survey instrument, for positivist measurement, will be used to triangulate on aspects of the phenomenon of IT occupational culture. Triangulation is the use of multiple methods of research which is a common approach in sociology (Phillips, 1985). Furthermore, the combination of interpretive and positivist approaches into a pluralist approach is appropriate for IS research (Lee, 1994; Lee, 1991).

In order to triangulate on the phenomenon of IT occupational culture, both qualitative and quantitative data collection methods will be used. Sociologists typically use a combination of qualitative and quantitative methods in performing cultural research where qualitative interviews lead to the development of quantitative scales (Bernard, 1995). The dissertation is composed of three parts which build on each other to address the unified theme of IT occupational culture.

Part I is an interpretive exploration of the shared values of the IT occupation and their meanings based on qualitative interview data that result in a hermeneutic interpretation. Hermeneutics is a method of analyzing a text based on both its underlying meaning and its overall context. Part II is a positivist study and develops an instrument to measure the values identified in Part I. The instrument in Part II will also be used to look for significant differences in responses between IT professionals and non-IT business managers. Business managers have their own occupational culture and tend to have different occupational values such as productivity, efficiency, profitability, and morale (Posner & Schmidt, 1996). Part III is a positivist study that uses the instrument developed in Part II to examine the impact of those value differences, measured as cultural distance, on the critical outcomes of IT/Business alignment and IT value.

3.1.1 Research Questions

The research questions below line up with Part I, Part II, and Part III and are in keeping with the criteria used in the strong program of cultural sociology.

RQ1: Part I: What are the core values of IT occupational culture and how have they developed out of shared history, shared language, and shared context?

RQ2: Part II: What are the measurable dimensions of IT occupational culture?

RQ3: Part II: Is IT occupational culture significantly different from business management culture and, if so, how?

RQ4: Part III: What is the impact of occupational cultural distance on IT/business alignment and IT value?

3.1.2 Full Research Model

The full research model for all three Parts is shown below in Figure 4 and is addressed in detail in the Research Objectives sections that follow. Part of the research model is based on a pilot study conducted two years ago. A brief description of the pilot and its results are in the following section.
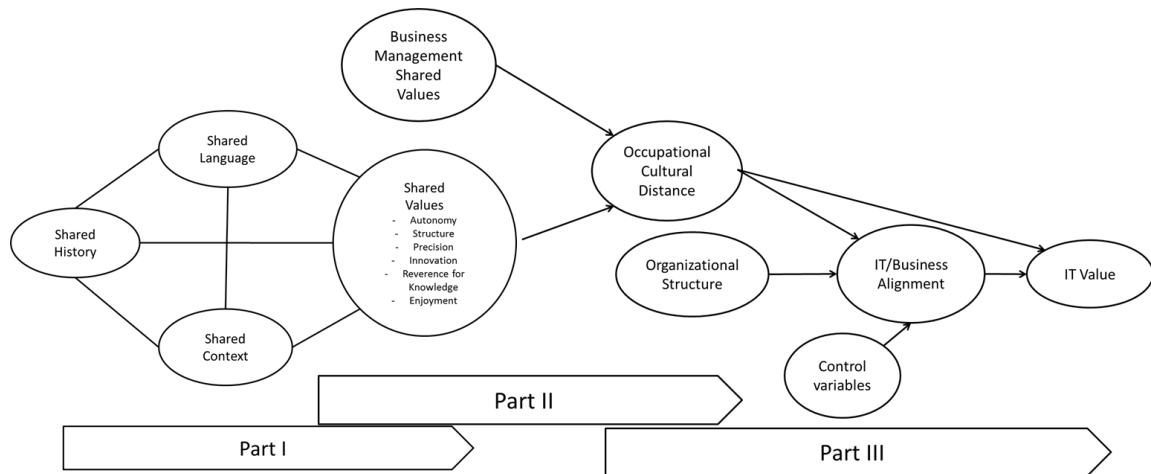
Figure 4 – Full research model for Parts I, II, and III

3.2 Initial Pilot

An exploratory pilot study was conducted in order to begin the process of identifying IT occupational cultural values through both qualitative and quantitative methods. The pilot addressed the research question: *What are the dimensions of IT occupational culture?* The pilot included interviews which guided the development of an instrument to measure IT occupational values. IT occupational culture was found to be fairly homogeneous as shown in the results at the end of this section.

3.2.1 Instrument Creation

In order to answer the research question, the research design was constructed similarly to other successful dimensions scales such as House et al. (2004) and Smith et al. (1998). Creating the dimensions began with a thorough literature analysis. As stated in Smith et al. (1998), the goal is not to be exhaustive but representative.

Stage one, using Smith et al. (1998) 's nomenclature, included the following three steps: 1) specifying the domain and dimensionality of the constructs of interest based on the literature review, 2) generating a sample of items based on literature, interviews with IT professionals, and previously validated instruments, and 3) assessing the content validity. Content validity refers to how consistent and representative the items are with the domain on the scale construct (Smith et al., 1996; Straub, 1989).

Step 1 of stage one was addressed through a thorough literature review on culture research in IS. (Note that the pilot limited its literature review to IS research whereas the full study includes a more comprehensive background of research in cultural sociology.) Step 2 of stage one was addressed through both the literature review and the use of pre-survey interviews with IT professionals. Seven IT professionals were interviewed using the protocol in Appendix A. This process was iterative in the sense that dimensions, definitions, and items were added and/or modified as appropriate based on feedback during the interviews.

Content validity in step 3 of stage one was specifically addressed by following a Q-Sort method with four PhD students to rank the items that were determined in step 2. A Q-sort is a process where the subjects rank-order the Q-sample stimuli along a continuum defined by a condition of instruction (McKeown & Thomas, 1988). The condition of instruction included an explanation of the value dimensions but did not indicate which items went with which dimension. Students were asked to assign each item to a dimension and then rank-order their assignments based on how relevant they thought the item was to the dimension. A Q-sort can be used in evaluating cultural dimension items

with PhD students in order to determine the most appropriate items for a set of a priori dimensions (House et al, 2004). Items that were not consistently assigned to the expected dimension or that were low in relevance were discarded.

Stage two of the research design included finalizing the instrument items and doing a final pre-test with PhD students and faculty to ensure items were well-worded. The last step of stage two was administering the instrument to a sample pilot of IT personnel in different organizations. Like the interviews, the survey participants were IT professionals who were not in management. Exploratory factor analysis was performed on the pilot results to ensure that items were loading on the instrument dimensions appropriately. Differences in dimensional mean scores were then statistically analyzed to see if there were significant differences between the different IT groups in the pilot.

The pilot of the survey instrument had 79 participants who were all IT professionals. The full study sample has 480 participants that include both IT professionals and non-IT business managers. The pilot results were promising for deeper investigation. The results of the pilot are discussed below.

3.2.2 Qualitative Results

The seven initial interviews included 1) a 33-year-old web programmer with 11 years of experience in IT at a dot-com in Silicon Valley, freelance consulting, and a large university IT group, 2) a 32-year-old mainframe programmer with 14 years of experience in IT with IBM, 3) a 55-year-old production analyst with 20 years of experience in IT at six different companies including a large manufacturer, 4) a 35-year old

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telecommunications developer with 12 years of experience in IT at a large IT services company and a large telecommunications manufacturer, 5) a 33-year-old support analyst with 11 years of experience including a large bank and a large retailer, and 6) a 42-year-old lead analyst with 22 years of experience in IT including large restaurant chains, a dot-com in Silicon Valley, and large retailer, and 7) a 36-year-old female programmer with 14 years of experience in IT with a large manufacturer.

The initial seven interviews with IT professionals showed strong and consistent support for the original five dimensions based on literature as well as two additional dimensions that came out of the interviews. When conducting qualitative analysis, the frequency of a symbol, idea, or subject matter can be interpreted as measuring its importance, attention, or emphasis (Krippendorff, 2004). Showing the numeric frequency of codes appearing in interviews is a way of showing the relative importance of the variables of interest (Guzman et al., 2004). Word frequency calculations were performed using NVIVO software and are shown in Table 2. Figure 5 shows a visual representation of the framework. Note that Alignment was conceptualized as a cultural value in the pilot and was later determined to be better understood as an outcome for the full study. The following value dimensions were identified and measured in the pilot: Structure of Power, Control, Open Communication, Risk, Reverence for Knowledge, and Enjoyment. These will henceforth be abbreviated with the acronym SCORRE. These dimensions were subject to change and additions based on the outcomes of the full study interviews. The value dimensions are discussed below. Quotes in each subsequent section are identified with the participant's number in parentheses.

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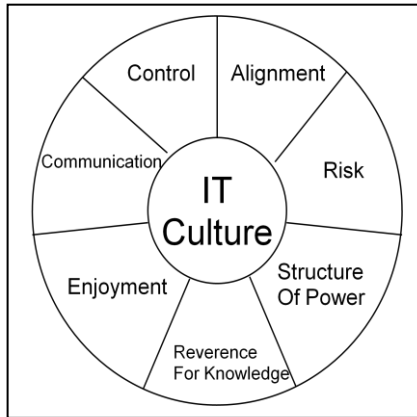
Figure 5. Pilot Framework of IT Culture

Table 2. Code Frequency in Interviews

Code name	Frequency
Control	32
Communication	30
Enjoyment	29
Alignment	24
Reverence of knowledge	21
Risk	19
Structure of power	17

3.2.3 Communication

Interviewees consistently emphasized the value of good communication for IT professionals and described it as "very important", "vital" and "number one". IT people want to receive timely communication from their customers, their management, and their peers in IT. They do not always receive good communication and this is a constant source of frustration. At the same time, they know that they need to provide good communication to their customers, management and peers, even though they realize this is frequently lacking in IT. Part of this is due to language. It is easier to communicate

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with people who speak the same technical language and share the same technical

background according to the interviewees. The term "translation" was used frequently in

five of the seven interviews.

> It's hard to communicate with people that don't have the same level of technical
> knowledge that you have. There's this translation that has to happen. (1)

> You have someone who is technical enough but not a coder, but also business
> enough, but they don't actually work in the business, someone in between who
> can speak the speak of both sides and translate. (6)

> I was going to be that liaison, that translator. (3)

These linguistic translation issues were seen as a major obstacle to good communication.

There was a definite pattern of questioning why IT required "liaisons" to communicate

with business people in order to accomplish this translation. When there is a

communication gap, this can cause tension especially in customer interactions to the

point that IT people are perceived as being arrogant and disdainful.

> There's always been that kind of disdain for folks that are outside of IT. That's
> been since my first day being in IT, I've seen that. (5)

> [Users complain] 'why don't you tell me in terms I understand?' (2)

People were quick to point out that the stereotype of IT people not having good

communication skills has diminished greatly over time but still lingers on. "We have our

own language, but there are some of us out there who would rather speak in English" (6).

3.2.4 Control

The interviewees saw control as a critical concern for IT professionals. Examples of control included the need for documentation and uniform standards in IT. Most people were quick to describe different organizations they had worked in as "tight" or "loose" and emphasized their own preference for a "loose" environment. Paradoxically, IT people have a desire for tight control in the environment while simultaneously desiring looser control of their own actions. Rigidity, tightness of control, and bureaucracy were seen as "less fun". Interviewee #1 said "this is the first time I've been in the larger size machine", giving the mechanical metaphor a negative connotation. Tightness of control frequently manifests itself as a greater need for testing before going to production.

> When I was at the dot-com, in the beginning everybody had access to the system and we didn't think twice about testing anything in production. (6)

> We've always tested on the production box. (7)

People also saw a consistent trend in the occupation from loose control to tighter control over the last ten years, moving from the dot-boom to the present era of Sarbanes-Oxley.

> Before there were no tools and it was managed by virtue of having people that were intelligent and good stewards. (1)

> They put some policies in place and we're still resistant to that stuff. We've been kind of like "Wild West" style for a while and we don't want to change. (7)

> We were cowboys! [during the dot-boom era] (1)

This idea was closely correlated with a trend from decentralized power to centralized power structures. Objectively, control is a compelling issue because of the frequency of codings in Table 1, but also subjectively because two different people in different contexts brought up the Wild West metaphor in the context of control. The fundamental occupational shift from looser control to tighter control seems to describe the essence of how the IT occupation has evolved over time. We do not want *cowboys* to ride in and save the day any more, we want *police*.

3.2.5 Alignment

None of the interviewees used the word 'alignment' but they all expressed an impression of a disconnect between business users and IT people. This disconnect was more than just the technical vocabulary and included broader ideas of not enough "collaboration," not "lining up" with organizational goals, lack of "guidance", not being "unified" with the business, not "going in the same direction", and "a different world" between IT people and business people. Even stronger language was used to describe the relationship as "confrontational", "friction", and an ongoing "battle."

> I see more of almost an attitude that's confrontational that "we don't need those guys, we'll tell them what to do. We'll make up our mind and we will design our system ourselves and then we'll turn it over to the programmers in the IT department." (3)

> The business has been making decisions long before IT was ever involved and it seems that IT has been playing catch-up ever since. And we're still playing catch-up. (5)

Interestingly, poor alignment can work in the other direction as well where "IT drove the

business model" in the dot-com era. All interviewees ultimately gave sincere stories

about really wanting to help their businesses and recognized the need to work together

better.

> We're not manufacturing experts. So we need to be helped along in terms of what
> the end-user needs. (3)

> The *successful* IT departments are the ones that have a good working relationship
> with the business. (6)

One interviewee who rode the dot-boom wave indicated that he saw "everybody pulling

together" (6) when the company gave employees stock options to reinforce the sense of

ownership and being on one big team. This is in sharp contrast to "IT is usually a

scapegoat for things." (7) The findings suggest that alignment may be achievable by

avoiding the extremes of IT making decisions without the business (evidenced by the

collapse of the dot-coms) and the business making decisions without IT (vividly

described by all the interviewees) and finding the middle ground of healthy dialogue.

3.2.6 Risk

Risk was a topic that everyone was eager to discuss and many wanted to talk

about the possible factors that affect risk-taking such as age (older=less risk-tolerant) and

size of the organization (smaller=more risk-tolerant). At the same time there was an

overall trend that IT people are at their core more comfortable with risk than business

people and this may reflect a fundamental difference of values.

You have to be comfortable to take the risk. I mean, what's the alternative, you don't ever try something? (3)

I like innovating to the point where if everything starts breaking down then go back and fix it. (4)

Who wants to work on the same software the rest of their lives? (5)

IT would take more risks if the business would back them. (6)

Risk was associated with innovation, development, and being on "the cutting edge" and its opposite was referred to as "safety", "reliability", and "stability." There were indications of correlation with the dimension of Control, specifically around testing new products. However they also wanted to distinguish between different areas of risk.

In terms of supporting stuff, risk is bad. In terms of developing stuff, risk is good. (2)

Maybe as a techie you have more forgiveness for technology change than you do people change. You want your people to be stable and your technology to evolve in a positive manner. (5)

What I started to see over time is that the people who aren't as comfortable taking risks often end up supporting existing applications and the people who are comfortable with risk are the ones who end up pushing out and creating new applications….I don't think their roles have formed their view on risk, I think how they view risk has formed where they end up in the organization. (7)

IT people seem to crave an environment where risks and mistakes are tolerated. "If you have one of these adversarial places that is just looking for a chance to pounce on you because this didn't work, you know, you're not going to be there much longer." (3)

3.2.7 Structure of Power

Power structures were harder for the interviewees to articulate, in part because there are so many aspects to the idea: centralization versus decentralization, hierarchy versus flat, empowering IT versus empowering business users, and top-down decision-making. In general, there were strong preferences for less hierarchy, more diffuse power structures, and empowering people to make their own decisions.

> What you say and what you decide has to be as important and as vital as much as anyone else out there. (3)

> We had a lot more power, a lot more ways to make decisions there…I like that a lot better. (5)

> The only group that I've ever worked in that had a different structure was the dot-com…it was relatively flat. (6)

> I like for people to have the power to make decisions. (7)

At the same time, IT people realize the business importance of consolidating power.

> The reality is that once we're centralized we can add more functionality than we could before. It's becoming more important to be centralized than it was in the past. (7)

The interpretation would be that people in the IT occupation chafe at having to obtain

approval from multiple layers of business management and have a strong preference for a

"hands-off" management style with "fewer chiefs, more Indians." The industry trend

towards greater centralization is only accepted grudgingly by IT professionals because it

contradicts their values.

3.2.8 Reverence of Knowledge

Reverence of Knowledge is the first dimension that was not based on the a priori

framework from IS literature. The idea that IT people respect technical knowledge

vehemently over organizational position or, significantly, business knowledge is an

important insight. Multiple participants also admitted that there was "ego involved" in

feeling superior to business users.

> In non-IT groups, power, I think, is dependent on social stature. "I'm a manager, I'm a director, I'm an executive". Whereas in IT, I think power is more "this is what I know." (2)

> The ones that were even more higher esteemed were the ones who not only sympathized with the engineering environment but the ones who could talk shop…My best manager was just like that. (4)

> If you get into a problem, you're not going to go to the Director help, you're going to the person who has been there the longest and knows the most. (6)

> I have a hard time with people who slide into a supervisor position who don't have an IT background. (7)

Several interviewees were dismissive of technical certifications as not being indications of "real" knowledge. These interviewees seemed to be indicating that there is a difference between knowledge based on actual experience and knowledge based on memorizing for a certification exam. This is consistent with the 17th century philosopher John Locke's (1910) view that knowledge is derived from experience alone. Ironically, it is the certification process that business people value. It should be stressed at this point that not a single person indicated that people with knowledge of the business had high value or that IT needed or wanted to develop more business skills. It is quite possible that this dimension is a fundamental occupational obstacle to the business alignment issue described above. There is an underlying paradox here: you may increase your alignment with the business by having IT managers with more business skills, but the IT employees with not respect them. Or you can have IT managers with technical skills that have their group's respect, but business alignment may diminish.

3.2.9 Enjoyment

Enjoyment was the second of two dimensions added during the data collection process due the frequency of this content theme. There is an association of "fun" and "enjoyment" with "problem-solving" and "challenge" that is specific to the IT occupation and these were words there were used over and over by all the participants.

If I didn't feel challenged, I wouldn't be happy. (6)

Do you always color inside the lines this particular way so that all our managers can understand it? That's one of my beefs with the job. (1)

There's a creative aspect to IT. (2)

Programming was one of the most creative things I have ever done. It's very rewarding. (3)

Because of the creativity, I wrote something and it's *mine*. (4)

A recent issue of *ComputerWorld* confirms that IT job hunters are looking for "more interesting/challenging work" as their second most important criterion after compensation. (ComputerWorld, 2010, p. 31). Surprisingly, this enjoyment was not just about playing with new technology but specifically the enjoyment of people. The joys of being social were emphasized over and above the opportunities to tinker.

I enjoyed my co-workers. It was more of a tight-knit community, a tight-knit family. (4)

What I want is a good working environment, good people to work with, and I want to be challenged. (6)

It's very much like a family….I think if I didn't have as much fun as I have, I think that I would have quit a long time ago.….That's really what brings me back every day. (7)

The word frequency count in NVIVO highlighted some quantitative evidence to support this idea. In aggregating all the interview transcripts, "people" was the *third* most used word with a count of 286, whereas the first appearance of any IT-specific word ("technology") was very low on the word frequency list with a count of only 42. The

emphasis on people over technology is another indication that the stereotype of the IT person being anti-social has changed.

The results of the pilot interviews were not generalized facts, but deeper understandings of the context of the IT profession and how it is changing. The interpretation from within is one of cowboys who were used to the environment of the Wild West and now are dealing with an environment of increasing control, centralized power, more bureaucracy, and less freedom. The classic stereotype of the cowboy is long on action and short on words, they want to blaze their own trail and leave the settling to others, they enjoy a high-risk challenging lifestyle and have little respect for those in authority. Even though IT cowboy culture has evolved and matured since the boom of the 1990s, there is still underlying friction with business users due to differences in values. These issues do not seem to be part of any one organizational culture but rather reflect cultural trends across the occupation transcending organizational boundaries. Working towards a new shared understanding may help IT professionals continue to evolve from cowboys to a new breed of professionals.

The pilot interviews with IT professionals show strong support for the SCORRE value dimensions (see Appendix C). The interview data also validates that while some of the organizational dimensions used in the literature on culture in IT are relevant, not all necessarily apply to IT occupational culture, such as Plisken et al's (1993) Performance orientation and Reward orientation. These dimensions are important to some degree to IT professionals, especially with regard to career advancement, but may not be specific to the IT occupation. The dimension of communication, absent from Plisken et al.'s (1993)

set of dimensions, received the strongest support and was consistently ranked number one in importance by the interviewees. The strong support evidenced by the initial interviews validates that the SCORRE dimensions are relevant to IT occupational culture. The complete list of SCORRE value dimensions is depicted in Figure 6.
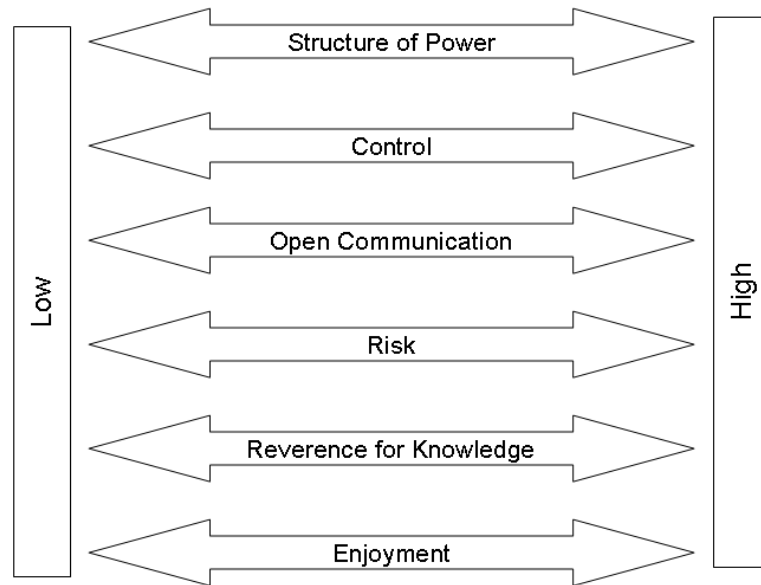
Figure 6. Proposed SCORRE Values of IT Culture by Pilot

3.2.10 Quantitative Results

The survey instrument based on the SCORRE values was sent to four different organizations. Group 1 was the entire IT department for a public university in the Southeast of the U.S. Group 2 was the corporate IT department for a telecommunications manufacturer. Group 3 was the IT Operations department for a large retailer. Group 4 was the mainframe group of a global technology services company. There were 27

54

responses from Group 1, 6 from Group 2, 11 from Group 3, and Group 4 did not respond.

To compensate for this, the survey was sent to a fifth group on the social network

Linked-in. The name of this group is "The Association of Information Technology

Professionals (AITP)" and membership is composed of information technology business

professionals worldwide. This fifth group had 41 responses. Each group's responses were

kept separate by creating five different web links for the survey. The total number of

responses was 85. The total response rate is difficult to calculate due to the method of

posting the survey online through Linked-In. Six responses were removed due to being

incomplete (where less than 50% of the survey questions were answered), leaving a total

usable sample size of 79. Because of the low response from Groups 2 and 3, they were

simply added to Group 5 in order to represent the industry. This allowed for some general

comparisons between Group 1 and Group 5, in addition to being able to test for reliability

and validity of the instrument. Group 5 will be referred to as Group2 from this point

forward. Group 1 is the university IT department and Group 2 represents the industry of

IT professionals.

The characteristics of all respondents were 70% males with an average of 4.4

years of experience working in IT. Age brackets included 18-25 year olds (2), 26-35 year

olds (21), 36-45 year olds (25), 46-55 year olds (22), 56-65 year olds (6), and over 65 (1).

Two respondents withheld their age. Education brackets included High School Diploma

(2), Some Years of College (25), Bachelor Degree (36), and Master's Degree or higher

(14). Overall descriptive statistics for mean responses for the seven dimensions is shown

in Table 2. Statistical tests were conducted in SPSS in order to determine three things: 1)

reliability of the instrument, 2) construct validity of the latent variables, and 3) possible

norms. Note that Alignment measures are flagged with an asterisk to indicate that

Alignment was included as a value in the pilot, but was later changed to be the dependent

variable in the full study.

Table 3. Descriptive statistics for SCORRE dimensions

	Items	Minimum	Maximum	Mean	Std. Deviation
Communication	4	4.00	13.00	7.986	2.402
Control	5	5.00	16.00	8.933	2.772
Alignment *	5	5.00	16.00	8.213	2.820
Risk	3	3.00	13.00	8.653	2.430
Structure of Power	3	3.00	14.00	7.946	2.229
Reverence for Knowledge	5	5.00	23.00	13.800	3.468
Enjoyment	5	5.00	16.00	9.480	2.500

3.2.11 Reliability Results

All responses from both groups were combined in order to examine the reliability

of the instrument items. Cronbach alphas were calculated in SPSS resulting in the values

in Table 4.

Table 4. Cronbach alphas (before dropping items)

Latent Variable	Cronbach alpha (before dropping items)
Communication	0.721
Control	0.829
Alignment *	0.852
Risk	0.752
Structure of Power	0.668
Reverence for Knowledge	0.798
Enjoyment	0.797

After the factor analysis (described below), the following items were dropped in order to either strengthen the Cronbach alpha or the factor loadings or both. The items dropped were Comm1, Con 5, Ali4, Ris4, Pow2, Pow3, Kno4, and Enj6. Full descriptions of all items in the pilot instrument are in Appendix D. After these items were eliminated, Cronbach alphas were calculated a second time as part of the iterative process of purifying the measures to get the best sample of items (Churchill, 1979). High Cronbach alphas show a high degree of correlation between items and they should be high when measuring the same construct (Straub, 1989). The final result of the pilot is very high reliability scores, all of which were over the rule-of-thumb of .70, with the lowest being Communication at .72 and highest being Alignment at .868 as shown in Table 5.

Table 5. Cronbach alphas (after dropping items)

Latent Variable	Cronbach alpha after dropping items)
Communication	0.720
Control	0.807
Alignment *	0.868
Risk	0.754
Structure of Power	0.803
Reverence for Knowledge	0.775
Enjoyment	0.804

3.2.12 Construct Validity

Exploratory factor analysis was done in SPSS to see if the items were loading on the appropriate seven latent variables. After the initial reliability test, all the items were kept for the initial validity test. The initial loadings for the rotated factor matrix (using Varimax rotation) are shown in Table 6.

Table 6. Rotated Factor Matrix (Before dropping items)

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
Comm1	0.202	0.153	0.068	-0.193	0.301	**0.332**	0.033
Comm2	0.318	0.310	0.189	-0.100	0.055	**0.547**	0.046
Comm3	0.121	0.213	-0.074	-0.044	-0.076	**0.701**	-0.066
Comm4	0.199	0.206	0.004	0.010	-0.084	**0.491**	0.003
Comm5	0.154	0.162	0.137	0.146	0.223	**0.742**	-0.099
Con1	**0.702**	0.039	0.063	0.049	-0.121	0.245	0.064
Con2	**0.701**	0.056	0.069	0.110	-0.104	0.053	0.019
Con3	**0.756**	0.133	0.080	0.058	-0.043	0.136	0.098
Con4	**0.745**	0.164	-0.111	0.046	0.030	0.089	-0.066
Con5	**0.625**	0.181	0.022	0.146	-0.206	0.054	0.080
Con6	**0.651**	0.001	0.058	0.039	0.136	0.049	-0.122
Ali1	0.182	**0.805**	0.015	-0.134	0.073	0.023	0.050
Ali2	0.143	**0.879**	-0.032	0.052	-0.021	0.037	0.081
Ali3	0.123	**0.838**	-0.108	-0.008	0.052	0.230	-0.021
Ali4	0.074	**0.488**	-0.168	0.305	-0.234	0.300	-0.178
Ali5	-0.064	**0.631**	0.205	-0.054	-0.140	0.108	0.027
Ali6	0.208	**0.731**	0.066	0.049	-0.205	0.167	-0.007
Ris1	-0.009	0.036	0.048	0.098	0.064	-0.064	**0.842**
Ris2	0.083	0.063	-0.181	0.098	-0.012	-0.003	**0.834**
Ris3	-0.151	0.018	-0.249	0.055	0.062	0.136	**0.588**
Ris4	0.202	-0.042	-0.062	0.141	0.257	-0.125	**0.555**
Pow1	-0.109	-0.009	0.065	0.089	**0.743**	0.149	0.224
Pow2	-0.498	-0.132	-0.017	0.106	0.294	**0.388**	-0.050
Pow3	-0.227	-0.190	-0.163	-0.130	-0.103	**0.394**	0.112
Pow4	-0.109	-0.155	-0.004	0.099	**0.785**	-0.084	0.054
Pow5	-0.123	-0.099	0.029	0.128	**0.863**	-0.033	0.013

Kno1	-0.085	0.044	0.122	**0.714**	0.160	0.171	0.070
Kno2	0.120	-0.005	0.073	**0.633**	0.026	-0.039	0.062
Kno3	0.159	0.006	0.171	**0.579**	0.058	0.212	0.134
Kno4	0.254	-0.163	0.337	**0.557**	0.073	0.134	0.082
Kno5	0.029	0.012	0.045	**0.788**	-0.057	-0.282	-0.024
Kno6	0.036	0.001	-0.084	**0.780**	0.098	-0.186	0.111
Enj1	-0.106	-0.022	**0.618**	0.015	-0.179	0.043	-0.014
Enj2	0.166	0.061	**0.808**	0.133	-0.134	0.042	-0.061
Enj3	0.032	0.007	**0.776**	0.010	0.135	-0.067	-0.240
Enj4	0.098	0.207	**0.659**	0.164	0.170	0.108	-0.336
Enj5	0.089	-0.046	**0.708**	0.006	0.137	0.026	-0.133
Enj6	-0.030	0.013	**0.616**	0.250	0.086	-0.090	0.251

As indicated previously, items for Comm1, Con 5, Ali4, Ris4, Pow2, Pow3, Kno4, and

Enj6 were dropped and Cronbach alpha's recalculated. Dropping 9 items has the added

benefit of shortening the survey for the full study in the future. After this measurement

purification step, the factor loadings improved and all items loaded on their respective

constructs. Construct validity is demonstrated by the correct items loading on the same

constructs indicating that the instrument is measuring the right things. Moreover, there is

high discriminant validity because none of the items are crossloading on other constructs,

meaning the constructs are well-defined and separate from each other. Table 7 shows the

final results of the factor analysis. With only a few exceptions, all items had high

loadings above the generally accepted cutoff of 0.4 (Hulland, 1999).

Table 7. Rotated Factor Matrix (After dropping items)

	Rotated Factor Matrix						
	Factor						
	1	2	3	4	5	6	7
comm2	0.157	0.230	0.206	-0.095	-0.062	**0.635**	0.010
comm3	-0.059	0.219	0.172	-0.085	-0.145	**0.485**	-0.046
comm4	0.069	0.197	0.217	-0.098	0.063	**0.510**	-0.011
comm5	0.163	0.102	0.117	0.105	0.035	**0.733**	-0.059
con1	0.079	0.134	**0.723**	-0.225	0.001	0.119	0.097
con2	0.181	0.039	**0.633**	-0.091	0.020	0.031	0.065
con3	0.108	0.139	**0.865**	0.015	0.092	0.175	0.005
con4	-0.061	0.159	**0.593**	0.006	0.062	0.325	-0.166
con6	0.091	0.015	**0.480**	0.062	-0.049	0.132	-0.140
ali1	-0.004	**0.731**	0.139	0.033	-0.114	0.090	-0.030
ali2	-0.017	**0.875**	0.110	-0.048	0.050	0.049	0.116
ali3	-0.089	**0.756**	0.071	-0.012	-0.018	0.291	0.021
ali5	0.088	**0.545**	-0.022	-0.059	-0.047	0.208	0.032
ali6	0.074	**0.680**	0.172	-0.326	0.035	0.089	-0.042
ris1	0.033	0.088	-0.036	0.106	0.118	-0.110	**0.726**
ris2	-0.221	0.077	0.085	-0.026	0.163	-0.078	**0.778**
ris3	-0.258	-0.089	-0.214	0.070	0.079	0.137	**0.436**
pow1	0.080	-0.071	-0.019	**0.674**	0.009	0.040	0.294
pow4	0.000	-0.102	-0.004	**0.843**	0.150	-0.107	-0.034
pow5	0.060	-0.085	-0.141	**0.805**	0.109	-0.044	-0.052
kno1	0.208	0.000	-0.159	0.179	**0.503**	0.253	0.225
kno2	0.050	-0.058	0.101	0.023	**0.614**	0.106	0.089
kno5	0.121	-0.078	-0.007	-0.008	**0.736**	-0.253	-0.012
kno6	-0.017	0.041	0.043	0.167	**0.815**	-0.095	0.142
enj1	**0.547**	0.007	0.095	0.051	0.080	0.080	0.035
enj2	**0.796**	-0.001	0.200	-0.150	0.072	0.007	0.102
enj3	**0.813**	-0.035	0.034	0.038	0.029	-0.037	-0.157
enj4	**0.737**	0.164	0.039	0.101	0.060	0.144	-0.252
enj5	**0.682**	-0.043	0.058	0.078	0.037	0.116	-0.095
Extraction Method: Principal Axis Factoring.							
Rotation Method: Varimax with Kaiser Normalization.							

3.2.13 Norms

The final step of analysis is to look at potential norms (Churchill, 1979). The two groups were separated in order to see if there were any significant differences between group 1 (all from the same organization) and group 5 (a larger collection of IT professionals from different organizations representing the occupation broadly) simply as an exploratory activity. The items for each construct were summed and then their means were compared in SPSS using simple t tests. Descriptive statistics for the two groups are shown in Table 8.

Table 8. Descriptive statistics of two groups for comparison

Group Statistics					
	GROUP	N	Mean	Std. Deviation	Std. Error Mean
COMM	1	25	7.583	1.791	.365
	2	54	8.169	2.592	.356
CON	1	25	8.750	2.706	.552
	2	54	8.943	2.824	.387
ALI	1	25	8.208	2.797	.570
	2	54	8.226	2.819	.387
RIS	1	25	8.750	2.090	.426
	2	54	8.584	2.575	.353
POW	1	25	8.083	2.357	.481
	2	54	7.867	2.166	.297
KNO	1	25	13.250	3.025	.617
	2	54	14.018	3.640	.499
ENJ	1	25	9.458	2.283	.466
	2	54	9.452	2.591	.355

A t-test is a common way of comparing the means of two unrelated groups with normal distributions to see if the means are significantly different or not (Bryman &

Cramer, 2001). An independent samples t test confirmed what the box plots (not shown) indicated, namely that there are *no* significant differences between the two IT groups. The results of the independent samples t test are shown in Table 9.

Table 9. Independent samples t test for two groups

	Independent Samples Test						
	t-test for Equality of Means						
	t value	**d.f.**	**p value (2-tailed)**	**Mean Difference**	**Std. Error Difference**	**95% Confidence Interval of the Difference**	
						Lower	Upper
COMM	-1.00335	75	0.318	-0.586	0.584	-1.750	0.577
CON	-0.28185	75	0.778	-0.193	0.686	-1.560	1.173
ALI	-0.02613	75	0.979	-0.018	0.691	-1.396	1.360
RIS	0.27536	75	0.783	0.165	0.599	-1.029	1.359
POW	0.393164	75	0.695	0.215	0.547	-0.876	1.306
KNO	-0.90237	75	0.369	-0.768	0.852	-2.466	0.928
ENJ	0.008944	75	0.992	0.005	0.615	-1.220	1.231

3.2.14 Discussion

The statistical analysis from the pilot data reveals several interesting findings. The pilot was successful in that it served to confirm the reliability and validity of the SCORRE dimensions of IT occupational culture that were proposed. The pilot also served as a dry run of the full instrument in providing an opportunity to identify unclear instructions and items, cull out inappropriate items and shorten the overall survey for the full study. Since the primary purpose of doing a pilot is to determine if there are any problem areas with the instrument, either through unclear instructions, unclear question

wording, or technological problems with the online survey format, an additional open-ended question was added at the end of the survey to capture feedback. In general, there were no technical issues with the survey and very few questions about specific wording, although there are opportunities to fine tune the wording for the full study, for example with words like "flat", "should", and "knowledge", based on the feedback. Formal and informal feedback also confirmed that IT professionals consider this area of investigation both important and interesting. The pilot instrument including all items is shown in Appendix D.

The initial finding that there were no significant differences between Group 1 and Group 2 is not surprising in that it validates that the SCORRE dimensions do, in fact, reflect what is *common* to IT occupational culture. If there had been significant differences in each dimension, this would have indicated that some of the dimensions were overlapping with organizational cultural differences. Just as national culture differs between different nations while within-nation means do not vary significantly, so too occupational culture should not vary much within the same occupation. It is expected that one would find significant differences when comparing these dimensions with *different* occupations.

The full study will compare IT occupational culture against business management culture. Such differences would serve to identify the areas of difference that may drive friction in IT/Business alignment. For example, the interviews revealed that there may be an underlying tension between achieving business alignment and reverence for knowledge. Even though a manager with business experience may excel at getting their

team aligned with business objectives, such managers do not get the respect of their IT group who values technical knowledge and hence they value managers that are more technologically savvy. Furthermore, the reverse may also be true, that managers with technical background who have the respect of their IT group are less able to get the group aligned with business priorities. The intent of the pilot study, however, was simply to identify the core elements of IT occupational culture and to that end, this study was successful through its qualitative results and its quantitative results in the pilot.

In short, the pilot was able to address the first of Straub's (1989) three validities for survey-based research, namely instrument validity as demonstrated above. The second type of validity, internal validity, is maintained by being aware of other rival explanations. For example, one might expect there to be no significant differences between the test group and the industry group if the dimensions were trivial and were of no real interest to IT professionals. However, the initial interviews show strong support that the SCORRE dimensions capture core themes that are important to IT professionals. The third form of validity, statistical conclusion validity, will be addressed as the sample size increases.

CHAPTER IV

PART I – INTERPRETATION OF ITOC

4.1 Part I Research Objectives

The research objective of Part I is to conduct a deeper interpretive exploration of the collective values that IT professionals share based on qualitative data with a larger sample size than in the initial pilot. IT professionals are defined as those people who work for a living within the functional area of Information Technology within an organization or as an IT consultant. Consistent with a cultural sociological approach, the main areas of interest are: 1) shared values, 2) shared language, 3) shared history, and 4) shared context. Sociologist Gary Fine's (1996) study of restaurant workers addressed these fundamental areas through ethnographic interviews and proposed that other occupations may be studied similarly. Different occupations have different shared values in common. For example, college professors may value "academic freedom", nurses may value "quality of care", policemen may value "safety", occupationally-speaking. Business managers value "profitability", "productivity", "morale", etc., and these occupational values will be contrasted later.

A figure showing the relationships between the constructs of interest is shown in Figure 7. While Trice's framework for occupational culture provides useful content for the construct of Shared Context, Trice's framework is necessary but not sufficient for explaining IT occupational culture as a whole. The research framework proposed in

Figure 6 extends Trice in important ways, not the least of which is showing the web-like relationship between values and other aspects of culture.

The research question for Part I is: *What are the core values of IT occupational culture and how have they developed out of shared history, shared language, and shared context?* The goal is not only to simply *identify* those core shared values, but to *interpret* their meaning based on language, history, and context. The result should be "the rich wine of symbolic significance" to use Alexander's (2003) apt phrase.

4.1.1 Part I Research Model
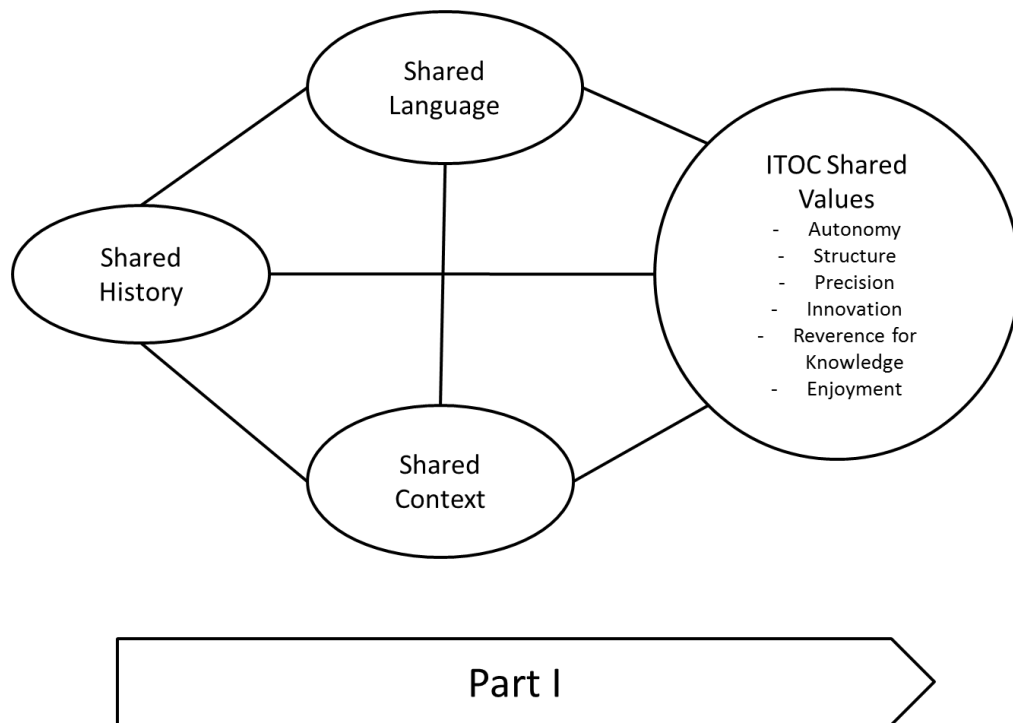
Figure 7. Research framework for IT Occupational Culture in Part I

Interpretive studies typically do not begin with a rigid *a priori* model to test (Orlikowski & Baroudi, 1991). Therefore, the framework shown in Figure 6 is simply a guideline that will be useful in conducting the interpretive research. The framework shows that IT Occupational Culture may be said to consist of shared values, shared language, shared history, and shared context. The lines between constructs have no directional arrows because the goal is not to test for causality, but rather to show that there is a relationship between these areas. Shared values are shown on the right-hand side because this is the primary area of interest. Culture is often described as a web, and therefore all the areas of interest are shown to be interconnected. While there may be other aspects to culture, this simple framework identifies the consistently broad themes found in the literature on culture, particularly in cultural sociology. Identifying the values that drive everyday behavior is a huge undertaking and therefore boundaries have to be drawn around the cultural domain (Rubin & Rubin, 1995). The boundaries of the framework in Figure 6 serve to make data collection and analysis more manageable. It also establishes a nomological network of the phenomenon as described in more detail below.

4.1.2 Shared Values

Values are the core element of any cultural group (Deal & Kennedy, 1982; Hofstede & Hofstede, 2005; Brief & Nord, 1990). Group values are a cohesive force that binds a group together. Values have been defined as enduring beliefs "that a specific mode of conduct or end state of existence is personally or socially preferable to an

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opposite or converse mode of conduct or end state of existence" (Rokeach, 1973, p. 5).

Values are more stable in a culture than its practices (Hofstede & Hofstede, 2005).

Shared values provide meaning and spur social action (Brief & Nord, 1990; Swidler,

1986). Because cultural values do not arise out of a vacuum or "some free floating

heritage of ideas" (Swidler, 1986, p. 283), it is necessary to do a deeper exploration of

how these values have developed and been shaped over time by language, history, and

context. Once again, IT professionals, like any occupational group, have their own unique

shared values.

4.1.3 Shared Language

Shared language is the means by which culture is transmitted from one generation

to the next (Halbwachs, 1992; Ferrante, 2003). Language is "a widely shared system of

symbols which links past, anticipated future, and present experiences" (Phillips, 1985, p.

42). Language can incorporate elements of sacred and profane values (Durkheim;

Alexander, 2003). Language generates meaning (Brief & Nord, 1990); so to understand

language is to help understand meaning. Shared language can convey information above

and beyond the denotation of the actual words because words mirror cultural values

(Ferrante, 2003). Commonly-used expressions can identify the unique preoccupations of

a cultural group (Ferrante, 2003). Fine (1996) addresses the role of language in kitchen

workers and how language is used to create occupationally-shared standards around how

food should taste. IT professionals have their own shared language(s). Database analysts

speak in SQL queries, network engineers speak in TCP/IP and three-letter acronyms.

Project managers speak in terms of SDLC phases (Software Development Life Cycle). This esoteric language can impede communication with other groups outside of the subculture (Trice, 1993; Nord et al., 2007; Guzman, 2006) while simultaneously reinforcing a sense of shared culture within the occupational group.

4.1.4 Shared History

Culture is "an historically transmitted pattern of meanings embodied in symbols" (Geertz, 1973, p.89) and "the sum total of all the shared, taken-for-granted assumptions that a group has learned throughout its history" (Schein, 1999, p. x). Work values, in particular, are transmitted through historical processes and any study of work values must address the influence of shared history (Brief & Nord, 1990). For example, Fine (1996) situates his study of restaurant workers in the history of restaurants. Ignoring shared history can lead to a lack of understanding of ultimate outcomes (Brief & Nord, 1990). Interpretations of the meaning of any work activity are driven by our interpretations of the past (Brief & Nord, 1990; Allan, 2001; Halbwachs, 1992). Relevant past events in shared history can include social and economic events and institutions (Brief & Nord, 1990; Daynes, 2010). Historical changes give rise to cultural patterns of values (Swidler, 1986).

There are historical events that IT professionals share in their collective memory. Some events of collective significance include Y2K, 9/11, the dot-com boom and bust, outsourcing and offshoring trends, the rise of the Internet, and the rise of compliance regulations. The role of IT professionals has changed over its history as well. Initially, IT

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served primarily in a back office or support role capacity but today plays a more strategic function within organizations (Chan & Reich, 2007). The cohesiveness of the IT occupation has also increased over time (Duliba & Baroudi, 1991; Guzman, 2006) and may be an indicator of a transition from "unsettled" to "settled" lives referred to by Swidler (1986).

4.1.5 Shared Context

Trice's (1993) Theory of Occupational Culture identifies the core characteristics of an occupational culture as esoteric knowledge and expertise, extreme or unusual demands, consciousness of kind, pervasiveness, favorable self-image, primary reference group, and abundance of cultural forms. Esoteric knowledge and expertise are highly specialized skills and abilities that encourage feelings of superiority within the occupation. Extreme or unusual demands are challenging tasks that produce an emotional high. Consciousness of kind is an emotional awareness of who is inside and outside the occupational group. Pervasiveness is the level that an occupation takes over the worker's life both during work hours and after work hours. Favorable self-image involves pride in one's profession. Primary reference group means that members refer to other members of this group for gauging their own performance and merit. Abundance of cultural forms refers to the rich symbols, language, and rituals that members of an occupation interpret similarly where no explanation of the meaning is necessary. These seven characteristics have been used previously to describe the cultural context of the IT occupation (Guzman et al., 2004; Guzman & Stanton, 2004; Guzman et al. 2006; Ramachandran and Rao, 2007)

but are missing the contextual link with shared values which this study will provide. For

Geertz (1983), contextualization is the primary goal when analyzing cultural groups. IT

professionals share a context of similar job functions as well as technical expertise. IT

professionals frequently need to be on-call 24/7 in case of system down-time in ways that

other groups do not. Stress, burnout, and turnover are common within the IT profession

(Joseph et al, 2007). This sets them apart from other occupational groups within an

organization. Occupational subcultures exist apart from organizational culture and can

become a source of conflict due to their culture differences (Trice, 1993) and can lead to

perceptions of 'us versus them.' By examining the relationships between shared values,

shared language, shared history, and shared context through in-person interviews with IT

professionals, a meaningful interpretation of IT occupational culture can be achieved.

4.2 Part I Methodology

The methodology for Part I is a hermeneutic analysis based on qualitative

interviews in the tradition of cultural sociology. Qualitative interviews are appropriate for

studying the interrelationships between values, language, and beliefs of a cultural group

within their context (Creswell, 2007; Brewerton & Millward, 2001). Ethnographers use

qualitative interviews to attempt to uncover the underlying meaning in the routine

activities of members of a cultural group (Creswell, 2007). Durkheim's sacred and

profane elements of society coupled with Weber's deeper meanings of work can be

combined using Alexander's (2003) strong program of cultural sociology for analysis and

interpretation.

Data collection was through qualitative semi-structured interviews with IT professionals to explore the values that are important to them collectively. Schein (1990) emphasizes that interviews are the best means for collecting cultural information about values. The interactive process of interviewing is important because it can generate new knowledge by collecting and interpreting the informants' perceptions of the world (Kvale, 1996). Interviews create 'deep understanding' of people's experiences (Albrechtsen, 2007). Interviewing is by far the most common method of gathering cultural information (Bernard 1995). Finally, interviews are appropriate for interpretive cultural research because the interviewer is attempting to understand the interviewees' view of the world, their work, and their life experiences (Rubin & Rubin, 1995).

4.2.1 Data Collection

Data collection was based on 25 in-depth interviews with IT professionals from a variety of backgrounds. Permission to begin data collection was granted by the Institutional Review Board (IRB) at UNCG under study # 11-0250. See Appendix F. No incentive was offered to interviewees for their participation, but all participants requested that their names and company names be kept confidential. The target number of 25 was based on similar studies. Creswell (2007) gives the guideline of 20 to 30 interviews as typical for qualitative research. As Guzman (2006) examined perceptions of IT occupational culture by *students* who were preparing to enter the field of IT, this study addresses the context of those who have been in the profession for at least 7 years (enough time to be fully socialized into the occupational culture). Additional interviews

were not necessary as a level of saturation was reached where new information no longer

added to understanding (Creswell, 2007). By the end of the interviews, a sense of

saturation was clear in that answers to interview questions were becoming expected with

no new major insights being achieved. Clearly one could go on interviewing hundreds of

people and get new stories and new details, but there are diminishing returns, and 25

interviews with a variety of subjects provided enough rich and useful results for

qualitative analysis.

The interviewees for the semi-structured interviews were selected using

purposeful sampling in order to obtain a broad range of demographics (LeCompte &

Schensul, 1999; Creswell, 2007). These demographics included variations in age, gender,

years of experience, industry, and type of IT role. The three selection criteria for

interview candidates were:

1) IT professionals who had worked in the field at least 7 years.

2) They had worked in multiple organizations in IT departments, not just one

company for their entire career.

3) They were not members of IT management.

These were guidelines for purposive sampling and the interviewees were

generally representative of the overall population of interest (Bernard, 1995; Creswell,

2007). IT managers tend to share more in common with business management culture

and overall organizational culture than with IT occupational culture (Guzman et al., 2004;

Iivari & Huisman, 2007), therefore IT managers were excluded as potential interviewees.

Appropriate participants were obtained through a variety of means. Initially, personal and

professional contacts were used. Additional interviewees were obtained in two ways.

First, interviewees were asked if they knew other professional associates that would be

willing to be interviewed in a process known as "snowballing" in gathering potential

interviewees (Gameson, 1998). Second, a large IT services recruiting firm was extremely

helpful in providing additional contacts that met the selection criteria.

4.2.2 Interview Protocol

The interview protocol was based on the original pilot but included some

important improvements. Additional questions were added based on the new framework.

The pilot did not examine the areas of shared language, shared history, and shared

context explicitly and new questions were added (e.g., what historical events do you think

were important to the IT occupation?). The initial pilot focused on identifying shared

values; however these were all framed positively, literally as to what IT professionals

valued highly (e.g., "what do you like about…" "what do you love about…"). The full

study sought to go beyond positive values to examine dislikes and hatreds and uncover

what IT professionals shun and avoid. The initial 7 interviews from the pilot were

included in the full study. It is acceptable and even encouraged to include pilot interviews

in a qualitative data set even if additional questions are added as the research process

moves forward (Richards, 2005).

The qualitative results from the pilot interviews were extremely fruitful, so large

changes from the interviewing format used previously were not necessary. Based on

experience in the pilot, IT professionals are extremely willing and able to talk about IT

occupational culture and the interview questions simply serve to "wind them up" and then listen to what they have to say. The complete revised list of questions is in Appendix B.

Each interview did not have a set time limit and lasted as long as needed in order to fully explore what was important to each person in terms of their IT occupational values. The session concluded when the interviewee felt they had addressed all of their top concerns around values so each interview was "saturated" with nothing else to unearth. Each interview lasted from one hour to two hours. All interviews were conducted face-to-face, tape recorded and then immediately transcribed. Traditional Dictaphone equipment was used to pause, rewind, and slowdown the recording in order to capture every word correctly. Nuances and tonal inflections were captured in the transcription in order to emphasize important issues. In order to keep up with the heavy workload of transcription, this process was outsourced to a professional transcriptionist. All the transcripts were checked in order to ensure the transcriptionist was accurately capturing the recorded data. The transcriptionist did an excellent job of identifying unknown words (typically technology-related words) and indicating emphasis with italics and inflections such as laughter in parentheses in the transcripts. All the transcriptions were then provided to the interviewees for validation that the right information was captured and they were allowed to make corrections or amendments. These steps serve to increase the reliability of data gathered in an interview process (Yin, 2003). A lesson learned from the data collection process was that outsourcing the transcription process is critical to completing the work in a timely manner.

In terms of confidentiality, interviewees were asked if their information should remain anonymous or not. In all cases, the interviewees preferred not to have their names or the names of their firms published but were comfortable having generic demographic information published such as "a 30-year old programmer with a Fortune 50 retailer".

The location for each interview varied, and this was necessary in order to accommodate everyone's work schedules. Locations included meeting in restaurants, the researcher's office on campus, the interviewee's office at their work location, or sitting outdoors. It was not feasible to make the interview location the same for each interview. While each type of location was conducive for in-depth discussion, there were pros and cons to each one. In restaurants, for example, people were able to loosen up quickly due to the casual non-work environment, however background noise was occasionally a challenge for recording and subsequent transcription. Meeting in the researcher's office on campus provided a quiet environment for a clear recording but may have made interviewees nervous or uncomfortable at first. This was evidenced by subtle leg shaking, foot tapping, furtive eye movement, and stiff body language. However, even in these cases, the interviewee was able to open up and ignore the sterile environment. Meeting at the interviewee's work location seemed to make them at ease in a quiet environment but slightly less inclined to talk about conflicts with co-workers. Meeting outdoors in a neutral, safe, quiet environment seemed to be the ideal location for interviewing.

Cultural interviews are typically based on semi-structured interviews that are based on an interview guide with a written list of questions and topics that need to be addressed (Bernard, 1995). Interview questions followed three types of qualitative

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questions: main questions, probing questions, and follow-up questions (Rubin & Rubin, 1995). First, the main questions were those prepared ahead of time to guide the conversation and these are shown in Appendix B. Main questions in cultural interviews are primarily devices to get the interviewee started in talking about their cultural perspectives (Rubin & Rubin, 1995). Second, probing questions were used if interviewee responses lacked sufficient detail or clarity such as "Can you provide an example of what you're talking about?" or "What do you mean by that?" Probing questions can also help the interviewee know that the interviewer is actively listening and engaged which can build trust (Rubin & Rubin, 1992; Bernard, 1995). Probing questions are not created ahead of time but rather flow from the conversation and allow the interview some latitude in exploring different issues in order to be faithful to what is important to the interviewee. A probing question such as "Can I quote you on that?" or even a confirming comment like "That's a great point!" provides feedback to the interviewee that they have accurately hit on a core area of interest for the interviewee and may provide some additional information in that vein (Rubin & Rubin, 1995).

Lastly, follow-up questions tie certain responses back to central themes. Follow-up questions are not prepared prior to the interview and are based on the interviewees' responses. An example would be "You're not the first person I've interviewed that has compared IT to fire-fighting. Why do you say that?" Follow-up questions may be done during the interview or several days later after the interviewer has reviewed the transcript and discovers areas that need clarification (Rubin & Rubin, 1995). Follow-up questions, in this case, were done via email for documentation purposes. Probing and follow-up

questions are frequently necessary when the interviewer does not share a common technical language with the interviewee, for example technological terminology and acronyms. For this study, the researcher has 18 years of experience in the IT profession and technical terminology was never a problem. Knowing the special cultural vocabulary allows a research to ask meaningful questions that will be understood and appreciated by the interviewee (Rubin & Rubin, 1995).

Where Patten et al. (2009) used a similar ethnographic interviewing method to examine the culture of the enterprise IT organization from the CIO's perspective, this study examines IT occupational culture from the employee's perspective. But similarly to Patten et al. (2009), because the lead researcher had previously been an IT professional for 18 years, this research is from an "emic" perspective, where the interpretations were made from an insider's orientation (Bryne, 2001). Acknowledging the emic relationship of interviewer to interviewee helps to address the Principle of Interaction Between Researchers and Subjects as a best practice of interpretive research (Klein & Myers, 1999). Because culture defines who is an insider and who is an outsider, it is helpful for the interviewer to be considered an insider so that interviewees will be comfortable opening up (Rubin & Rubin, 1995). This was clear in how the interviewees interacted with the researcher in an open and relaxed way.

4.2.3 Qualitative Analysis

There is no single "cookbook" way of analyzing qualitative data (Bernard, 1995; Weber, 1990). Analysis in qualitative research means sorting out the structures of

significance or codes and interpreting their meaning for a wider audience (Geertz, 2002).

Therefore, the analysis of the interview data involved several stages including 1) coding,

2) content analysis, and 3) hermeneutic interpretation. While the unit of data collection is

the individual, the unit of analysis is the occupational group level because the results are

being generalized to this group level. The unit of analysis is the unit about which

descriptive and explanatory statements are to be made (Babbie, 1992). The overall

approach the qualitative analysis is shown in Table 10.

Table 10. Qualitative Analysis Steps

Stage One - Coding	Step 1	Descriptive coding
	Step 2	Topical coding
	Step 3	Pattern coding into topical categories
Stage Two – Content Analysis	Step 1	Thematic/analytic coding
	Step 2	Code Frequency analysis
	Step 3	Code Co-occurrence analysis
Stage Three – Hermeneutic Interpretation	Step 1	Analysis through lens of cultural sociology
	Step 2	Analysis with literary metaphor

4.2.4 Coding

Coding of the interview data is the first step of qualitative analysis (Rubin &

Rubin, 1995). A code is "a word or short phrase that symbolically assigns a summative,

salient, essence-capturing, and/or evocative attribute for a portion of language-based or

visual data" (Saldana, 2009, p.3). Coding is the process of transforming raw data into a

more quantitative form (Babbie, 1992) although qualitative data is not the same as

quantitative data (Richards, 2005). The aim of codifying is "to arrange things in a

systematic order" (Saldana, 2009, p. 8). While the coded data is not quantitative, many

techniques of content analysis are based on coded data, including word-frequency counts, key-word-in-context listings, classifications of words into content categories, content category counts, and retrievals based on content categories and co-occurrences (Weber 1990). All of these techniques were used in the coding process.

After the interviews were transcribed, they were imported into the online qualitative software Dedoose (www.dedoose.com) for ease of coding. The choice to use Dedoose instead of the de facto standard of NVIVO software was based on 1) faster coding, 2) greater stability, and 3) licensing for convenience of accessing the data from any location. Dedoose was developed specifically for social-cultural qualitative research and follows a similar, although stream-lined, process for coding as in NVIVO. Where NVIVO refers to "nodes" of text for coding, Dedoose simply calls them "excerpts" to be "coded" therefore that is the language that will be used from this point forward. The same type of coding process that is typically used in NVIVO was used in Dedoose.

There are three main types of coding in any qualitative research: 1) descriptive, 2) topic, and 3) analytical or thematic (Richards, 2005). Descriptive coding involves storing information about the interviewees. Dedoose stores these as descriptor codes. These descriptor codes included gender, age, race, education, major, interview date, years in IT, size of current IT group, current industry, current organization size, and a unique identifier in order to preserve anonymity. The complete descriptors are reported in the Results section below.

Topic coding involves tagging or labeling text according to its subject. The mechanics of coding involve separating the text into short paragraph-length units

(Saldana, 2009), a process that Dedoose calls "excerpting". Topic coding summarizes in a word or short phrase the basic topic of an excerpt of qualitative data and is frequently used in all types of qualitative analysis (Saldana, 2009). Codes can be based on a priori codes as a provisional list of codes determined beforehand as part of a conceptual framework (Miles & Huberman, 1994, p. 58 in Saldana, 2009). The provisional list of codes can be based on literature reviews, a conceptual framework, research questions, and/or a pilot study (Saldana, 2009). Thus the initial codes were based on the framework from the literature and the pilot. However, provisional codes can be changed, added to, or removed as the coding process moves forward (Saldana, 2009). Many new codes emerged from the data. The goal was not to straitjacket the data into the anticipated form but rather to allow the data to speak for itself. At times it was particularly useful to use *in vivo* codes. In vivo coding or verbatim coding means "in life" and refers to a word or phrase from the actual words used by interviewees (Saldana, 2009) In vivo codes are useful when a similar phrase occurs regularly amongst the interviewees (Richards, 2005). So for example, "fell into IT" was a common in vivo code that described the unforeseen ways that the interviewees began their career in IT. As new codes emerged, new understandings emerged.

The *process* of topical coding can be a catalyst to seeing new patterns in the data that provide new insights. The coding process itself was very much a journey and it was important to keep an open mind. The speed of Dedoose for the coding process (as compared to NVIVO) also allowed the researcher to focus on the meaning of the coding rather than the laborious mechanics of coding. The researcher was the sole coder for

consistency of coding. Verification of consistency of coding over time was tested by re-visiting the coding of the first coded interviews and in some cases re-coding from scratch for comparison. In this way, newer codes created towards the end of the coding cycle were accounted for in the older coded interviews although the coding did not change substantially.

Key-word-in-context (KWIC) is a useful strategy for coding which preserves the context of the surrounding sentences around each topical code (Weber, 1990). Dedoose supports KWIC and easily provides the surrounding context via its process of excerpting. The first round of topical coding involved tagging important ideas in each of the 25 transcripts with a code. Examples of codes included ideas like "bureaucracy" or "love" or "creativity". This is also sometimes called coding "up" from the data (Richards, 2005). Coding can include instances where the interviewee got particularly excited or upset or their body language changed (Rubin & Rubin, 1995) which were coded as "important". After this initial coding process there were 222 different codes. Table 11 shows all the codes from the initial round of coding.

Table 11. List of codes in 1ˢᵗ round (duplicates removed)

List of codes			
9-11	empowerment	magic	routine
acronyms	enjoyment	making a difference	sabotage
adjectives	esoteric knowledge	manual work	sandbox
alignment	expectations	marketing	satisfaction
analytical	experience	meaning of work	satisfaction
antibusiness	extreme-unusual demands	mechanic	self-taught
antisocial	fake	micromanaged	sense of humor
appearance	favorable self-image	Microsoft	shared context

appreciation	fears	military	shared history
Asperger's	fell into IT	mistakes	shared language
authority	firefighting	mobile	shared negative values
autonomy	flexible work schedule	music	shared values
bandaids	freedom	mystery	silicon valley
blame	friends	negative	silos
bleeding edge	frustration w end-users	novelty	sloppy
boredom	fun	novelty	social
building	gender issues	old guard	specialization
bureaucracy	good ol' boy network	open communication	speed
burnout	great quotes	open source	stagnant
business buzzwords	grumpy	organized	standards
business understanding	hacking	outsourced	stereotype
business values	handholding	ownership	strategy
capitalism	hate	parent	stress
casual dress	hats	paycheck	stress
certifications	have your back	people skills	structure
challenge	heard	perception	structure of power
changes	help people	personal development	stubborn
CIO	heroes	personal history	taking advantage
cloud	hobby	pervasiveness	taking things apart
collaboration	humility	planning	teacher
competence	humor	playing	teamwork
compliance	I am different	political	technical
conflict	idealism	pranks	technological
consciousness of kind	indispensable	precision	technology
consulting	indispensable	prestige	time
control	innovation	pride	tools
corruption of knowledge	insular	primary reference group	totem pole
creativity	introverted	privacy	toys
critical thinking	isolation	problem-solving	translation
cultural forms	jargon	profitability	transparency
curiosity	job hopping	progress	trenches
customer focus	job security	puzzles	trust
cynical	job title	quality	turf battle
decision making	keeping up with tech	quick to respond	understaffed

defensiveness	layoffs	rational	understanding
detail	lazy	reactive	understanding business
differences	leadership	real	urgency
different types	learning	recognition	variety
disdain	leveling up	religion	video games
drive	libertarian	remote control	villains
dynamic	linear thinking	repetitive	virtualization
easy	logic	respect	wall around IT
economic	long-term	reverence for knowledge	work-life balance
efficiency	looking bad	rigidity	younger people
empire building	love	risk	

Richards (2005) mentions that computer software makes coding much easier but this can sometimes result in a flood of codes that may or may not be useful to the research questions. Second cycle coding reorganizes and reanalyzes and synthesizes the data after the first initial coding (Saldana, 2009). Some excerpts needed recoding as new codes were created or merged. In the second round of coding, the codes and their related excerpts were examined again to ensure that there was consistency in the coding scheme over time and some codes were revised as necessary and duplicates removed. The process of qualitative coding is intentionally malleable and not static (Richards, 2005). But consistency of coding is what provides reliability in qualitative research (Richards, 2005). To help ensure consistency, full text word searches were used on all keywords across each transcript to ensure relevant excerpts were not erroneously overlooked in the beginning. The researcher needs to be extremely organized and rigorous but at the same time creative and flexible in the coding process (Saldana, 2009).

The next step was to group the codes into useful categories. Pattern coding is a way of grouping categories together into a smaller set of themes in the next cycle of coding (Saldana, 2009). Coding categories may be developed based on theoretically determined categories (Brewerton & Millward, 2001). Thus, some of the categories used included the constructs of interest in the research model, i.e., "shared language" (similar use of common IT terms), "shared history" (collective memory of events), "shared context" (Trice's seven occupational culture characteristics), and "shared values" (important recurring issues with either a strong positive or strong negative connotation including, but not limited to, the original SCORRE values from the pilot). Additional categories were also modified in the second round. For example, it was useful to group the codes of "personal history", "technological history", "political history", and "economic history" under the category of "shared history". Keeping an open mind throughout the entire process was crucial. For example, categories for Reverence for Knowledge and Enjoyment were created after the initial pilot interviews. Similarly, the category of "structure of power" used in the pilot evolved into the category of "autonomy" as described in the Results section later. Table 12 shows the consolidated categorization scheme that emerged from this process.

Table 12. Coding Categories

Category	Sub-category1	Sub-category2	Sub-category3
Shared language			
	jargon		
	acronyms		
	business buzzwords		

	translation		
Meaning of work			
	help people		
	making a difference		
Shared values			
	Enjoyment		
		Challenge	
		detail	
		friends	
		Fun	
		Playing	
		pranks	
		quality	
		Risk	
		satisfaction	
		Sense of humor	
		social	
		toys	
	Reverence for Knowledge		
		certifications	
		Problem-solving	
			puzzles
			taking things apart
		critical thinking	
		totem pole	
			real
			fake
		understanding	
		experience	
		competence	
		respect	
			appreciation
			recognition
		drive	
			self-taught
		mystery	
		heroes	

			teacher
		curiosity	
		learning	
		keeping up with tech	
	Open Communication		
		analytical	
		logic	
		Precision	
		rational	
		transparency	
	love		
	innovation		
		bleeding edge	
		building	
		Creativity	
		dynamic	
		mistakes	
		novelty	
		novelty	
		progress	
		technology	
		Variety	
	Structure		
		access	
		control	
		organized	
		planning	
		standards	
		structure	
		tools	
	teamwork		
		collaboration	
		have your back	
		trust	
	autonomy		

		authority	
		decision making	
		empowerment	
		freedom	
		Structure of power	
Shared history			
	Personal history		
		Fell into IT	
		hobby	
		Parent	
		silicon valley	
	Technological		
		changes	
		cloud	
		mobile	
		remote control	
		virtualization	
		Y2K	
	Political		
		9-11	
	Economic	job hopping	
		job security	
		layoffs	
		outsourced	
Shared context			
	Pervasiveness		
		work-life balance	
	Cultural forms		
		books	
		movies	
	Consciousness of kind		
		different types	
		I am different	
		insular	

		job title	
		music	
		stereotype	
		video games	
	Favorable self-image		
		prestige	
		pride	
	Primary reference group		
		respect	
	Esoteric K		
		differences	
		many hats	
		specialization	
		technical	
	Extreme-unusual demands		
		burnout	
		expectations	
		stress	
		stress	
		understaffed	
		urgency	
Alignment			
	business understanding		
Great quotes			
Business values			
	Capitalism		
	Customer focus		
	Efficiency		
	Leadership		
	Profitability		
	Teamwork		
	Understanding business		
Adjectives			
Negative values			
	bureaucracy		
		antibusiness	

		conflict	
		empire building	
		micromanaged	
		ownership	
		sabotage	
		sandbox	
		turf battle	
		wall around IT	
	frustration w end-users		
		handholding	
	villains		
	rigidity		
		compliance	
		linear thinking	
	appearance		
		fake	
		marketing	
		perception	
	paycheck		
	hate		
	fears		
		blame	
		corruption of knowledge	
		hacking	
		looking bad	
		taking advantage	
	routine		
		boredom	
		manual work	

		repetitive	
		stagnant	
	old guard		
		younger people	
	sloppy		
		bandaids	
		lazy	
Other			
	antisocial		
	Asperger's syndrome		
	being heard		
	casual dress		
	CIO		
	consulting		
	cynical		
	defensiveness		
	disdain		
	easy		
	firefighting		
	flexible work schedule		
	gender issues		
	good ol' boy network		
	grumpy		
	humility		
	idealism		
	indispensable		
	indispensable		
	introverted		
	isolation		
	leveling up		
	libertarian		
	long-term		
	magic		
	mechanic		
	Microsoft		
	military		

	open source		
	people skills		
	personal development		
	privacy		
	quick to respond		
	reactive		
	religion		
	silos		
	speed		
	strategy		
	stubborn		
	time		
	trenches		

4.2.4 Content Analysis for Thematic Coding

Themes are the outcomes of coding and categorization (Saldana, 2009). The goal

of content analysis is to be able to make inferences from the text based on thematic

patterns (Bernard, 1995). In order to make valid inferences, the classification procedure

must be reliable in the sense of being consistent (Weber, 1990). The classification must

also generate variables that are valid to the extent that they measure or represent what the

researcher intends them to measure. So the set of categories was distilled into a more

concise set of major themes based on not only category frequency but also careful

reflection. "Qualitative inquiry demands meticulous attention to language and deep

reflection on the emergent patterns and meanings of human experience." (Saldana, 2009,

p. 10) While word frequency counts helped build the categories and category counts

helped build the themes, it was necessary to continually circle from the broad themes

back to the interview data to ensure that the themes were staying to true to the context of

what was said, and more importantly, what was meant. This circling back and forth to look at the data with fresh eyes after time has passed is good for achieving new insights (Richards, 2005). One example of this would be the realization over time that open communication was less important than precision communication which led to the theme of Precision.

Analytical coding is what leads to theory emergence and theory confirmation. It is also the most difficult type of coding to do (Richards, 2005). Analytical coding required deeper thinking about the core values that might be represented by different statements from the interviewees. It requires an awareness not just of what is said, but *how* it was said, and what was *not* said. It also requires keeping the codes in their natural context.

Two forms of content analysis in Dedoose lent themselves to this kind of analysis. The first was a simple code frequency count across all the imported transcripts. When conducting qualitative analysis, the frequency of a symbol, idea, or subject matter can be interpreted as measuring its importance, attention, or emphasis (Krippendorff, 2004). Showing the numeric frequency of codes appearing in interviews is a way of showing the relative importance of the variables of interest in qualitative research (Guzman et al., 2004; Brewerton & Millward, 2001). Figure 8 shows a screen capture of how code frequency counts are displayed in Dedoose.
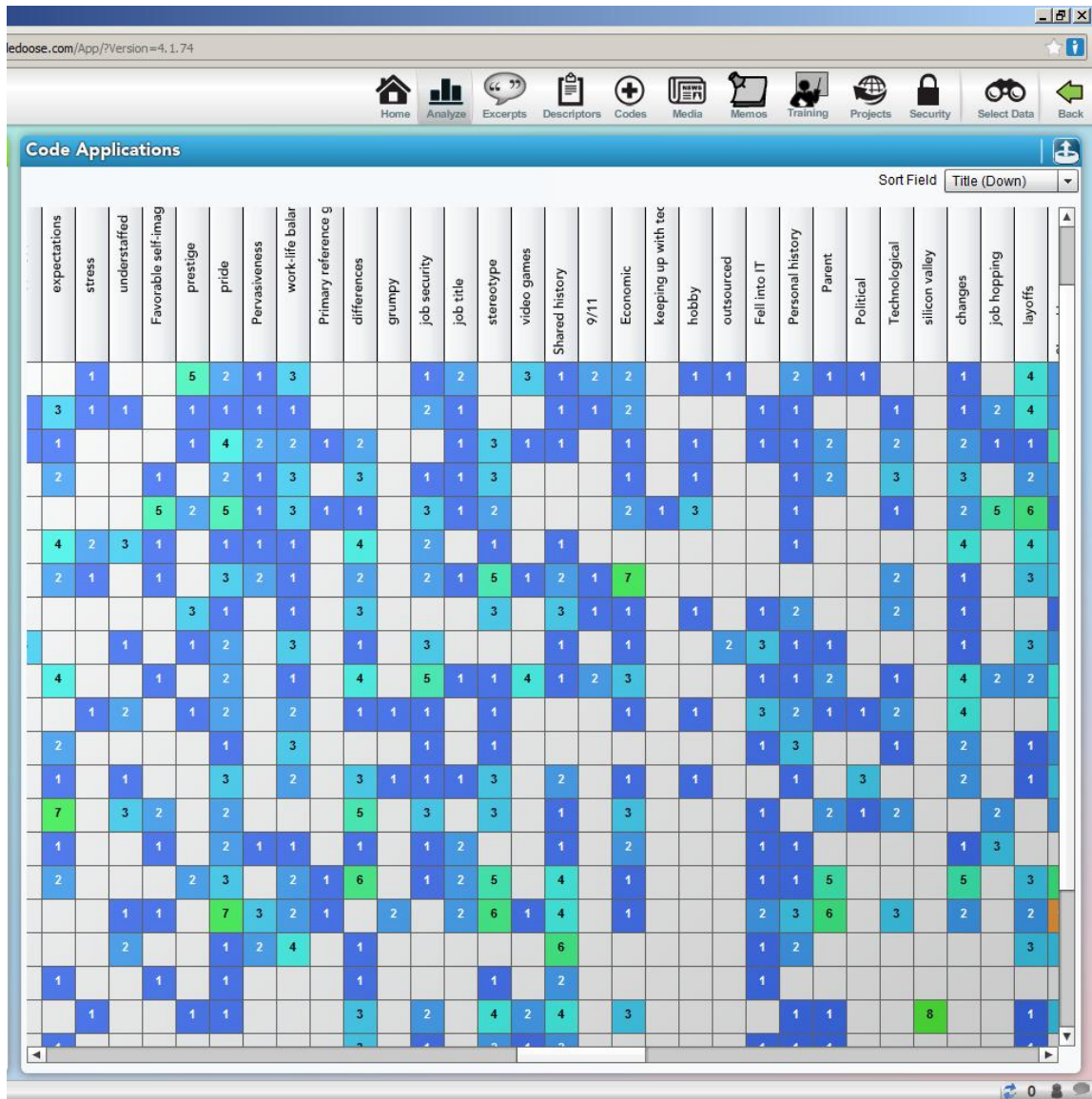
Figure 8. Screenshot of Dedoose codes

The second form of content analysis is in code co-occurrence. Co-occurrence coding is

the process of simultaneously coding a passage or overlapping passages with multiple

codes because human speech does not always lend itself to a single idea for each

paragraph or even each sentence (Saldana, 2009). Dedoose not only allows the coder to

handle overlapping codes easily, but provides co-occurrence analysis to see which codes

frequently occur in proximity to other codes. This was useful for grouping codes and

categories together based on their physical proximity in the transcripts. Figure 8 shows an

example of a co-occurrence chart in Dedoose. Co-occurrence charts were helpful in

quickly finding examples of relationships between the major constructs in the original

framework (such as between Shared Language and Shared Values which highlighted the

specific link between communication and precision; or between Shared History and

Shared Context which highlighted how economic layoffs have led to extreme or unusual

demands in the workplace). Co-occurrence provides empirical evidence of the potential

relationships between different ideas such as "Reverence for Knowledge" and "Respect"

(co-occurrence =15). Co-occurrence can also sometimes provide deeper insights into the

data such as "Reverence for Knowledge" and "Heroes" (co-occurrence=13). An example

of co-occurrence in Dedoose is shown in the screen capture in Figure 9.

Code Co-Occurence

Include Overlapping Excerpts

Codes	Shared negative values	old guard	sandbox	bandaids	taking advantage	boredom	stagnant	sloppy	conflict	corruption of knowledge	empire building	negative	fears	sabotage	hacking	routine	repetitive	lazy	perception	looking bad	manual work	antibusiness	appearance	blame
Shared negative values																								
old guard																								
sandbox																								
bandaids															1					1			1	
taking advantage										2					1							1		1
boredom																2						1		
stagnant													2	1						1		3	2	
sloppy																						1		
conflict																								
corruption of knowledge					2										1									
empire building																								1
negative																								
fears							2															1	1	
sabotage							1													1			1	
hacking				1	1					1														
routine						2										1						2		
repetitive																1								
lazy																								

Figure 9. Dedoose code co-occurrence

Pulling excerpts out of context can dramatically change their meaning and every effort was made to avoid doing this. Theory that emerges from qualitative data should offer more than simply what the participants report but should be able to adequately account for the data in order to make sense of what is going on in the data (Richards,

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2005). This sense-making of finding deeper meanings within textual data is entirely consistent with the strong program of cultural sociology.

Finally, it was important to not overstate the homogeneity of IT occupation culture. Certainly there are differences between members and even sub-groups. The three-way perspective of culture was an important tool to include in the qualitative analysis. The three-way perspective indicates that culture may be analyzed as 1) integrated, 2) differentiated, or 3) fragmented (Martin, 2002). Integration sees consensus and consistency and this may be the primary perspective for this research. Differentiation examines inconsistent interpretations and differing subcultures within a group. Finally, fragmentation emphasizes the role of paradox, ambiguity and tension with a culture for which there may be no easy explanations. Furthermore, all three may be used simultaneously for a richer interpretation of culture and the researcher needs to be cognizant of all three perspectives throughout the analysis. This three-way view of culture has also been advocated for IS research in particular (Kappos & Rivard, 2008).

4.3 Part I Results

4.3.1 Sample Demographics

Table 13 shows a complete list of the descriptor codes used for the interviewees and their demographics.

Table 13. Interviewees and demographics

ID	Age	Years in IT	Gender	IT Function	IT group size	Org size	Current industry	Education & Major
1	33	11	Male	Programmer	50	21000	Education	Masters IS
2	32	14	Male	Mainframe programmer	200000	400000	Technology	Masters IS
3	35	12	Male	Developer	500	96000	Technology	Masters IS
4	55	20	Male	Mainframe programmer	18	24000	Manufacturing	Bachelors IS
5	33	11	Male	Support	1000	200000	Retail	Associates IS
6	42	21	Male	Support	1000	200000	Retail	Bachelors CS
7	36	14	Female	Project mgr	600	26000	Manufacturing	Bachelors IS
8	43	25	Female	Business Analyst	15	3000	Education	Bachelors Other
9	34	15	Male	Programmer	4	2500	Education	Bachelors Other
10	46	25	Male	Consultant	1	1	Manufacturing	Bachelors IS
11	37	11	Male	DBA	32	1500	Healthcare	Masters IS
12	26	8	Male	DBA	30	300	Financial	Bachelors IS
13	34	12	Male	Consultant	5	5	Manufacturing	Associates Business
14	48	25	Male	Network Admin	600	26000	Manufacturing	Bachelors CS
15	39	15	Male	Consultant	6	11	Manufacturing	Bachelors Business
16	42	19	Male	DBA	300	10000	Financial	Bachelors CS
17	42	16	Female	SysAdmin	25	1300	Legal	Bachelors Other
18	31	14	Male	Security	25	3000	Nonprofit	Bachelors Business
19	44	11	Male	Applications Architect	2000	40000	Financial	Bachelors CS
20	42	18	Female	DBA	50	500	Healthcare	Bachelors IS
21	35	14	Male	SysAdmin	24	2000	Healthcare	Associates IS
22	33	11	Male	SysAdmin	25000	200	Financial	Associates IS

23	36	17	Female	Consultant	7000	7000	Technology	Bachelors Other
24	38	12	Male	SysAdmin	7	300	Publishing	Associates IS
25	35	13	Male	SysAdmin	500	24000	Retail	Associates IS

4.3.2 Codes

As indicated earlier, the initial coding resulted in 222 separate codes. A frequency

chart showing the most popular codes is shown in Table 14.

Table 14. Top codes by frequency

Code	Totals	Code (cont.)	Totals
Reverence for Knowledge	175	villains	27
Structure/Control	123	critical thinking	27
adjectives	82	Efficiency	27
Problem-solving	72	rational	26
understanding	71	business understanding	26
Shared language	69	Profitability	25
Alignment	68	hate	24
Esoteric K	67	stagnant	23
Open Communication	60	prestige	23
Extreme-unusual demands	56	Business values	23
Enjoyment	52	social	21
meaning of work	51	Fell into IT	21
stereotype	51	precision	20
pride	48	frustration w end-users	20
layoffs	47	decision making	20
differences	47	routine	20
paycheck	47	I am different	20
great quotes	46	Technological	20
heroes	45	younger people	20

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people skills	45	detail	19
Shared history	43	Cultural forms	18
teamwork	42	job hopping	18
structure	42	progress	18
antibusiness	41	Pervasiveness	17
Structure of power	39	novelty	17
Consciousness of kind	39	blame	17
Risk	39	Customer focus	17
Variety	38	disdain	17
respect	37	Challenge	16
changes	36	Favorable self-image	16
work-life balance	36	help people	16
self-taught	35	fears	15
Economic	35	job title	15
love	35	Playing	15
fake	34	gender issues	15
speed	31	rigidity	15
expectations	31	different types	14
drive	31	Creativity	14
job security	30	understaffed	14
Fun	30	marketing	14
building	30	long-term	13
bureaucracy	29	video games	13
Personal history	28	Leadership	13
easy	28	trust	13
empowerment	28	friends	12
Parent	27	idealism	12

4.3.3 Categories

Categorization of these codes into logical groupings of similar meanings resulted in 35 categories that are shown in Table 15. All of the sub-sub-categories have been removed for clarity.

Table 15. Code categorization

Category	Sub-category
Shared language	
Meaning of work	
Shared values	
	Autonomy
	Drive
	Enjoyment
	Hate
	Innovation
	Love
	Negative values
	Communication
	Reverence for Knowledge
	Structure
	Teamwork
Shared history	
	Economic
	Personal history
	Political
	Technological
Shared context	
	Consciousness of kind
	Cultural forms
	Esoteric Knowledge
	Extreme-unusual demands
	Favorable self-image
	Pervasiveness
	Primary reference group
Business values	
	Alignment
	Business understanding
	Capitalism
	Customer focus
	Efficiency
	Leadership
	Profitability

4.3.4 Value Themes

After careful content analysis and reflection, there were six core value themes selected from the shared value categories that capture the essence of IT occupational values. While there are strong similarities to the original SCORRE values in the pilot, there are also important differences. This is primarily due to the fact that research is a journey and the ending point was somewhat different from what was anticipated. Again, a certain open-mindedness was crucial during the analysis process in order to allow the data to speak for itself. Flexibility and creativity are important research traits in qualitative research (Saldana, 2009) The six shared values identified in the data are 1) Autonomy, 2) Structure, 3) Precision, 4) Innovation, 5) Reverence for knowledge, and 6) Enjoyment. Table 16 shows the code frequency for these six values. These will henceforth be abbreviated with the useful acronym ASPIRE. This acronym is particularly meaningful in that the values themselves identify what IT professionals *aspire* to in their occupation. It is easily remembered and powerful enough to provide helpful guidance to business and IT managers alike in their daily interactions with IT professionals. Each shared value is defined in Table 16.

Table 16. Coding frequency and definitions of the ASPIRE values

Shared value	Coding Frequency	Definition
Autonomy	39	the level to which members of an occupation believe that they should be empowered with access to tools, access to data, and decision-making for the organization.
Structure	123	the level to which members of an occupation believe that orderliness and definition are needed in the work

		environment.
Precision in communication	60	the level to which members of an occupation believe that communication about work tasks must be detailed, accurate, and exact.
Innovation	47	the level to which members of an occupation believe that technological improvement, novelty, and creativity are valued
Reverence for knowledge	175	the level to which members of an occupation believe that intelligence and increasing technical knowledge (learning?) determine respect and admiration
Enjoyment	52	the level to which members of an occupation believe that their job should include play, fun, and socializing.

4.3.5 Qualitative Validity and Reliability

Validity in qualitative research can refer to credibility and confirmability (Richards, 2005). Respondent validation is a popular method of checking validity (Richards, 2005). Because all interviewees were allowed to make corrections and clarifications of their transcribed conversations and none of them gave any indication whatsoever of being disingenuous in their answers, the data should be considered to have high validity. Face validity is present as well, as the ASPIRE values do form a cohesive unit on the surface. But the acid test of validity was sending the ASPIRE definitions and the overall interpretation back out to all the interview participants to get their feedback. Examples of their responses are shown in Table 17.

Table 17. Interviewee feedback

| |
|---|
| Magnificent job my friend. I'm looking forward to seeing the end results. (4) |
| |
| Thumbs up Tim… looks good and I agree with the results. Interesting about business management and how underlying motivations cause frictions. (5) |

> This is a good summary. I look forward to reading more of your work. (9)

The rest of the feedback from interviewees was similarly positive.

Reliability in qualitative research refers to repeatability and consistency of processes, i.e., the interviewing, the handling of the qualitative data itself, and the coding (Richards, 2005; Krippendorff, 1980; Weber, 1990). Every aspect of data collection and analysis was performed with as much rigor as possible. Because the interviews were conducted using an interview protocol template, tape recorded, transcribed electronically, maintained digitally in a highly organized way, and coded the same way at different times by the same researcher through multiple iterations of coding and re-coding, the qualitative data should be considered highly reliable.

4.4 The ASPIRE Values

The ASPIRE values identify core values of the IT occupation that are shared by its members. The ASPIRE values emerged from the data over time. Figure 10 shows how each of the original SCORRE values evolved into the ASPIRE values during the course of this two-year investigation. The transformation only served to strengthen the original model.
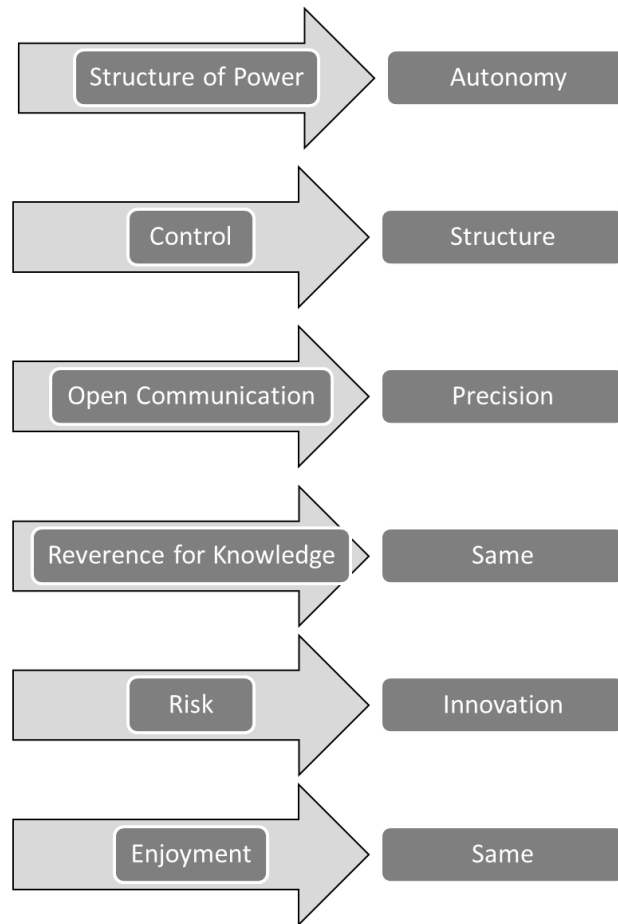
Figure 10. Evolution from SCORRE values to ASPIRE values

4.4.1 Autonomy

While the theme Structure of Power, defined as a preference for centralized or decentralized structures at work, was based on literature as well as a preference for more decentralized structures in the pilot, the full study put this idea in its proper context. The recurring theme was that IT professionals care less about the actual structure of power in an organization and care much more about personal power, literally having a sense of empowerment at work. This empowerment can manifest as decision-making authority,

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easy access to data, access to the right tools to do the job, and a limited need for managerial approval. Its opposite was bureaucracy and needing multiple levels of approval to get work accomplished. This type of bureaucracy had a strongly negative connotation in the interviews. For this reason, Structure of Power was changed to the more accurate term "Autonomy". Examples of codes associated with Autonomy included decision making, empowerment, micromanagement, freedom, tools, and authority. Table 18 shows examples of the theme of Autonomy from the interviewees. Note that bold text is the voice of the interviewer.

Table 18. Examples of Autonomy

I don't think the power structure matters as long as it's supportive. I don't care whether I work in a centralized or a decentralized environment as long as I can get the work done that I want to do. (23)
I'm definitely not for everything being extremely centralized…I guess it depends. (7)
[I would like it] if I was able to actually participate in any of the decision-making so we could make better decisions. That would be more meaningful. That would also get me more invested. (9)
I like having the power to be able to make a policy decision if it means getting someone's machine fixed or getting somebody back to work, I like having that sort of flexibility and power. (5)
I prefer people to make their own decisions and use their own best judgment. I like for people to have the power to make decisions. (7)
Fewer managers, more Indians. Fewer chiefs, more Indians. (6)
Generally, I want to be empowered to do what I need to do to accomplish my job and I don't want to have to beg and plead at several levels of management to get that to happen. So …I think this is true for any…any…well no it's not…this is what I often

believe to be true for every human being and then I remember, I'm reminded that it's not true. If you empower someone, make them feel that they're able to do what they need to do, you're going to get better work out of them, and they're going to be happier about doing the work, which is a positive loop of feedback. But that's not what I'm seeing here. (9)

Is there one that you're more comfortable with?

Decentralized (very quickly). Personally I don't like really tightly managed. I think whenever you decentralize functions out a little bit it's much looser, kind of horizontally differentiated organizational structure. I'm really comfortable in that kind of environment. I like working with peers. I like working with a mentor. I don't necessarily like working with 3 layers of management. Even though technically they're the same thing, the way that they interact with each other, with you, the way the work gets done is much more different, I think it's more collaborative. (1)

I don't know that a flatter structure is always better. I've kind of noticed in doing this in a lot of different places, we did a lot of work when I was at [company deleted] for a lot of banks and school systems, and there seems to be a lot of those places where you've got one guy that knows everything everybody kind of fears him and reveres him at the same time, and kind of has a god complex about the network, and I think that's probably unhealthy. It definitely kind of drives the ego-centric nature that kind of comes in a lot of introverted people by nature is that I am the most important thing in my universe, and I think that's a dangerous thing. So, I don't know that a flatter hierarchy would be always beneficial, because if there's nobody to tell you no, then you're the ultimate authority and I think that can kind of be dangerous. So, I think it's good sometimes to have the checks and balances. Like, we do change control here. I don't make a big change without my peers kind of looking over what I'm going to do. And at first I kind of hated that because, why can't I make a change? I'm the security, I should be able to do this. But then I thought more and more about it. Well, what if I haven't considered every possible thing that could happen with that? I mean, I think I have. I mean, I know every possible outcome from me clicking this checkbox. But I think having that peer review and check off that everybody agreed that this is the right thing to do is probably more beneficial to our users maybe than we sometimes want to admit. (18)

Decision making at [company deleted], everything comes top-down. What you do on a daily basis, what you're responsible for, and what you're not, you don't know if that's going to change the next day due to a merger. Suddenly you don't reset passwords any more for instance. We did it all, we reset passwords and everything and then they

branched that off and we had no input in that at all. They wouldn't come by and ask. They would just look at the numbers and make a decision. The difference in [company deleted] with that is my boss will come by and seek for my input on how we should handle certain things. He'll also ask me to create documentation for end-users. We even host a web site that end-users can go to and find solutions for things. I like that a lot better! (5)

I think that pyramid structure is not a very…how to say this…it's not a good idea in IT. Because a lot of…and then there's probably organizations where it does work well. But in my opinion, when you have that pyramid type of structure where I'm just a tech support, I guess you'd call them low-on-the-totem-pole, you know, not as much responsibility but their voice isn't heard either. Because these guys down here who are in the trenches helping users have a lot of good damn ideas that this person up here at the top will never hear!(13)

So for me control has to do with the freedom to architect solutions. Do I need to control others and make them do things exactly the way that I want them to do? I really don't have a desire for that. But if I'm building it, then yeah, 'cause I'm building it, right? We do peer review on code and we do this thing where you go in and say wow, why did you do it like that? Why didn't you do it like this? All of us have a rationale for why we approach a problem a certain way. If you get out the door and you're not using a bunch more memory or processor cycles and you achieve the same thing that I achieve, my way is no better than yours. But that doesn't mean that I have to write mine exactly like you wrote yours either. So there's a need for some personal control there because I think the problem-solving a lot of times can be a really intimate kind of experience, in a very personal kind of way, the way that you approach solving a problem is kind of personal to the way you're made up. I know it's true for me, I don't know if other people think so. So for me, personally, there need to be certain controls at a high level to control quality. Those are pretty generic. Whenever you say control to me, I think how I get to do my job. How I get to achieve what I've been asked to achieve. How do I get to pick how that gets done? (1)

> **It's kind of a paradox. A lot of people have shared similar stories where they value having a lot of freedom, but at the same time they want rules and structure. I'm wondering if they want to be the ones to impose rules and structure as opposed to having them imposed on them.**
>
> Yeah, I guess I do sound like I've not...(pause)...what am I trying to say? Earlier I did say that I liked the structure, but now I'm saying that I don't want to be micromanaged. I want to be able to do the job that I think needs to be done, my way. But there's a contradiction there.
>
> **That's not a bad thing, it's just interesting. Because I think there are two different versions of control. I want to be fully in control of my environment, but I don't want to be too heavily controlled myself.**
>
> Right, right, right. I've got boundaries, but I want to be able to stretch out to those boundaries as much as possible. Hmmm, this is interesting, I'm learning something about myself. (20)

So Autonomy, for IT people, is important because it gives them the freedom to do their job correctly in their eyes. They want to be able to make decisions and work independently without much supervision. The opposite of Autonomy for the interviewees was bureaucracy, which always had a negative connotation, and micromanagement. Certainly there are few jobs where one *wants* to be micromanaged. At the same time, the constraints of management seem to bother IT professionals more than most.

4.4.2 Structure

"Control" continued to be a strong theme however the term had too much ambiguity. Depending on the context it could mean control over the environment, a psychological trait, attention to detail, or even governance. The common thread, however, was a strong preference for orderliness. None of the interviewees used the term

"orderliness" but rather used the word "structure". Therefore "structure" became the *in vivo* code for what they were describing as order and definition in the environment, and ultimately emerged as a core value. The interviewees liked having a sense of structure around them in the workplace as opposed to having things ill-defined or chaotic. This included job titles, job responsibilities, division of labor among teams and among departments, and knowing exactly who is responsible for what. Some also called this a process focus or simply "things running smoothly". Lack of organization, in all forms, was a strong negative. While IT professionals may in some cases express a preference for being unstructured in terms of dress code or flex-time, these are superficial issues. What runs deeper for IT professionals is the need to bring order out of chaos. Examples of the theme of Structure are shown in Table 19.

Table 19. Examples of the theme of Structure

I really liked the structure of that IT department because we had programmers, and we had business analysts and we had project managers. Everybody had their own piece of the pie and we had QA and testers. So it was like the perfect environment to work in. **So you liked that structure?** I did. The whole life cycle. Everybody had their job. You know, it was very defined, and I knew what I had to do and then when I was through, I would pass it on to the tester and they would make sure everything was passing. So, I did like that part. (20)
It's important to have a well-documented process for doing something (23).
I love it so far. This is a big difference from where I was. I like the fact that at the place where I am now, there's a lot more structure. Things are project-based, kind of like ideal the way you want things to go. Like, you won't have major projects to come in and all of the sudden just drop everything and do this. You know, I hear them say

all the time, "Well, we need to scope that." You know, which is definitely project management terms for "Let's slow down and see what we're looking at," whereas the normal way to do it is to shoot from the hip, let's go out there and just try to get it done and then we'll back up later and try to fix the issue. It's a different environment, much more structured, much more "Let's do it by this order." (21)

Somebody's got to be the gatekeeper. You can't test in production.

So who do you think the gatekeeper needs to be?

Honestly it's the person whose job it is the keep the lights on. It's typically whoever is tasked with Operations. Different companies call it different things. It's the group that runs the day to day IT. Engineers need to have their own systems and there should be a firewall in between. It doesn't mean that if you're having a problem you can't give them temporary access in it, but they don't need to be rolling code out. It needs to be structured. (6)

In an organization that is producing services and products you have to have a certain amount of structure. The drift and the evolution for the structure happens more slowly over time because you have to have a consistent product and consistent results. (1)

I think we want it [structure and standards]. It makes it easier to support. Not to mention, speaking of levels of governance, now with so many federal and international regulations for security, export laws for encryption, having that standardization in place helps to pass those audits. I think IT people do like standardization. (2)

Yes. This is my mildly offensive theory of geek socialization. You have this spectrum of people and there's severe autism on one end, and autism and Asperger's and geeks and regular people...

You're not the first person to say that. Keep going.

I really do believe that the tech industry attracts people with a mindset that likes order and is a little bit obsessive and it's technically-oriented and that comes with, in many cases, although not all, in many cases, that comes with corresponding social deficit. There's a great blog post that I cannot find on the Internet anymore and I wish that I could, I wish I had bookmarked it, about filtering. Normal people, when you have a conversation between two people, each person is applying an outbound filter. They are picking the data they want to communicate and they are filtering it so that they can communicated it in the way that they think will be best received by the other person. Geeks, in many cases, look at filtering as data impedance, and so they give you the full package of data with minimal filtering, assuming that you will filter on your end to extract what you want. Because they don't know what you want, so they could be filtering incorrectly, so they just give you the full batch. That's the polite term for saying that geeks are often not politically correct or polite. And so, when you get a geek talking to a normal person, there's a filter mismatch. The geek is going to be annoyed because they're not getting the straight dope, and the normal person is going to be annoyed because they're getting this blast of unfiltered data. But among geeks, I mean, I've sat in rooms with people…you would have said from the outside that we didn't like each other. But we were having a technical discussion, and at the end of the day, we all go have a beer. There are definitely egos involved, and sometimes you'll get big swinging dick syndrome where somebody comes in and feels the need to demonstrate that their technical penis is longer than everyone else's, but, you know, overall there's not a ton of that. At least in my world, and again, I have to caveat all of this because I've self-selected to not have to put up with a lot of that crap. But I do believe that geeks are more likely to be well-intentioned but less socially apt than your average person in non-technical positions. And I think the same is probably true of doctors at a really high level. (23)

We've got a process under way now, I'm trying to think of a better term for it…one of the things that they've noticed, they being the Japanese, at this point have noticed that we lack structure, we lack control. And one of the things that I've seen and I'm sure other people have is what we call change control. If you want to go from one process to a new process, there has to be a transition there. And there was no transition between one process change of an idea to the next other than the department head saying ok guys we're going to do it this way today. He sends us an

email, mentions it to me in the break room, you talk about it over the phone and say 'oh why don't we try this for a while', 'yeah ok let's do that'. And there's no documentation, there's no control over that process. For a daily clerical type of function, they need a step by step process that they can follow and I'm all over that. We need to have that step by step. And there was never that formality or control before and we are just now trying to institute that. And this is after lord knows how many years. I'm wondering if they are ready for that tight of change, that type of control. You know before it was very loose and whoever came up with an idea, great we'll try it. Now it's like let's talk about it, let's control the environment a little more, which means document these processes. A lot of people are grumbling over that control, because it's some serious stuff. It's some serious documentation and it adheres to its own formal control, if you will, you don't just type up a document, it has to match the document control specs. I think that's a good idea. It's just hard to get down their throats sometimes. (4)

I can't think of anything I particularly don't like about IT. There are certain things I don't like about specific jobs, but it's mostly because we don't do IT properly. Like things aren't organized properly, things aren't documented well and things like that that irritate me. Also when IT is not properly managed. Two completely different jobs. In my first job, we had a very tight budget and everything was strictly managed, which was good in some ways and some ways restrictive. And now I'm at the other end of the spectrum where we have kind of an unlimited budget, not an unlimited budget, but all of our needs are met and there's really no structure and we have to invent our own structure.

And you have a preference for more structure?

I like something in the middle. It's hard to drive that kind of change from the middle to the top when you don't really have…your managers aren't in support of it. They're just kind of ad hoc.

So one of my questions has to do with when you've worked in IT departments in different companies, how is IT treated differently from company to company. You started talking about ad hoc management and structured vs. no structure. Is that the biggest difference you see in different IT shops?

The two shops I've been at. And in my first part-time job was managed well and things were documented and organized well and you knew exactly what your job roles are. I think that's the biggest problem.

At the insurance company?

Well at the insurance company yes. You knew exactly what your job role was. At this company it's very hazy and you don't have some people in some key positions. Like we don't really have a Systems Administrator. In a company our size, that's a huge problem. We have someone who's kind of in that role, but they're not really in that role, they're not really responsible as a Systems Manager and that person's not really qualified to do that job. So that's a real problem. Things like that are what drive me crazy in my current job. (11)

I know I've worked in [company deleted] power utility, and that was probably the best organized. Of course everybody complained about it while I was there, but it really was very well organized. It was very well-organized as far as change control, it was very well organized as far as outage procedures and things like that. It was very well organized. Projects were very well organized. But I've been in companies of equal size or larger that have not been very well organized. One of the companies that I worked for was very much run by the kind of a "good old boy" network. And that was just a mess. I mean everybody's buddy was a manager and there were just all of these layers of management fat who really did little other than to impede progress. And then I went to another larger company like that, about 15,000 users, and they were similarly structured. It was all about who you knew and whether you knew the right person to yell loudest at in order to circumvent any kind of structure or standardization and stuff like that. "Well, this is the rule, this is your mailbox size. It's built that way because we've been to scalability lab at Microsoft and they said that for optimal performance, for the performance that you desire, this is the way that it should be configured. These are the limitations that you should have." And that was announced and planned out and everything well prior to the implementation of this new Microsoft Mail system, and from the get-go, people hollered about it, and then they heard this person had complained about it and they go, "Well so-and-so got it," and so then that person got it and that person got it, and the next thing you know, we've got mailbox size limitations of twice the limitation that the system was "spec-ed" out for, and then those without limitations at all, above and beyond that.

And I'm assuming that the higher up in the organization you were, the more space was allocated?

Yeah, and then that's just an example, but things were very much run that way throughout the organization. And it was frustrating. Where I am now, at least they don't pretend to have any sort of limitations. The attorneys get what they want.

(laughter) There are no limitations! (sighing) (17)

Why do you think things ran more smoothly there?

I'm not sure. I think you had people that, for whatever reason, they had a really good work structure and they had people in the right places, I guess. And they had a good structure as far as moving forward. In some places that gets clogged up…sometimes you've got people in the wrong places who can slow down progress. In other words, the guy making the decisions about why we should do x, y and z, he's maybe not even a technical person, and maybe he's a director that's responsible for something else. So sometimes you don't have the right people in the right places. I'm taking a guess at it, I don't know. But they seemed to have a pretty good laid-out structure.

When you say "structure", because there's different types of structure, you're talking about having the right person in the right job or having a lot of well-defined policies and procedures or a well-defined division of labor?

Procedures, yeah, and I'm going out on a limb here as far as, I'm talking more along the lines of management and I can only see so high up to my manager, but past him, I don't know where the decisions are made but it seemed more well-defined as to who was responsible for what, and when something needed to be done, there was a lot more engagement with other teams. In other words, we didn't have to go fight another team to get something done. There was somebody it seemed like at the top down, the message came down…you didn't have a lot of fighting between teams.

Between teams within IT?

Inside IT. It seemed like everybody was in tune with the same marching orders. Like I said, I couldn't see but so high, but they seemed pretty well structured. (22)

But structure is something…I have yet to see a great level of structure anywhere I've been that I kind of expected, at least somebody like [deleted],[deleted], please take out some of these names.
(laughing)

Sure.

But, you know, because I guess when I think of some of these places that are…when I worked at a smaller, you know, 350-person place, I guess I kind of expected that. I

didn't know any different. But when I moved off to some, you know, bigger [deleted], bigger [deleted], I couldn't believe that they're just as unstructured as anybody else. You know, I expected better documentation, better "Oh, what do I do now?", better this, better that. You know, [deleted] is worse!

In terms of defined procedures and processes?

Yes. All of the above. And once again, I think that's why I feel more comfortable there because I see they've got a ton of room for improvement. But I guess I expected a lot more because they are who they are.

And you like having a certain…?

I do, because there's more to work on. There's more stuff that could possibly make me shine or, you know, it's unpolished. But I would expect it, a company as big as they are. There's more things I can do there because they're not structured. (25)

Somebody would come with some cockamamie application or whatever and say, "We need to put this on the mail server," and we'd say, "Nope. We'll put it up in a test lab and we'll test it over here and we'll see what it does. And then, after we've done that, we'll evaluate whether or not we're just going to throw this on the mail system." It was very standardized, it was very controlled, and we kind of complained about that when I was there, but it really, retrospectively, it was a pretty good system.

So you like having those kind of rules in place?

Absolutely.

And that the rules are enforced?

Absolutely. Absolutely. That's ideal. I don't know. A lot of places don't do that now. That's just my experience, anyway. (17)

I want to say detail-oriented. But that's not always exactly true. They have to be detail-aware. (8)

In this environment that I'm in now, it's a more fast-paced environment. Some of that is just lack of structure, I think, yeah, not a clearly refined process for things. Everything's not as streamlined. You've got people running around putting out fires. It's not quite as streamlined, so you've got people doing these drive-bys. "Hey, can

you get me this? Hey, can you get me that?", or you've got a last-minute request. It's like you want to do your job and you want to do it well, but…people give feedback as well. So, you can be doing 50 things a day, dealing with 50 different people and none of them will know that you're dealing with somebody else. It just takes that one person to say, "Hey, so-and-so didn't give me good service," and you've got to go back and explain to your boss, "Hey, do you remember that I was doing the work of 5 people that day, and I just forgot some?" Now, in my current job, in my situation, and a big reason for that is their size, they're so big as far as their IT and they don't have maybe the best plan, so, it's not very streamlined. As big as they are, I'm surprised how big they are and how almost manual some of this stuff is. It's amazing. You know, it changes from place to place. It depends on where you work and who you're working for. (22)

I have noticed that overall we have people not worried about the details as much and not doing their due diligence, not…putting it out there and not worrying about testing it.

You see that as a good thing or bad thing?

A bad thing. And I think it's an overall cultural thing that I've observed. People are not trying as hard to do the good…to make sure it's perfect or make sure it's right. I see that as being maybe a generational thing. Younger people are doing get-it-done, quick-quick, tweet it out or whatever, if I can just blast it out there and do it immediate instead of checking it and make sure you got it right…testing.

When you say focused on process to you mean focused on detail or precision or formality?

Less formal. If you're process, you're OK, I've got a checklist to follow, am I following, checking off each and every step? Do I know what the consequences of doing this are? Or am I just …am I following a checklist or do I understand what I'm doing? A checklist is a good thing but following it blindly is not a good thing. (14)

…the ability to assimilate data rapidly and structure it in your head. (23)

Structure and order is incredibly important for IT people. Because data is highly

structured and defined, perhaps IT workers want everything else around them to be as

well. This is conjecture based on interviewee #23's quote above about being able to

assimilate data structures "in your head" and other interviewees comments about being able to think in a structured way. What started out as "Control" turned into "Structure" primarily because of a willingness to be open-minded and actually listen to the *in vivo* codes and use them. The opposite of Structure is disorganization, lack of control, and, ultimately, chaos. Disorganization and "willy-nilly" processes were consistently identified as things to be shunned and avoided.

4.4.3 Precision in Communication

Open communication was initially the central theme of the pilot. The inability of IT employees to communicate effectively is perhaps a "nerd" stereotype based on introversion. This, coupled with IT people's strong desire for *more* communication from others, e.g., "Why are we the last ones to know anything around here?" seemed to point to openness of communication as the core value, especially since this is a commonly measured organizational culture value (see Ashkanasy et al., 2000). However, as the interviews proceeded it was clear that in *no* case did IT people have any trouble communicating. So there was no evidence of IT people being poor at communication skills. They were articulate, verbose, and insightful in all their comments, so the stereotype of poor communication is one that is not supported by empirical evidence. It became apparent that all the interviewees were eager to get into an extreme amount of detail, either about their background, their work, or technology, sometimes insisting that their job title was recorded exactly right. The interviewees seemed consumed with finding exactly the right word during their narratives and rarely used either improper

grammar or vocabulary. Their common desire for a high level of *precision* in communication, even during the interviews themselves, was a break-through moment in the analysis. This need for precision may be what business managers identify as "poor communication skills". Where business managers may deal in generalities, IT employees must, as a requirement of their occupation, deal in very specific detail in every aspect of their job. Thus, the complaint of IT people that they do not receive enough communication is better understood now. They do not receive enough *precise* communication from their business counterparts. Examples of the theme of Precision in communication are shown in Table 20.

Table 20. Examples of the theme of Precision

We like to see communication, lots of communication, I think that's one of the toughest things in this job is either end-users aren't communicating to, or we're not communicated from the business what's going on. I don't know if that's internal to my company or that's everywhere. But communication's important. (5)
It's frustrating when there's a lack of communication, and we see it all the time when a new software will be deployed that we weren't told about and we have to support it or an end-user sees a new software and they haven't been trained on it and they have to call it, that's frustrating. (5)
Originally I had open communication, and I'm starting to change that over to precise communication. IT people crave a lot of detail that they're not getting from other people. *Absolutely*! (20)
There's one that initially I called open communication. I've narrowed it down to precise communication as something that IT people tend to crave. It's a level of detail in their communication that other people on the business side don't or can't give.

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I agree with that, yeah. *Absolutely*! (22)

I have one [category] called open communication, but I think I'm revising that to precise communication because that's what IT people value…
Much, much better way to put it! I mean, a lot of times it doesn't matter to me, I feel like I'm an open person, I feel like you can come up and talk to me about just about anything that you want to, whether it's painful at work or anything like that, you know, it's not the openness. The biggest problem that we have is getting the information, the correct information at a level of detail to a level, to know what we need to do. That would be the same with me, that's a big issue. But, me being open, people come and talk to me all the time. I feel like that's openness, and we have so many means of communicating, you can send me an e-mail, you know, that stuff works, that's open. I mean, you can call me, that's open. But if you don't give me the information I need, that does me no good. (21)

When I go in to talk to a customer, I like to start the conversation by asking them what they're trying to accomplish, and what they're interested in getting from me. But in many, many cases, I find that the problem they think they're trying to solve is either a parallel problem or a subset to other problems that also exist in the same arena, but they are either not aware of or they're so focused on the problem they're trying to solve. So, to me, the first step for any engagement isn't, "How do I solve the problem they're presenting to me?", it's investigating the problem they're presenting to me and seeing if it's their real problem. (23)

There's communication between you and the group that you operate in. There's communication between that group and other groups. Sometimes that's in a management kind of… not actually clients. And then there's communication with clients….IT is not, in my estimation, really great all the time about communicating with end-users. There's a lot of reasons I think that's true but I think some of that is, it's hard to communicate with people that don't have the same level of technical knowledge that you have. There's this translation that has to happen. Some translation is not perfect. And if you continually get people information that you're translating down to them, there's a greater tendency that they're going to misunderstand something. I think that there is a lot of hesitancy to communicate as regularly as you probably should because of that factor. Some IT people don't communicate down to the client level because they're afraid that they're going to be looked at like they're not as smart as they want to be. There's ego involved in it. I know for me, personally, it's difficult whenever I go and I'm dealing with somebody that's a high aptitude or skilled client that they know they know a lot of things that I

know. You've got to watch yourself when you're out there. Keep your interaction clean. Give them everything that you're supposed to give them. Don't start being weird about whether or not they know more about something than you do, and you're the IT guy. I think it exists. I think it's why some IT people don't like to communicate with clients. (1)

But in every single job I've ever had, business always wants something yesterday, IT says you can't have it until 2 weeks, so you compromise and throw something out in a week. It's always been a source of frustration for me. IT comes back and gives a realistic projection to have it done right in 2 weeks, but gotta have it in a week. There's always friction there. The successful IT departments are the ones that have a good working relationship with the business and you know, really, it's going to take 2 weeks and if you wanted it in a week, you should have told us a week ago. And if you set those expectations, you'll get pushback, but you can work better. But there's always friction there. (6)

It's definitely different because IT people never feel heard or never feel understood. Because it goes back to that stereotype of "I don't even understand what you're saying, just get it done!" from the manager, the non-IT manager. If Sales & Marketing dictate a new solution and IT is in the room saying you can't do it because this, this, this, this. "Well I don't understand what you're saying, I just want it done." There's definitely two different languages in there. Because IT cannot talk to Sales & Marketing. I've seen it time and time again. It just doesn't happen. So there's definitely a language barrier there. Or maybe it's a …I don't know…it's a good question. (pause) Maybe it's attitude? I don't know. But I think the language barrier is definitely there. They're talking two different ways of…business.

You mentioned attitude. So Sales & Marketing people have different attitudes than IT people?

Absolutely. Mm hm. Sales & Marketing are very…"I have this amount of requirement and I'm done with it." Well IT's usually not done with it. IT is usually "Ok I've got to help you through this and once you're done with then it, then I've got to support it." The attitudes are a whole lot different because Sales & Marketing might be saying "I want SalesForce.com. I want you to research it. Figure it out. Implement it. Then maintain it. Then support it. Then troubleshoot it."

And upgrade it.

Exactly. There's the attitudes. And Sales & marketing think you should be done. I just want to use it after you get it up and going. But I also need support and handholding. So that's the attitudes. (13)

So you figured out it wasn't behavior that was changing at the end of the month, it was just the way the data was being tracked.

The way we designed this report and again I was part of it, was not going to give us an accurate reflection, which the point of that report was to drive behavior of the organization. And I was like "we're looking at the wrong things if we're looking at this report. There's not a problem in the 3rd and 4th week. Our rate is 75-80% completion rate. But by chopping it up on the first day we're missing those things that are 2 or 3 days old that should be bringing our percentages down that 1st and 2nd day." And it was crystal clear. You run this report for a year, every month was like that. Every month was going down. And this goes back to "Awesome work, (deleted). That's fantastic to see. We understand what you're saying…but we don't want to change it back."

They didn't want to change the report?

No. That was a tough one for me to swallow. (16)

Their communication style tends to be highly verbal with precise content. They are put off by a lack of precision in language or in project planning. For them, a lack of precision in speech can translate into a lack of precision in action. If they do not receive enough precision and detail to complete a project, they cannot complete it successfully. There were remarkable similarities in terms of the interviewees' shared need to use exactly the right word during the interview and going back and changing something if they felt it was not precise enough. This value is in sharp contrast to what one sees in management in terms of "good enough" or "close enough" or "just give me the bottom line, not all that detailed stuff." The opposite of precision in communication, for them, is

being too vague, too imprecise, or communicating irrational expectations especially with regard to timelines for projects.

4.4.4 Innovation

Risk had to be eliminated as a shared valued because most of the interviewees felt strongly that either a propensity to take risks or risk aversion was purely a matter of *where* in the organization the IT person was and what their job function was. Thus, the developer and programmer may be eager to take chances and innovate and express their creativity, while system administrators and operational support people are more inclined to play it safe and not take any chances in the production environment. However, what was common to both types of IT people is a love of technology itself and technological progress. The narratives of trying new things, playing with new technology, and creating a novel approach to improve a process were repeated over and over and these ideas can be more succinctly termed "Innovation." This is perhaps an obvious point to make about IT occupational culture, but it is by no means trivial. Examples of the theme of Innovation are shown in Table 21.

Table 21. Examples of the theme of Innovation

I think that's one of the exciting things about being in IT is that it's always changing! I mean just in my short 11 years I've seen so many different operating systems and different softwares come and go, I like that part of IT. Now as far as risk is involved, I think it's important for anybody to have stability but I think IT people are more adaptable to change if it comes along I've seen, even those that are not adaptable I see them, although they go kicking and screaming they adapt pretty quickly. So as far as what's important, I like that the technology changes and I'm sure lots of IT people like that. Who wants to work on the same software the rest of their lives? (5)

The one I'm talking about is like virtualization, right, like going from all physical to, in my experience I'm thinking [company deleted] from physical servers to virtual servers. Yeah, some of the teams kind of got in the way with that. You're going to save so much money going to virtualization, going from 500 physical servers when we can consolidate that down to maybe 30 or 40. I mean, just think about the savings in 40 servers versus 500, then think about the network, the electricity, the heating, the cooling. Or, the cooling from the data center, right? It's an eye-popping amount of money. Man, I tell you what, I have never seen so many people slow that thing down. It was amazing, it was amazing. From there I went to networking, for instance, where the year before they went in and they put in a whole bunch of equipment, tons of racks of switches, right? Well, guess what? Virtualization, we don't need all of that. Oh, so you don't want to have us virtualize now, okay. Oh, you think that this virtualization is something that is like some fly-by-night experiment, right? You're scared to put it on your network. I mean, this was literally what they were saying. We don't know what it's going to do on the network, we're scared. I mean, the whole freakin' world is doing it…how can you not figure it out? That kind of stuff, and that stonewalled that place for 2 years, and you've got to think that for 2 years, they could have been saving thousands. And it was the kind of thing where you were going, "Look," you know…that was my experience, I guess. (22)

So what do you not like about the maintenance/occupational…

It's boring as sin! It's the same old thing, it's holding the line. That's good for some people. I don't want to begrudge them or anything. We need 'em. But it's very, uh, mind-numbing, I find. Getting that same call every week from the operators, "what do we do again when this happens?" And it's like "Remember that email I sent you?" That's it, too, there's also the expectation to be on call, particularly, in for instance the manufacturing firm. You have on-call responsibilities, which get up in there with your life schedule. And it's nice to be able to put in a more regular 9-5. Although I don't. (laughing) But the idea at least…I don't necessarily like the idea of being called on the maintenance things in there. I write up the maintenance procedures and escalation procedures and stuff like that, and help them get going but then. (10)

I've got this kind of idealized fantasy about landing a job somewhere in a place that's pretty progressive where there are fast development cycles. You see a lot of software development SCRUM techniques. It's a development methodology like agile programming where you work with small teams, fast iterations, that kind of thing. There's room for you to test out theories and make mistakes on a small scale as you're doing your fast iteration. You're actually encouraged to be more experimental. One of

the things that really attracted me to IT is that whole you know the new technology the fast turnover it doesn't stand still. I like that a whole lot. I have not worked in a place exactly like that yet. (1)

Do you like to play it safe?

No, I'm on the other extreme, I like innovating to the point where if everything starts breaking down then go back and fix. (3)

…and here it is lone dude, little hillbilly guy in North Carolina was building content management applications by myself with everything I have, and they have this huge IT department and they were asking me, "how can you get it done so fast?" Because I don't have the red-tape bullsh*t that you guys have! You know, you don't have to a meeting about a meeting and a committee about a meeting and then project managers and Gantt charts and all this crap! I mean, just remove that sh*t and just develop! As long as you have the requirements, say, data needs to be secure. SSL. Done! You know? It's not rocket surgery! Just get all your minutiae out of the way and just build stuff! At the end of the day, you can't let the process stifle innovation. You need to innovate and then build processes around the innovation. Not the other way. You can't say, "well we can't innovate because we have a process. You need to get approval from your upper middle manager and your upper middle manager needs to get approval from the vice president, and the vice president needs the CIO" and at that point, I'm already done with the application without waiting on all this approval. It's just bullsh*t! (13)

In design, there was a lot of creativity, you had a lot more flexibility to do what you want, as long as you had the buy-in from the code owner.

Which did you like better?

I enjoyed design a lot more than I did patching.

Why?

Because of the creativity. I wrote something and it's mine. Versus in patching, yeah it's my patch but it's not my code. I made the widget but I didn't design the widget.

And that's important to you?

That's important to me. I mean patching gave me the satisfaction that I did the job, I created the patch and it fixed the problem and the nice thing about it is I had a quicker turnaround in patching. I could create the patch and hey I did this, I did three of them this week. Versus in design, it was like a research paper, I have to write it, I have to design it, it's a longer process, so it's more fulfilling at the end, it's just not instant gratification. You get small snippets, hey I wrote that piece of code and it worked great the first time but the main satisfaction it going into the lab and seeing it work. And work well. (3)

I need a lot of …I'm a very creative individual. And oddly enough programming was one of the most creative things I have ever done. You literally take the most basic instructions or wants or needs, requests, from users and work with them on the people side and then transfer that into a computer language that it's going to do exactly what they want it to do. And it's a work of art when you're done. It's a masterpiece, hopefully. (4)

When I first came to the company I worked for, [company deleted], I was floored, amazed, aghast at the lack of embracing of technology. They embraced it on a personal level but not on a cohesive, global level if you will, a company-wide level. (4)

I think a lot of the stifled innovation makes them negative. Or dealing with users. I mean that's frustrating for anybody. I understand that. Been there, done that. And I've been negative as well. (13)

I enjoy the…really the cutting-edge technology. One thing that I've learned over the years, though, is that I think as I mature because we've got a couple of young guys who work with us, and I don't think I was that bad, but these guys are, you know, "New toys, new toys, new toys! Let's throw up 2 or 3 servers and 2 or 3 clients in a virtual environment, but let's play around with them and see what we can do," and all that good stuff. I've sort of matured to the point to where I view IT as a business unit now.(24)

The theme of Innovation encapsulates the desire for novelty, variety, creativity, and challenge that all the interviewees shared. This also included some codes for progress, building, and improvement, all in a technological sense. IT people like that technology is always changing and do not understand people or organizations that do not

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embrace it like they do. The opposite of innovation is stagnancy and boredom. Several interviewees talked about leaving work environments that became stagnant in terms of not keeping up with the latest hardware and software.

4.4.5 Reverence for Knowledge

Reverence for Knowledge was a theme that emerged during the pilot and continued to grow and expand in the full study. For many reasons, this is the most important value of the six ASPIRE values. Quantitatively, the code count was much higher for this theme than any other. Qualitatively, interviewees became very serious in their tone when they were talking about knowledge, learning, problem-solving ability, and the importance of being able to think in a certain way. Not a single interviewee had a problem with the use of the term "reverence", despite the religious overtones to the word. Examples of the theme of Reverence for Knowledge are shown in Table 22.

Table 22. Examples of theme of Reverence for Knowledge

I think some of it is mystery. To have the knowledge over a non-IT person. Sort of like a power. A power thing. Like "you don't know how to do that." I think that's part of the culture. I think that's part of the mystique, the feeling of superiority. We're all our inner nerds. We were the ones shunned in high school and now these jocks are looking to us to make their systems work. They're the sales weasels (laughing). (3)
I have one [category] I'm calling reverence for knowledge… Mmmm! **…that is, this predisposition to…and revering is kind of a strong word, but respecting people that have technical knowledge …** Oh yeah!

…over who simply have managerial authority over what I'm doing.

Oh yeah, absolutely 100%! I will respect a guy who knows what he's doing over a guy who tells me what to do, 9 times out of 8. (laughter) I can't be strong enough about that! (9)

I've always said that it's great to have knowledge, but if you don't have knowledge, that's not the end of things. It's having the ability to acquire the knowledge, and that's not walking around to somebody's office and asking them a question. I am not a "no knowledge = bad" guy. I am "no knowledge and don't want to do what you need to do to obtain the knowledge" being you're bad. (24)

…the ability to assimilate data rapidly and structure it in your head. The ability to, there is a skill that is required and very rarely actually there, which is the ability to translate between technical concepts and the non-technical audience. If we had more of that, we would be better off. There is the ability to not be afraid of new technology, not to be intimidated by something that you don't understand. To some extent, you get different answers from a programmer because that's a way more technical, in some respects, role than mine. I am a different aspect of the IT industry from programming. I don't code. I take products that we have and I help people understand how to deploy them. The ability to troubleshoot. Oh my God, troubleshooting! The ability to think logically through a situation and say, "Okay, if I'm seeing this behavior, what could it flow out of?" The ability to change one thing at a time, in an organized fashion, rather than just Easter-egging out a whole bunch of things. Because then you don't know what fixed it. That is the thing that drives me the most f****** nuts, is if I'm in an interoperability environment and we've got an interoperability bug and somebody changes 4 things at once and then says that it's working, that's useless to me. Because unless you back out of all four of those changes and then do them one at a time, you have not solved the problem. You have made it work, but you have not solved the problem! That's a very different thing. (23)

One of the guys was really good; he just came in and told me, "Ninety percent of what you learn is going to be on the job. The stuff you're going to learn in the books is the utopia, about how things should be. Everywhere you go it is not going to be set up that way. Whatever situation they're in, 90% of what you learn is going to be on the job. That's how it's been." (21)

at that point in my career, well I didn't know anything. You learn in the book, but you don't really know anything. (21)

I love…this kind of goes along with the video games. And I'll digress to video games. There's a bunch of different genres. I'm not really big on a lot of today's genre, they have all these shoot-em-up games and racecar games that seem to dominate. I was more the one that liked the Mario games or what they call "platformers". And what those are, their key element is solving puzzles. You got to move this thing over here to free up this over here to do this. So translating that to my IT roles, I love figuring out things when people say "hey, how come these numbers don't work right? This doesn't make sense to me. What's the problem?" I love being able to figure out the problem, and when I figure out a problem or make a model that works…it's just a great feeling! And that's what I love about it, being able to fix the things.(16)

Do you think that IT people respect knowledge more than status or authority within a hierarchy?

Yes! Yes!

You say that pretty quickly.

It's a lot like the military, you've got the seasoned veteran who knows what he's doing but he's still a sergeant and you've got the lieutenant who just got out of officer's school but doesn't know what he's doing, who do you think the mean are going to follow if you get into a fire fight? In IT, if you get into a problem, you're not going to go to the Director for help, you're going to the person who has been there the longest and knows the most, or the person who's just been around the longest. (6)

Okay, maybe you're helping me understand this, because a lot of people, just to share some of my research with you, a lot of people use this vocabulary of well, real IT people or your true IT person or a good IT person, well does that mean that there are fake IT people running around out there?

Well, there's a lot of people who like the idea or like the higher pay scale when it comes along with having a job, so they jump into that. Sorry, I carpool and I was just letting him know where we were at. Uh, I apologize. It's not a big deal. I carpool with a guy. He's one of our programmers for our web team, we work in different buildings, so.

But you think some people may just be in IT for the money?

Well, yeah, or that it was convenient or that it was easy, or it's kind of what they got into or kind of fell into it, but I think what you mean when you say real IT people, they really have that drive, that commitment to technology, not just to this is what I do. The learning defines them, not the job they have. I think some just want to say they're in IT, but their commitment and kind of their internal drive system is not to progress and to learn more and to do more and to become more adept at what they do, it's just to get a paycheck and exist. So, my drive and the people that I surround myself with, our drive is to learn more, to be the best at what we do in our area, and to kind of master our field of expertise. So, like me moving into just security, I have really put myself into finding people that know more than I do about security, getting their information, reading their blogs, going to classes where I can learn from them because I want to be one of those people. I want to be the people that other people come to for information. You know, you want to be your oracle in your area, and so to be that, you've got to put in the time. You don't just wake up one day and know everything about firewalls or know everything about you know, how to use host intrusion prevention, we've been working on that a lot here, so it's something that you've got to have that drive to want to know, want to learn. (18)

I definitely think that the brain process is different in an IT person than in your average…and it's that curiosity, that wonderment of "how does this go together?". I think that when you put that together with that ability to put things together in a logical process, it makes for some really stellar stuff. (18)

And to us the obvious is irritating and to them the obvious is a mystery. So…IT people sort of think things through a little bit different. (12)

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That goes back to the whole argument of knowledge versus stature because if the knowledgeable people in our department will argue with managers and say that's not the way to do it, this is how we're going to do it. And there's not really a saying, but a belief in our area that "the managers come and go but the experts stay put." So you may have a manager that comes in and they've been a manager of this group for 2 years and they're working with someone who's been an expert in this field for 20. And those people when the manager says this is how we're going to do it, they so noooo that's not how we're going to do it. (2)

You talked about two different kinds of managers. Who did you respect more?

The former engineers.

OK, why?

They knew what we went through as far as deadlines, as far as resources that we need. They were more sympathetic as far as what an engineer needs, versus hey do this, here's the time frame.

So not so much that they knew how to do the job but they knew what it was like to do the job?

Now the ones that were even more higher esteemed were the ones who not only sympathized with the engineering environment but the ones who could talk shop. We had a couple of those who would sit down and say yeah maybe you should write it that or maybe we should avoid that method.

And you'd rather work with a manager like that?

Yes. My best manager was just like that. (3)

> **Do you think IT people are different than people who work in other jobs?**
>
> I do, I think their minds work in a different way. And I don't know that that applies to all IT people, but I think it applies to the really good IT people. I believe that problem-solving skills are more innate than they are learned. It's tough to teach someone how to take a process apart. Some people just seem to have that ability, to take something apart, and I think they gravitate toward those fields like IT or mechanical engineering and that kind of thing, but I definitely think that the brain process is different in an IT person than in your average…and it's that curiosity, that wonderment of "how does this go together?". I think that when you put that together with that ability to put things together in a logical process, it makes for some really stellar stuff.
>
> **Do you think it is critical thinking skills?**
>
> Definitely, yeah. I mean, that's what it is, it's critical thinking, it's "How does this work?". If I click this button and nothing happened. Why did it not happen? That deeper thinking whereas your regular user will go, like, "Oh, it doesn't work" and they walk away. An IT person, he wants to know why does it not work? It's an element of critical thinking. But that's what I break it down into. It's critical thinking, that's kind of the over-arching concept, but what are you thinking about? Well, I'm thinking about why this doesn't work and how it goes together from step-by-step-by-step processing down to…. Because every action has a reaction, so it's from that course of action to down until you find the root cause. (18)

In addition to the high frequency count and the impassioned quotes from the

interviewees above, there is one more piece of evidence to point to why Reverence for

Knowledge is the highest value in IT occupational culture. One part of the interview was

to ask each person to list up to five adjectives that they felt described IT people in

general. These adjectives are shown in Table 23. This is, of course, their subjective

perception of themselves as a group, but nonetheless useful. Capturing these words and

performing a quick content analysis provided some additional insight about the

importance of Reverence for Knowledge as a core value. Over 20% of the adjectives

offered directly relate to intelligence, and this was something of a surprise. Just as importantly, the majority of the negative adjectives are also in some way related to feelings of superiority based on intelligence, i.e., arrogance, condescension, entitlement, and stubbornness. Intelligence is held in extremely high regard.

Table 23. Adjectives used to describe IT people

Enjoy	Humor	Intelligent	Detail	Drive	Stereo type	Negative	Positive
like to eat	really good sense of humor	brilliant	detail-oriented	diligence	geeky	arrogance	thoughtful
fun	goofy	clever	detail-oriented	a sense of urgency	anti-social	annoying	business minded
love what they do	quirky	competent	logical	dedicated	different	arrogance	creative
	quirky	curious	logical	diligent	geeky	arrogant	optimistic
	quirky	driven to learn	logical	driven	intro-spective	condes-cending	well-intentioned
	really good sense of humor	innovative	meticu-lous	hard workers	intro-verted	condes-cending	
	sense of humor	inquisitive	obses-sive	passionate	more com-fortable with techno-logy than people.	entitled	
	sense of humor	inquisitive	process-oriented		nerdy	entitled	
	weird	intellect-ually curious	well-orga-nized		quiet	grumpy	
		intelligence			really into techno-logy	indecisive	
		intelligent			smart ass	insular	
		intelligent				isolated	
		Intelligent				negative	

		Intelligent				obtuse	
		inventive				self-loathing	
		know-it-all				short-sighted	
		smart				unaccommodating	
		try to stay current				uncompromising	
						willful	

Reverence for knowledge means respecting intelligence and technical know-how. It also includes the constant drive to learn more. Knowledge, in this sense, is something that is always based on actual experience and very rarely based on book learning. Intelligence is something to be respected and admired in others and what IT people want to be known for. This is perhaps in contrast to business managers who want to be known as good leaders and not necessarily as the smartest person in the room. There is a painful disconnect when IT workers report to a manager who is not as technically proficient as they are. They defer to knowledge, not managerial authority. For them, knowledge of what is right is the ultimate authority. The opposite of reverence for knowledge is the most egregious of negative occupational values: pretense at real understanding, and corruption or abuse of knowledge. There is an intriguing notion in the data of a difference between those with "real" knowledge and those who are "pretending" to know for a misguided sense of prestige. All of this adds to the powerful mystique of secret knowledge on the part of the IT professional that people outside the occupation do not possess as evidenced by the first quote in Table 22.

4.4.6 Enjoyment

Like Reverence for Knowledge, Enjoyment was a core theme added during the pilot that was not present in the literature review. The word "enjoy" itself was used in conjunction with the other values frequently, but the enjoyment itself was important for its own sake. Other occupations may or may not find their work enjoyable. College professors might. Brain surgeons may not. But enjoyment for IT people includes fun, play, and above all having a sense of humor and laughing about work, even to the point of playing good-natured pranks on each other. This may contribute to the stereotype that IT people do not take their work seriously, but this is not the case. Thus, another stereotype of IT people as anti-social found no evidence. To the contrary, most interviewees discussed how much they enjoyed going out to eat with others in order to socialize more. Examples of the theme of Enjoyment are shown in Table 24.

Table 24. Examples of the theme of Enjoyment

I enjoyed my co-workers. I enjoyed that type of environment. It was more of a tight-knit community, a tight-knit family. (3)
if you were to walk in our department sometime, there's no telling what you'd hear, you know? (laughing) You could hear a couple of guys just bashing a user…it's certainly a different environment. I can't think of any department in really anywhere that I've worked where the environment is similar to the IT environment. There's times when it's stressful, but when it's not stressful, it's like the most relaxed, you know…anybody who walks in there, you could not not want to work in that environment because of how relaxed it is when everything is going as it should. It's almost like, "Wow, these guys are laid-back, they're cool, they're fun." (24)
To me it wasn't a job, it was a thing that I was doing as a hobby. So, with anything like that, if you love what you're doing, if it's something that turns out to be a hobby, you get paid to do it. That's the icing on the cake! You know, I didn't care about how

many hours I was having to work and even now, I still don't. I've got kids that…I know that being a father, they want me to spend some time with them. I have to be careful of the hours that I spend doing things dealing with technology, but the other side of it is that, even today, I go in every day and I learn to do something new. So, the fact of the matter is that in this field, this is just my feeling, if you're not enthusiastic about the job, I think you're in the wrong field. You should have a reason for getting up every morning and going in there. You know, in IT that's the thing you hear a lot of times, too. A lot of the guys that are happy in what they're doing, they don't tell you they worry about how many hours they work, you just don't hear those kinds of thing. They get up in the morning and they go and take care of what they have to do, but they're always learning something. That's what pushes us to keep going. That's one thing that pushes me to keep going. (21)

a lot of times I think that sense of humor, if you're not in IT or you're not a technophile type person, I think it gets lost and people just kind of like "those people are strange, they like the weirdest stuff." But you know for people who understand technology, when they're around other people who understand and like technology, they can crack jokes and it's, I guess, a secret language maybe that they all understand. (15)

I also enjoyed the learning experience side of it. The companies I worked for had no problem within their yearly budget to send their technical staff to seminars, training, workshops and I dearly miss that. You know in my mind that's one of the key elements of retaining people and keeping them up to par, is going off to seminars. IBM has something called CMON, it's their user group environment and we'd go to that at least once if not twice a year and it was in a different city in the country and it was like going back immersed in college for one week and you could take class after class after class 4 or 5 days in a row. And then in the evenings, you're having dinner, drinks or whatever, with coworkers or people you've never met before and you could exchange ideas. (4)

I worked for a place, not long, where I still wake up in a cold sweat at night. It was a very small shop, one of those transitional kind of jobs, but I had the family to think of so I took the job. It was awful. It was very adversarial not only between the IT group and user community but between the manager and the IT people. He was just an awful manager personally, just not a very likeable person. And he was looking for any excuse to pounce on you. So me and the other programmer were right in the middle. You were damned if you did and if you didn't, you were afraid to take any risk at all. You were going to get jumped on by somebody and it just made for an awful work environment. It was terrible. (4)

> We're a bunch of pranksters. The toy thing, I don't really get excited about new technology. It's cool and everything but I don't think I get as excited about the new toy as the guys do. I think the toy thing might be a little bit of a gender thing but I do love the people I work with. We're pranksters and we laugh. People think we're not working because we're talking over the cube walls and laughing all day long but we're actually getting tons of stuff done. Work hard, play hard is the concept. So I definitely think that's important.
>
> **So a sense of enjoyment is important to you professionally?**
>
> Absolutely. I think if I didn't have as much fun as I have, I think that I would have quit a long time ago. I think that's one of the things I like the most. I like the people I work with and I really have a good time. Everybody bitches about their job and there's days when you're cranky but if I'm going to be honest, I love what I do and I love the people that I do it with. That's really what brings me back every day. (7)

> Well the people that I work with can relate not only to me at the job but in my personal life, you know, I would say the majority of play video games, a majority of us like the same movies, we like to do the same things, we have a fantasy football thing at work where we all participate in, and we generally like hanging out with each other, and it's been that way throughout my career, there's always been a good compliment of people that I like to be around outside of work.
>
> **So would you say that a big chunk of your friends outside of work in IT? They're IT people?**
>
> Yes. Absolutely. The majority. Let me elaborate on that, even some friends that I've had in high school and college who weren't in the IT field of things have gone into IT since then. (5)

Enjoyment at work was consistently important to all the interviewees, whether it was socializing, joking, playing with new "toys", or just having fun at work. The idea of having fun at work may be alien to members of other occupations. The opposite of enjoyment is dullness, stress, and lack of interest. A good cultural sociology term might

be "disenchantment" to describe the opposite of enjoyment, based on Max Weber's terminology.

In summary, the six ASPIRE values evolved and emerged out of the entire interviewing process and form a more cohesive and unified set of occupationally-important shared value than the SCORRE values from the original pilot. Each one has strong support based on empirical evidence in the transcripts. Each one was mentioned in some way by all 25 interviewees, thus there is support for generalizing to the larger population of IT professionals as a whole.

Even though the six ASPIRE values are separate and distinct, many of the ASPIRE interrelate in interesting ways, based on further reflection. For example, as Interviewee #4 said "At lot of these are hand in hand, you can't have one without the other." There are additional interrelationships. For example, Autonomy and Precision in communication are related:

> Well besides permissions levels it's also the control of what software your techie people are using. That whole issue of "if only we had the proper software we could do this right." Well the manager either didn't want to spend the money out of the budget or really didn't understand, 'cause they're often not an IT techie person, doesn't understand exactly what that's gonna buy them and the IT people aren't always in a position where they can communicate that effectively. So you get this whole weird non-communication thing going on because the IT people, typically introverted, non-communicators, don't really understand why you need to know this. "We need this!" It's that simple. And I get that, but that's how they communicate. And then the manager's like "But I need a business reason for this that I can present to this non-techie person as to why I need this $60,000 whatever. So you end up in this struggle for control, 'cause the manager thinks the techie guys want to take control and the techie guys are like "why won't you give us what we need?" and it's really ugly. And nobody gets anything done! (8)

Structure and Innovation can have an inverse relationship:

> Hierarchy. Organizational chart. Standard issue. VP at the top or CEO at the top. "Underlings" or whatever you want to call them, "indentured servants", I don't know what you call them. I think in those structures that there's a lot of people that the further you go down on that, the more close they are to the real problems. These guys up here, and this is just speaking from experience, they really don't know what's going on out there. They're just reading ITWorld magazines …(impersonating silly voice) "Well SharePoint sounds like a very good implementation because the implementation costs and stuff like that" (laughter) and you don't know sh*t. I mean, you don't know sh*t! I mean, I'm dealing with implementations by something they read in freaking PCWorld or they went to a symposium and said that Microsoft promises 400% reduced or increased productivity or whatever the f*ck (laughing)! I don't know. And they implement these solutions that they don't know sh*t about! (getting animated) And then these guys down here have really good ideas. I even hate saying that, "these guys down here" because those guys down here are really making the show go. (13)

> Structure is important, but I also don't want it to be too structured to the point to where I can't be innovative, either. If I have to follow…and I told my manager this once before, I was like, "Well, look, if you want me to file an SOP I'll file an SOP, but if that's the route where we're going, then we don't need IT guys in here. All we need someone who is literate because if all I have to do is file an SOP, then that tells me that I just need to be able to read. I can't deviate, even if I see a better way, so…and that's a tough situation, because SOPs are good. You don't one guy configuring something one way and then another guy configuring something just completely different. But on the other hand, IT is a lot about… some things you can do 5 different ways. You can take the scenic route or the expressway, as long as you remember that destination. So, I don't really want to be restricted to having to do something the exact same way every single time, but at the same time, that can be good. So, it's tough. Structure's important, but I also want to do it and be able to deviate from that. (24)

Innovation and Structure and Enjoyment can all be seen as interrelated:

> It's fair to point out that we were in this special place [Silicon Valley in the late 90s] where maybe my experience is not reflective of other people's experiences in less innovative environments. Because you there was a whole lot of, it was pretty loose out there in terms of the different business ideas people were trying out at

the time, with all the startup stuff. We had a bunch of people who had never really managed anything, people fresh out of business school, had a great business idea and got some venture capital for it. So that really colors, I think, the way that I'm going to tell you that history work to me kind of comes out of that and into this more structure, more bureaucratic, less fun…sometimes… (1)

Finally, in addition to Shared Values, the results of the content analysis also provided ample support for the other constructs in the overall research model and how they specifically relate to values. The ASPIRE values do not exist in a vacuum and are very much interconnected in a web with Shared Context, Shared Language, and Shared History.

4.5 Shared Context

Taking advantage of Trice's Theory of Occupational Culture, Shared Context is well-represented with the six characteristics of occupational culture: esoteric knowledge and expertise, extreme or unusual demands, consciousness of kind, pervasiveness, favorable self-image, primary reference group, and abundance of cultural forms. Table 25 shows the code frequency of the elements of Shared Context. Table 26 provides examples of the elements of Shared Context.

Table 25. Shared Context code frequency

Code	Frequency
Esoteric knowledge	67
Extreme-unusual demands	56
Consciousness of kind	39
Pervasiveness	17
Favorable self-image	16
Primary reference group	5
Cultural forms	18

Table 26. Examples of elements of Shared Context

Esoteric knowledge	You need to know IP networking, how to subnet, routing protocols, how to configure a router. You need to be able to apply scientific troubleshooting methods. Look at the problem. Look at the parts of the problem. Break it down until you get to the part you can work on and solve the individual parts and eventually you'll have solved the whole problem. That's not really an IT-specific skill, that's a general skill. People that can solve parts of problems and know that they can chip away at it versus "oh God it's an insurmountable problem." Look at the different pieces. Is everything broken or are parts of it working? (14)
Extreme or unusual demands	We worked in a stressful environment over there at [company deleted]…really late nights. That was another reason…I knew there was places that you had to work late, but once a month you were guaranteed to work from 3 to 6 in the morning, guaranteed, and it was on a Friday night. Second Friday of every month. (25)
Consciousness of kind	Yeah, well, I think that you can tell from talking to someone whether they're an IT person. I think the question is, I guess, what type of IT person they are. You can talk to someone from a networking environment and depending on the terms they use, you can tell that they're a networking IT professional. You can talk to someone who's a DBA, and if they're talking in select statements, you can tell that…so it really depends on what type of IT person. You can certainly talk to an IT person and really get an idea of whether they have any mid-level range knowledge of IT or not. Yeah, yeah. (24)

Pervasiveness	That's actually, yeah, that's an important component. For instance, a couple of weekends ago, I had a buddy come down and we spent the weekend learning how to compile stuff through the Android operating system. You know, just 'cause!! You know. **'Cause it's your idea of fun?** Yeah!! Yeah, we found out there was this free tool and we thought "well we can make this happen, right?" and by the end of Friday night we had something up and running in the emulator, until the next weekend, rest of the weekend, trying out different mobile frameworks and stuff to see how it would go. **And I'm sorry, was that recently?** Oh, two weekends ago! So yeah! But yeah, that interest going outside of the workplace is important…for happiness in the career and also for success, for whatever definition that might be, which I think includes happiness in the career. (9)
Favorable self-image	See, I think I'm very cool. So I wonder if I'm the cool person who just doesn't know they're a nerd. We joke about this all the time because we all think we're cool IT people, but do we just think we're cool and everybody outside of IT is just going "oh my gosh, look at those nerds over there!" I've never considered myself a nerd or a geek. So I don't know. (7)
Primary reference group	Well, I think that a lot of the times as far as heroes go, a hero to me…I don't have anybody that I'd say I look at that is going to be somebody that is well known, I mean, that's a hero to me. I mean, I don't look at somebody like Bill Gates or Steve Jobs and say that's my hero. They're not my heroes and they're not who I look to for any kind of real advice. I think a lot of times I find heroes in the environment that I'm in. I try to find people that I can look to that will get me to that next level, and that's the person I would pattern myself out of, their, you know, it was more like having a hero for the moment. That's the way that I've always worked (21)
Cultural forms	People who laugh at XKCD. A web comic. If you don't know it, you should. You will find it hysterical. If you find XKCD hysterical, then you're in IT. More, less flippantly, people who, when the computer is behaving weirdly, want to find out why and not just make it go away. People who get my jokes, you know? There is a whole

> subculture of IT humor. But, humor…humor is a really big marker,
> and a particular frame of mind. So, I would say the two biggest
> markers for me are the particular cultural humor, and a frame of
> mind that wants to take things apart, troubleshoot it, and put it back
> together rather than just make the problem go away and not care
> why. But, that may also be because a lot of my IT community
> overlaps with the maker community and the hacker community,
> people who are of that bent. So I don't know if it's inherent to the IT
> community, or if it's just inherent to the sub-section of the IT
> community that I swim in. (23)

These few quotes are only examples of the rich cultural context that IT
professionals share in common. Esoteric knowledge is prevalent in that they all need
highly specialized skills to do their jobs whether it be programming, system
administration, or project management. Extreme or unusual demands are seen when they
are frequently called upon to work nights and weekends in extremely stressful situations
that can create job burnout. Consciousness of kind means that they can tell who is an
insider and who is an outsider to their occupational group based on how they use IT
jargon or, more importantly, based on how a person approaches problem-solving in a
systematic manner. Pervasiveness is means they are typically working with technology
both at work and at home pervading their entire lifestyle. Favorable self-image is
demonstrated by the prestige or "coolness" that they associate with their career. Primary
reference group means there is a strong feeling that only people within their own
occupation can accurately judge the quality of their work, not people outside the
occupation such as business managers. And there is an abundance of cultural forms in
movies, television shows, books, magazines, and comics. Popular examples include "Big

Bang Theory" and "The IT Crowd" on television as well as movies such as

"OfficeSpace" and "Grandma's Boy".

4.6 Shared Language

Shared language is an important element of *any* culture at any level of analysis,

but especially so within the IT occupation. Stories abound of speaking a different

language with different words and understood meanings for members of the occupation

and the need for translation when speaking with people outside of IT. Several were quick

to point out that *every* occupation has its own language. Thus shared language belongs in

the model for any occupational culture. Examples are shown in Table 27.

Table 27. Examples of Shared Language

Of course. The language that lawyers use has differences, the language non-lawyers, the language doctors use…so, yes, but I don't think it's limited to IT people. I do think that it is a tribal marker! I will go into a room full of people who are looking at me, because I dress fairly nicely for work, both because I have really comfortable business clothes and because it gives me…for a long time, I looked younger than everyone in the room, so if I didn't dress fairly nicely, I would get assessed as the admin, and that was annoying, so you do what you need to get around that. If I speak their language, technically or culturally, then I'm less likely to smell funny, to be run out of the room by the other dogs. (23)
as my own little personal anecdote, when I first went into [deleted] and someone, a manager, was in a department that they called "kai-zen" it's just means continuous improvement which is Japanese culture and many US companies are catching up to that. But when once he saw my resume, I mean the lights went on in his eyes, you could see it, that now, he has his own man, I was not with IT but I could speak IT. And I was from that point on going to every meeting he went to. I didn't even have to say anything or contribute, just as long as I was there listening to everything whether or not it had to do with IT or not because I was going to be that liaison, that translator (4)

> Also if you have someone who is technical enough but not a coder, but also business enough, but they don't actually work in the business, someone in between who can speak the speak of both sides and translate. Things works a lot smoother. (6)

> We have our own language, but there are some of us out there who would rather speak in English. (6)

Shared language includes highly technical jargon and acronyms and all the interviewees either acknowledged this explicitly or used highly technical language in their narratives. While there may be sub-categories of shared language based on specific job roles such as programming, networking, or database administration, there is an overarching language to IT. In stark contrast, there were some interviewees who expressed an aversion to using business buzzwords or business jargon and would use air quotes around words like "synergy" or "profitability" while sneering. Others recognized the importance of "speaking the language of business" without derision. In all cases, there was agreement that some kind of translation between IT language and business language was necessary in every industry.

4.7 Shared History

The importance of understanding Shared History when studying any culture is already well documented. Cultures are products of their history. Shared meanings of shared events serve to bind a culture together. The expected result was frequent and shared perceptions of historical events such as 9/11, Y2K, the dot-com boom and bust, the explosion of Internet use, increasing compliance legislation, and offshore

outsourcing. These can be categorized as Shared Economic History, Shared Political History, Shared Technological History, and Shared Personal History.

4.7.1 Shared Economic History

The terrorist attacks on 9/11 were mentioned the most frequently but their impact was more in an economic sense as causing job loss in the industry rather than in an emotional sense of loss. The dot-com boom and bust directly impacted those who were working during this time of rapid technological expansion in the late 1990s followed by an abrupt economic halt. There were many examples of job loss or job-switching during this time period due to the economy. Stories of being laid off and losing an IT job due to economic conditions were both common and painful to recount. Losing a job is a devastating life change because our identity is wrapped up in what we do for a living.

4.7.2 Shared Political History

Increasing compliance legislation such as Sarbanes-Oxley, HIPPA, and changing credit card security standards were cited as contributing to an evolving culture of compliance. This compliance culture, based on a national political agenda, means that companies are exerting more control over IT functions and this increased scrutiny is felt strongly by IT personnel. Another trend due to changes in legislation of H1B visas is the increase of foreign workers into IT jobs in the U.S. Offshore outsourcing, i.e., the use of developers from other countries as a source of cheap labor, is another strong trend but neither foreign workers in the U.S. or offshore outsourcing were strong fears expressed by the interviewees.

4.7.3 Shared Technological History

The interaction between technological history and the IT occupation was frequently mentioned. The biggest historical change was the explosion of the Internet for the interviewees. Without this technological change, IT could have remained a minor function in the accounting back office (as in the 1970s) instead of taking a role center stage as part of a business's overall strategy. The rise of mobile technology was also mentioned as a historical change. While mobile technology does increase the pervasiveness of IT Occupational Culture, this was generally seen in a positive light in terms of helping IT people to do their jobs remotely. The Y2K technology bug of IT systems not being able to handle the date change from 1999 to 2000 was mentioned by several in passing as an example of a "non-event".

4.7.4 Shared Personal History

What came as a complete surprise is that there was an unanticipated area of history that almost every single person had in common and a new code had to be created to account for it. This was shared *personal* history. There is a shared personal narrative that includes 1) an early experience with computers, typically in childhood coupled with 2) a positive influence from a parent or other family member. Examine the surprising similarities in the following excerpts in Table 28 as examples of Shared Personal History.

Table 28. Examples of Shared Personal History

Well, I guess I got really interested with my Commodore 64…Me, my dad and my brother wrote a program even though I'm not in programming at all, I stay away from it as much as I can, and we wrote our first program and we must have spent a day and

a half out of a magazine just writing this code, and when we got in, we didn't know what to expect. It was like C-64 Magazine or something, some really old magazine. All of a sudden, all it was a little racecar that just went up the screen, comes around, and it just looped. We must have spent all day doing that, and it was very frustrating, but then we got into games and stuff. Actually, I had a 128 that had 64, it was neat doing all of that. To me, all of that stuff was really neat. My brother actually went to the Navy and was in IT, too. (25)

When I was under 10, my father brought home an Apple II Plus, and he had a bunch of cracked games, and so we played Bouncing Kumongas, which is a real game, I swear to God, among many other games. So we always had a computer around the house. (23)

When I started the 7th grade, it was the first year of a new middle school called [deleted]. And there were 4 computers in every classroom and there was a teacher's computer, 5 pc's per classroom, teacher's computer hooked into the TV's and you know, it was as wired as you could get, it was all dumb terminals, booting twinax over the network, Netware 312. So, I got very interested in computers there and took some classes there, like about keyboarding and that kind of stuff, but I had seen computers before then, I kind of messed with DOS, kind of used pc's here and there at people's houses, my parents' friends and stuff, and so I started messing around, figured that I could jump out of the Netware shell and get into a DOS command prompt, so I started messing around with, like I could do net message system, messages to my friends in other classrooms and I could send them a message so that when they walked in they would see it, and I locked the entire system up by sending a net message to star. So, IBM came down and spent three days getting it all back up, so I got to spend those three days with IBM. And, so, every time they came from then on, they pulled me out of school to spend the day with them because I would lock the system up or find a hole or find a problem, and then they would call IBM and I'd be able to come, and I would re-create the issue for them to show them what I had done to cause this to happen. (18)

My Dad worked for IBM. Now the ironic part is…working for IBM? The first computer in our house was an Apple II. (laughter) (16)

My Dad brought home a used computer. It was a…I think it as a Tandy, I'm trying to remember now. It had no storage media, so every time you turned it on, you just got the…it was just a…you could do Basic programming on it, but it didn't have any applications, basically no O/S and so I bought a book of these fun Basic programs that you could type in the commands and make the little stick man walk or whatever. But every time I wanted to do it I had to type the whole thing in so that's kind of how I got

started in programming was, I was probably 9 years old doing that. And then it always stuck with me that I thought that was interesting and neat that you could make a machine do these things. (15)

I got my very first computer, it was a Commodore64 and that was the most amazing thing to me! And the stuff I did with that, oddly enough, I wrote a POS system for it! My Mom was in retail and I used to go to work with her all the time and I wrote a POS system on my Commodore64, so I guess I was destined to do that since early on. (6)

My Mom got an Apple II, that was our first computer. That little monochrome all in one kind of thing. Had to be late 80s. And then got my first Intel computer PC in 93, 92. A 486 SX. Couldn't even spring for the DX, had to go for the SX. That thing still cost $1000! (5)

I learned to program at the age of 10 on an old Commodore64. That peaked my interest and went into electrical engineering. My Dad was in telephony. He worked for BellSouth for 22 years and sort of got interested in engineering. He wasn't an engineer but the whole idea of designing peaked my interest. (3)

My Dad used to work on computers back when you had to feed cards into them and stuff. And so, he travelled all over Europe. He's from London. And he traveled all over Europe working on computers because he was the computer guy back before anyone knew that a computer guy even existed. And then when I was kid, he always had a computer in the house and I would play like Mother Goose Fairy Tales when I was a little kid on the computer and Captain Keen and King's Quest and Leisure Suit Larry and all that. (12)

My father was an electrical engineer who became a kind of…information engineer. He worked for NATO for a long time and he was programming in FORTRAN in the 50s on punch tape and I don't think he touched a computer from the 50s to the 90s. But at that point, he had stuff around him like flowcharting templates. I had seen various state diagrams. (10)

A great example would be my step-father, wonderful guy, love him to death! When I first got to know him, he was definitely an engineering/programmer. So he could make the computer do things I didn't even know what they were, but I was the one would figure out how to get it working if it broke, or knew how to navigate the system. (9)

> Speaking of geekitry, my Dad when I was younger spent me to computer
> programming camp. I spent a week learning how to program in Basic and it sounds
> geeky but that's what started my interest in it. And I had a Commodore 64 and
> programmed it and the allure there, what I don't have you know going years back to
> when I was doing it for fun and not because I wanted a good job, I enjoyed the
> creative aspect of making this beast, not a flesh and blood beast, but a code beast,
> that I could tell it what to do and I could make it do the things that I wanted it to do
> and only later when I was in high school and I was taking Pascal and now I can make
> tools that will help me do other things. (2)

So the shared narrative within the occupation goes something like this: "I will always remember the moment my Mom/Dad brought home our first computer and that started a life-long passion." It is, perhaps, relevant to mention that the researcher himself shares this same exact narrative as well. Shared Personal History is the shared history that resonates with IT professionals and, in its own way, binds them together.

4.8 Relationships in the Web of Culture

The connections between these four areas, Shared Values, Shared Context, Shared Language, and Shared History were evident although the relationships can be intricate. Some brief examples will highlight how the web of culture connects together. Four constructs that all relate to each other form six possible relationships.

4.8.1 Share Context and Shared Language

Every occupation has a shared language among its members and this is due primarily to the link between esoteric knowledge, that is, highly specialized skills and the terminology necessary to talk about those skills. Shared language is also used in the Shared context of Consciousness of kind. For example:

The ability to, there is a skill that is required and very rarely actually there, which is the ability to translate between technical concepts and the non-technical audience. If we had more of that, we would be better off. (23)

Yes. You can tell by talking to somebody. Yep. The first couple of sentences, and you can tell usually what they deal with by their jargon or how they say a letter on a keyboard…how much they care. I tell you what, it's really how much they care about computers is what you can tell when somebody talks. Because some people, you can tell they could care less about computers. (25)

4.8.2 Shared History and Shared Context

Economic layoffs have led to extreme or unusual demands in the work

environment. The more IT people who are laid off, the greater workload is placed on the

remaining IT workers resulting in frustration and potential burnout. For example:

Yeah, the employer, they know they have you. There's not a lot of jobs out there. Employers gain. Employers gain. They lay off people and they rehire. They think that one person should be able to do 3 people's jobs and do it as effectively. I think that's the big negative with what I'm seeing. People are just overworked. (20)

4.8.3 Shared Context and Shared Values

There is a relationship between the cultural context of Pervasiveness and the

cultural value of Enjoyment. There is also a relationship between the context of

Favorable Self Image and the value of Reverence for Knowledge. For example:

Yes, I'd say they definitely love what they do so they spend time outside of work studying and learning about new things. They're kind of driven to learn about IT. Maybe that's two things. They love their job. (11)

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How much does IT take over your after-work life?

Oh, oh, there you go! I mean, I love different things, different aspects of hooking things together and building my own computer and stuff at home.

Okay, but you're kind of working on technology-related projects on your own time?

Always at home, yeah. Yeah, I always hook together my DVR to stuff to get the whole room because the DirecTV guy couldn't do it. Crap like that. (25)

4.8.4 Shared Language and Shared History

The relationship between Shared Language and Shared History, apart from all the examples of jargon and acronyms, is the popular shared phrase "I fell into IT." This *in vivo* code was a kind of linguistic shorthand that effectively described the shared personal history of IT professionals. "I fell into IT" means that that they were not intentionally planning on a career in IT as shown in Table 29.

Table 29. "I fell into IT" narratives

It's kind of what they got into or kind of fell into it (18).
That's how I got into IT. I purely fell into it, and I lucked out. (17)
I'm in IT because I fell into it. That's where my interests took me. (9)
It was kind of by accident. I thought that I wanted to be a teacher. (7)
I didn't really know what I wanted for a career. (5)
I stumbled into IT and programming. (4)
I never intended...I just had to pick something..."you have to!" "I'm like uhhh, I don't want to!" Until of course then I graduated, it's like to only really marketable skill I

have is computer stuff. (8)
I started out, I wanted to be a journalist. So I got into IT sideways. (1)
When I got out of college, I had a Medieval Studies degree, and my choices were really to go on to grad school or to work in computers. And I kind of liked regular meals, so I went into working in computers. (laughing) (23)

So using the phrase "I fell into IT" is a shared phrase that nicely summarizes a shared history. It is also an example of shared language that IT people understand readily above and beyond the shared language of bits and bytes.

4.8.5 Shared Language and Shared Values

Shared language and intersects with the core value of Precision in Communication. What appears as talking an arcane language to outsiders is really just very precise language. This precision in communication is a very necessary part of the occupation. For example:

> Well yes, those of us, technical people, precision is everything. Have you read the "Accidental Empires" by Robert Cringley?
>
> **I saw the documentary he did.**
>
> In there, one of the things he talked about was why his job as a gossip columnist for InfoWorld was easy was that he always got…he was the Father Confessor for all these other geeks there, because precision matters so much. To engineers, it's against their culture to say…you can't go into a meeting and have the circuit explode and say "well I thought it was a 50 ohm thing, ahhh put a 75 ohm in there." You just don't do that! That's not part of our culture, our nature. So when people like sales people or managers try to get them to shut up and hush up major flaws and other things like that, they need someone to talk to, and that's why he always gets the stuff and would find out about late releases or vaporware going on and other stuff. There's this need to bare one's soul in there. I took that out of

there, but as he built that up, the notion of precision of communication, you need to know exactly, in our case, database, it can't be VARCHAR10 or VARCHAR20 or something like that. It is one or the other. I've got to go code this. Don't jerk me around, man! (10)

4.8.6 Shared History and Shared Values

The high value IT people place on Precision may have a very direct relationship with its history as much as its current context. For example:

> I'll go off on another diatribe here. When you had to do punch cards or you had to submit things to a central computer to compile? You had to be pretty detailed on what you submitted. You had one compile per day. So those people really think out their code, they think out their process. (16)

It is possible that part of the historical hacker culture's anti-authoritarian attitude has impacted the strong preference towards Autonomy in IT people. But there was stronger evidence that the early days of IT in Silicon Valley had a lasting impact on the value of Enjoyment at work. For example:

> **So before things went downhill, what was it like to be in San Francisco near Silicon Valley in the thick of it?**
>
> It was a crazy culture. When you went into the office, everybody was casual, people came in shorts, the business people came in in suits, we had a game room that had arcade games and a PlayStation 2, foosball, pinball, there was a pool table, Ping-Pong table, a snack bar in there that they kept stocked constantly. It was kind of like you hear Google has free snacks and so forth, well we had anything you wanted, you just asked the receptionist and she'd get it stocked in the snack room. I mean it was just a crazy time, there were parties going on, startups happening left and right. It was a wild ride. I'm sorry it didn't last longer. (6)

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It was a young hip kind of culture. People brought their dogs to work. It was everything as you expected. We were down on Wiltshire Blvd right across from the tar pits. It was a little office space, it was kind of fun. It was a good time. (1)

To summarize, the interrelationships shown in the research model found strong support in the qualitative data. More than likely, all the relationships may have bi-directional causal influences on each other but the purpose of this study was only to show that the basic relationships exist in a web-like structure. Shared values may be the core of any culture but they do not exist in a vacuum. The model shows that occupationally shared values are heavily connected to shared history, shared language, and shared context and the interview data supports this view. The results show rich support for the original a priori model in terms of the major constructs, but the content of those constructs, especially Shared Values and Shared History, did change from where the research started to where it ended up.

A concluding note should be made to refer back to the three-way perspective in analyzing any culture: Integration, Differentiation, and Fragmentation (Martin, 2002). The Integration view looks at the features of culture that are in common and shared by most members of the group. The Differentiation view examines differences in sub-groups within. The Fragmentation view analyzes those paradoxes, tensions, and contradictions that are sometimes glossed over in the other two views. This three-way view of culture has been used with success in IS research (Kappos & Rivard, 2008). It should be apparent from the constructs in the research model that what is being sought is primarily an Integration view of IT occupational culture that focuses on the shared elements of culture.

At the same time, one interviewee was extremely adamant that there are important

differences *within* IT occupational culture. Here is the complete conversation supporting

her argument of the differentiation view of IT occupational culture:

Is there anything I'm missing in my study of IT occupational culture that we haven't talked about?

I think that you need to be careful, because the IT industry is so non-monolithic. There is no…I would say, and it's probably not what you want to hear, there is no IT culture.

Okay.

There's IT operations. There are security researchers, there's the sales, purchasing, the vendor representatives who buy the technology, there's the business side of IT versus the people who get up at 2 in the morning and upgrade routers, and so I would caution you not to try to read it as one industry. It's really an umbrella over some wildly disparate cultures. I would say the culture of business IT has about as much in common with the hackers, security researchers, the "white hat hacker culture" as it does with an MD. So, that's…it's easy to generalize….

That's fortunate, because that's the next step of my research.

Okay.

There are different ways of looking at culture in terms of what separates one culture from another, but then also looking within that culture at how it's fragmented, how there are differences within a group. So, a lot of people are quick to point out that hardware people are different from software people.

Yep, yep, yep, yep. There is a big piece, too, that…one of the biggest divides I see in the IT industry…there are people who are Comp Sci majors, Electrical Engineering majors, the traditional IT majors, and then there are people like me who have stumbled into IT from a completely different background. We think differently. I live with one, and I've worked with many, many people, both…I've worked with people who got into IT from Physics, from Music, from English, and I've worked with people who went into a Computer Science program with an Electrical Engineering minor, and to me, that's going to be one of the biggest dividers you're going to find. There are the people who have the computer

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science/electrical engineering approach to things, and then there are the people who came into IT from the outside. I think the industry needs both, but there are limits to either, but there's a huge cultural division there. We all interact and we all get along, but we think really f***ing differently about the same…(pause) we're in the same environment, we're doing similar things, but our approaches are really different. (23)

Some typical differences that were pointed out in the interviews included software people versus hardware people, business analysts versus programmers versus systems administrators, and other such areas of specialization. The distinction between hardware people and software people is an old one (Gregory, 1983). Still, an implicit argument is being made in this research is that there are things that are core to the occupational culture and things that are in the periphery. That is not to dismiss these differences into the periphery as less interesting or less important. They will be the focus for future research in this area. However, one tantalizing view of the data suggests that there is a recurring motif of pride in being different. "I am not like most IT people. I'm different!" Consider that the sample of interviewees included IS majors, business majors, liberal arts majors, and college dropouts. But none of them admitted to being a typical IT person. To the contrary, no matter their individual background, they thought they were different. This was coded as the "I am different" speech shown in Table 30.

Table 30. Examples of "I am different" narrative

See, I think that's why I'm kind of a little different because I don't know if there's anybody else in the department who is thinking about the company's strategic goals! (24)
You've thrown around "hacker" and "geek" and "nerd". Do you self-identify with any of those? Not a hacker. To me, a hacker is someone who takes things apart and puts them back together and tries to figure out what they do and maybe better ways to do things, and I'm really not that person. At heart, I'm still a liberal arts major. (23)
I don't consider myself the typical IT person…I don't think I live that role. Maybe I'm just being…maybe I do. (laughing) I just don't know it. And maybe I don't want to admit it! (20)
I'm kind of a hybrid in-between. (17)
I'm the exception I would say. (16)
I'm called a computer geek or a computer dork. But I don't think of myself as a geek or dork. I'm not the guy who's a pencil-pusher, pocket-protector, things like that. There's some really cool people out there who are doing some really cool technology jobs right now. I don't think they're computer dorks. (13)
I definitely don't fit into the IT world as well as a straight IT guy so I'm sort of a walking paradox. So I have always been that person who was like a jack of all trades and a master of none. (12)
I've also spent more…also more of a socially congenial kind of person and communicative kind of person so I've often found myself riding the line, that I don't totally fit…I'm a geek! I mean through and through. But I don't necessarily totally fit the model, and a lot of times…so being different from all the 'different' people in that way is actually an advantage in a lot of cases, because I often ride the line in there. (10)
I get along with about anybody. I'm kind of unique in that aspect. (5)
Clearly that's not me. (8)

It is tempting to assert that this claim to differentiation is yet another factor that IT professionals actually have in common. It may be the case that most people say they are "different" in some way from others, but in this case it is more important because the idea dovetails logically with the "Fell into IT" narratives.

Finally, there is also evidence of the Fragmentation view of culture. Many tensions and paradoxes exist. There is a clear tension between Structure and Innovation. Too much Structure has the potential to stifle Innovation. Many of the interviewees used the phrase "*real* knowledge" to describe what was most important to them, but when pressed for what "fake" knowledge might be, they were unable to clearly articulate this. There was also tension perceived by some interviewees between younger IT workers and the "old guard." Most of the interviewees were adamant that they enjoyed and were passionate about their careers whereas for some it was just a job. But nowhere was the Fragmentation more clearly evident than in the question "Is your work meaningful to you?" The responses were either enthusiastic Yes's, emphatic No's, or hesitant Maybe's. What was clear, however, was what *would* be meaningful to them, whether they were finding that meaning in their work currently or not, and this theme will be explored in detail using a cultural sociological approach in the hermeneutic interpretation that follows.

Martin (2002) asserts that it is important to consider all three perspectives of culture when doing any cultural analysis. Hopefully this brief treatment of the three perspectives lends weight to the idea that there are interesting insights to be gleaned from this three-way approach.

4.9 Hermeneutic Interpretation – The Sacred and the Profane

The goal of cultural sociology is not merely to present data and findings, but to interpret the meaning of those findings. Cultural sociology combines interdisciplinary influences to examine meaning-making processes based on empirical evidence and hermeneutics (Spillman, 2002). Hermeneutics, as a field, arose from Biblical Studies as a way of discovering the deeper meaning of a text through careful analysis and understanding of the overall context. More recently, hermeneutics has been applied in research to *any* text and interview transcripts are just one example. Identifying the deeper meaning of the combined texts of interviews is a process of subjective interpretation. Subjectivity does not invalidate the interpretation as long as there is ample evidence provided for that interpretation.

The results of the coding of major value themes and the content analysis were used to create an overall interpretation of the deeper meanings of IT occupational culture. The approach of cultural sociology helps unpack the meaning of IT work. Just as ethnography attempts to describe a holistic perspective of a group's history, language, culture and context into a cultural profile (Creswell, 2007), a similar aim is sought for the occupational group. The result should create a compelling literary metaphor for the IT occupation. The goal of the metaphoric approach is to get at the overarching occupational ideologies. Occupational ideologies are emotional, action-oriented beliefs based on values within an occupation (Trice, 1993). For example, "Among accountants, a dominant ideology is the deep-seated conviction that order and rationality can be made a vital part of the behavior of work organizations, especially their financial control and

planning. Consensus and the governance of the workplaces, they believe, are possible by means of rational knowledge and factual information. Conflict, strain, and power struggles exist, but these are secondary to the 'bottom line,' where financial profit or loss are cold-bloodedly assessed" (Trice, 1993, p. 48). A similar overall ideology based on shared occupational values is the endgame of interpretation.

The interpretation is, admittedly, ambitious in keeping with the strong program of cultural sociology. It is firmly grounded in Durkheim's pioneering work in sociology in the 19th century. Durkheim studied religion as a cohesive force that serves to bind a cultural group together. The most fundamental aspect of any religion, for Durkheim, is the division between the sacred and the profane. Sacred elements provide cohesion and special identification of social groups as well as meaning. Profane elements are less meaningful and more routine. The sacred, for Durkheim, involved feelings of awe, fear, and reverence and were contrasted with the profane, or routine, aspects of life (Durkheim, 1965; Smith & Riley, 2009). Caillois refers to the sacred as being a way of transcending ordinary existence (Riley, 2010, p.13). The profane (coming from the Latin for "outer") is simply that which is not sacred, i.e., the ordinary, the mundane, and the routine.

Since Durkheim's time, contemporary cultural sociologists have found examples of the sacred and profane in other aspects of human activity besides religion (Riley, 2010). It may be argued that religion has become less of a cohesive force in contemporary society and that other areas of human activity potentially fulfill this function. For example, the Olympic Games and other sporting events are clearly secular activities, yet the ritualistic behavior of the participants as well as the observers reflect

"the kind of ritualistic obsession of the behavior of the religiously devout" (Riley, 2010, p. 10). Sports teams can help form fans' identity and serve to represent certain values that fans deem supremely important. The collective effervescence (to use Durkheim's phrase) of the fans in an arena are at least as high as that of participants in a religious festival.

A better example may be in the world of work. "We demonstrate our worth through work. It is the first fact about ourselves we give others, and it is the first thing we inquire of them. It is implied that we learn the deepest meaning about a person in learning her occupation" (Riley, 2010, p. 3). While work is traditionally viewed as a profane, everyday activity, it will be argued that there are elements of the sacred and mysterious in how the profession looks at itself, especially in the language that we use about IT in general.

This is simply a logical extension of an interpretation already begun by Jeffrey Alexander, one of the founders of cultural sociology. Alexander finds the sacred readily apparent in "information machines" and interprets those who work with computers as worldly priests who act as intermediaries between divinity (information) and laity (users). "When we want to consult the deity, we go to the computer because it's the closest thing to God to come along" (quoted in Alexander, 2010, p.188) Furthermore, technophilia in Western culture has evolved over a long period of time to the extent that technology is not just considered useful but *sacred* (Ignatow, 2003).

Riley also indicates it is possible to look at computer activity (both programming and playing computer games) as a sacred experience that transcends the mundane world. The act of going online or getting immersed in programming code can induce an ecstatic

state of trance. It is "the experience of successful performance, in other words, literally ecstatic ("to be outside oneself"). It enables us to transcend the mundane and live the eternal in the moment we are experiencing at that precise time. In this sense, cultural sociology points us away from the experience of the everyday, the normal, to an experience of the exceptional, the excessive, and the numinous" (Riley, 2010, p. 18). This is not to say that IT is a *purely* sacred activity because there are numerous profane elements in IT as well which are reflected in IT occupational jargon (Ignatow, 2003). But the lens of the sacred may provide important insight into IT occupational culture.

Returning to the parsimonious list of ASPIRE values, a deeper exploration of the meaning of those values to which IT aspires is now possible. What does it all mean, if cultural sociology is about meaning? How do we avoid reified empty values and fill them with Alexander's (2003) "rich wine of symbolic significance"? There are many ways to talk about meaning. The neo-Durkheimian discourse of the sacred and the profane provides an especially meaningful and powerful interpretation of IT occupational culture.

If we ask, what is sacred for members of the IT occupation, the first value we should examine is Reverence for Knowledge. Not only was it the most frequently mentioned, but also the most fervently. Several interviewees were asked specifically if they were comfortable with the word "reverence" due to its religious overtones and they overwhelmingly were. Consider that "the sacred" has been examined in the context of sporting events, so "sacred" is no longer the sole domain of religion. That is why the sociological definition of that which inspires fear, reverence and awe is so critical to

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understanding the sacred in the IT occupation. This is the unquestioned assumption of all IT personnel: knowledge is sacred and worthy of reverence.

Within the context of the IT occupation, this is a certain type of knowledge that is revered. Flyvbjerg (2001) distinguishes three types of knowledge in the original Greek that are relevant in the social sciences. *Episteme* is scientific knowledge, *techne* is technical knowledge including engineering and craftsmanship, and *phronesis* is practical wisdom for ethical action. Therefore, the knowledge that the IT occupation reveres should properly be called *techne*.

Knowledge can be considered sacred when it is revered. But the other two criteria of fear and awe are also present. There is frequently fear of IT knowledge that manifests as computer-phobia by people outside the occupation. *Techne* is not feared by members of the occupation but its improper use is a subject of great fear. The awe that technical knowledge inspires is apparent in the *way* people talk about it. One can easily tell when the interviewees get the moments of awe when discussing knowledge but they have to be listened to, not read, in order to appreciate them.

Might any other ASPIRE values be considered sacred? Wuthnow (1987) indicates that the ultimate sacred value is world order. "Peter Berger (1969) suggested that the ultimate human terror is not evil, but chaos. A total absence of order, a world without structure or meaning, is so horrifying as to be unthinkable" (Griswold, 2004, p. 24) Since the value of Structure represents order, it can reasonably be included as a sacred value since a lack of Structure in the work environment is eschewed so strongly by IT people . Innovation, which includes the power of creation, is connected to Structure if one must

create in order to bring about order. Building something new is something awe-inspiring for members of the IT occupation. The recurring idea of technological progress, making things better, improving things, even making the world better, seems to be important in IT. The power of creation is, of course, a popular sacred theme in all world mythologies, therefore to elevate Innovation to the realm of the sacred seems appropriate.

But what about the other values, Autonomy, Precision, and Enjoyment? It is difficult to conceptualize these three as sacred because they have more to do with IT workers' preferences for their work environment. Three motifs that recurred with the interviewees were "Enjoyment is what *keeps* me here", "I left there because I didn't have enough Autonomy" and "I need Precision in communication to do my job". The sense of sacredness is missing in these themes, which indicates they may belong to the realm of the profane. Moreover, the interview quotes provided earlier show the vehemence and the yearning associated with Reverence for Knowledge, Innovation, and Structure as opposed to the weaker preferences for Autonomy, Precision, and Enjoyment. In psychological language, we could talk about the division being between Herzberg's hygienic factors and true motivators. But in cultural sociology language, the division is sacred/profane. Profane values are still important (just as hygienic factors are important). But sacred values take us to a higher plane of existence. There is arguably a strong link between motivators and sacredly-held values. In this way, we can draw a clear distinction between the sacred values of Reverence for Knowledge, Structure, and Innovation versus the more profane values of Autonomy, Precision, and Enjoyment. This division is shown visually in Figure 11.
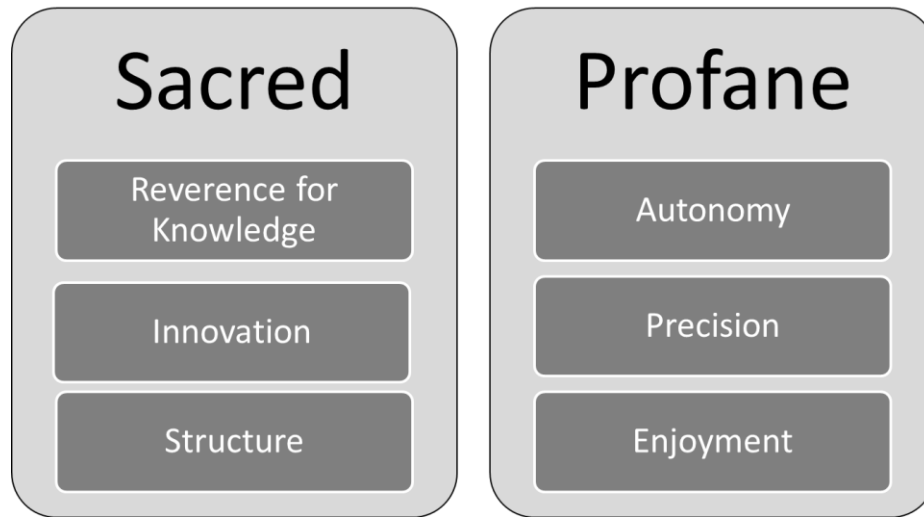
Figure 11. Division of Sacred and Profane Values

Let us delve even deeper into the meaning of the sacred. For Durkheim and his

followers (such as Marcel Mauss and Roger Caillois), the sacred is divided into "right"

sacred, the things we revere, and the "left" sacred, the things which fill us with horror and

dread. The left sacred is also called the impure sacred or the transgressive sacred (Riley,

2010). Left sacred is important because it provides insight into what is considered evil in

a social group, something to be shunned and avoided, something that those who

participate in it risk being cast out of the group.

The left sacred is another aspect of the sacred but can be identified by reflecting

on the opposites of right sacred values. For Riley (2010), the sacred represents cosmos

(order, creation) and the impure sacred is chaos. The opposites of the three sacred values

of Reverence for Knowledge, Structure, and Innovation are what fill IT professionals

with dread and horror and are to be avoided at all costs. Hacking with malicious intent

and hoarding of knowledge violate the devotion to Reverence for Knowledge. Dis-

organization in the workplace and inexplicable re-organizations violate the devotion to Structure. Technological stagnancy within an organization violates the devotion to Innovation. IT professionals, at their core, are not driven by money. They are driven by an intrinsic motivation for self-improvement (Reverence for Knowledge), technological improvement (Innovation), and process improvement (Structure). It is important to understand that money and the pursuit of wealth has no place in IT's sacred values and belongs in the realm of the profane.

What other evidence can be provided to substantiate the idea of the sacred in the IT occupation? Two questions in the interview protocol had to do with identifying heroes and villains in the career narrative. Heroes are an important part of any cultural group and a group's heroes can provide additional insight into what is meaningful to a group (Hofstede & Hofstede, 20050. Villains, conversely, violate our most deeply held values. The answers to the interview questions were surprising. Several people mentioned that they felt like they should say Bill Gates or Steve Jobs but then went on to say that they were considered *businessmen* and therefore not heroes. Not surprisingly, they would sometimes name a favorite innovator. However, the surprise was in the number of people who favored one very specific type of hero – teachers! The people that members of the IT occupation admire as their heroes are teachers – people who increased their knowledge in meaningful ways. The most common villain in the life narratives of the interviewees were knowledge hoarders who were unwilling to share what they had learned, an act of ultimate transgression.

An additional theme from the qualitative data came from the question "Is your work meaningful to you?" The answers indicated that IT professionals find meaning in helping others, whether internal to the organization or external, to achieve their goals. They are less interested in monetary rewards than in being recognized for their clever solutions to intricate problems. Interestingly, there were several stories given in response to the question that identified *teaching* as the most meaningful work. So teaching is a strong element of the sacred for IT occupational culture.

Let us dig deeper still into the meaning of the sacred for IT occupational culture. Now that we have identified 1) an ideology of three sacred values, 2) a strong sense of meaning in helping others, and 3) heroes who are teachers, we can seek a literary archetype to exemplify these traits. An archetype helps to symbolize a complex array of ideas in an easily presentable fashion. Who in our Western heritage personifies reverence for knowledge, creation and inventiveness, bringing order out of chaos, and a desire to help and to teach humankind? We must reach into our shared mythological past to find an appropriate archetype who embodies all of these traits.

Prometheus, in Greek mythology, is an archetypal figure who represents all of the above attributes. Prometheus is the Titan who steals the sacred knowledge of fire and teaches it to humankind in order to help them fend off the forces of Chaos in the world. Prometheus, whose name means "Far Seer", is the creator and master of technology who also has the arrogance to defy traditional authority coupled with the desire to help and to teach. Will Durant quotes Aeschylus' Greek tragedy *Prometheus Bound* to describe how

"Prometheus hurls defiance to Olympus, and recounts proudly the steps by which he

brought civilization to primitive men, who till then

> Lived like silly ants beneath the ground
> In hollow caves unsunned. There came to them
> No steadfast sign of winter, nor of spring
> Flower-perfumed, nor of summer full of fruit;
> But blindly and lawlessly they did all things,
> Until I taught them how the stars do rise
> And set in mystery, and devised for them
> Number, the inducer of philosophies,
> The synthesis of letters, and besides,
> The artificer of all things, memory
> That sweet muse-mother. I was first to yoke
> The servile beasts…
> And none but I originated ships…
>   And I,
> Who did devise for mortals all these arts,
> Have no device left now to save myself. (Durant, 1939)

Prometheus, of course, is punished by Zeus for his arrogance yet praised for his

knowledge. Using the archetype of Prometheus to represent all that is sacred in IT

occupational culture is a compelling and powerful vision of what is best in us. Let us then

take literary license to identify Reverence for Knowledge, Structure, and Innovation as

the Promethean virtues of IT. Figure 12 shows a famous statue of Prometheus chained to

a rock by the gods as punishment for teaching mankind the secret of fire.

Figure 12. *Prométhée enchaîné* **by Nicolas-Sébastien Adam, (1762)**

Now that a deep understanding of IT occupational culture has been achieved, it is necessary to rise back to the surface and refocus attention on what is of practical importance. How does the sacred/profane perspective help in the understanding of the role of IT in the business world and what new insights can be gained from it?

At a fundamental level, money is profane and knowledge is sacred for IT. This helps explain some of the underlying arrogance or disdain that those outside of IT often see. The sacred/profane view helps to explain why it is so hard for IT people to make the jump into management, because it is not a matter of simply needing to develop a new skillset as is commonly thought, but requires giving up one's sacred values in exchange for a different set of values. This may be the hardest thing for people to do.

The sacred/profane view also helps address the ongoing cultural chasm between IT and the business. Consider what would happen if one cultural group's *sacred* value

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was actually treated as a *profane* value by another cultural group. Is this not what happens when IT people come into contact with business managers? Do business managers not treat technical knowledge as means to an end rather than an end in and of itself? This is the difference between what Rokeach termed a "terminal value" and an "instrumental" value and may be the very crux of the issue for the "cultural chasm" that exists between IT groups and other business groups.

Reverence for Knowledge is the sacred value the binds all the other values together. One cannot be autonomous without knowledge. One cannot bring structure out of chaos without knowledge. Knowledge requires more precision in communication. Knowledge leads to innovation. Finally, learning itself is enjoyable for people in IT. These conceptual relationships are shown in Figure 13.
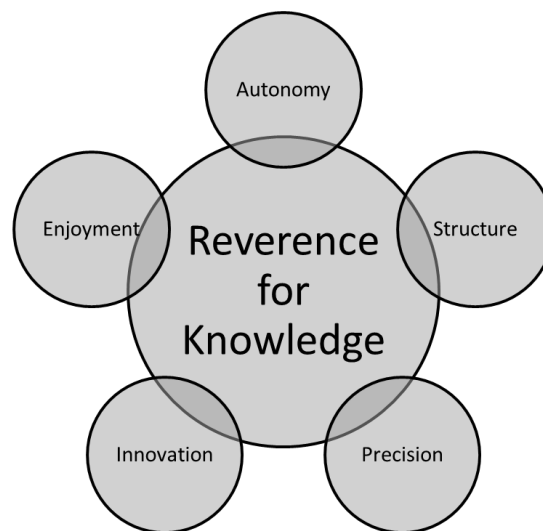
Figure 13 – Relationship of Reverence for Knowledge with other values

The sacred/profane view helps explain the strong aversion that IT people have to "blame" cultures within organizations. Because knowledge is based on experience and not book theory, IT people do not want to be blamed for making mistakes because that is precisely how they learn and improve. This is a lesson important for business managers to internalize.

The sacred/profane view also helps explain what IT people need most from their managers. They need managers that preserve orderliness, who do not abide disorder, who communicate precisely, who empower them to work with freedom and autonomy, who do not blame the mistakes that lead to innovation and allow them to build new creations, who foster an enjoyable environment, and most importantly, who respect and acknowledge their intellectual abilities. If IT people have different values than business managers, then the two groups may be providing what they think the other group values when in fact it is what they themselves value. It helps explain the immense frustration experienced by two occupational groups who do not understand each other well enough.

4.10 Evaluating the Interpretation

Creating a hermeneutic interpretation is a subjective process but it should be more than simply the main researcher's opinion. Richards (2005) discusses five qualities that can add up to sufficiency of interpretive analysis. These include 1) simplicity, 2) elegance of data that hangs together in a logical way, 3) completeness such that the categories of codes reasonably account for the data, 4) robustness in terms of being able to explain new cases of the data, and, finally, 5) making sense when the interpretation or theory is shared

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with the relevant audience. All five criteria have arguably been met in this interpretation as shown in Table 31.

Table 31. Sufficiency of Interpretation

Sufficiency criterion	Evidence
Simplicity	The ASPIRE values
Elegance of data that hangs together	Sacred/profane interpretation adds explanatory elegance to the ASPIRE values
Completeness	Content analysis with code frequency and code co-occurrence
Robustness	Examples provided of how the sacred/profane view better explains IT experiences with management
Making sense	Interpretation was shared with the interviewees and approved.

4.11 Next Steps

The problem of occupational value differences runs deep as evidenced by the above analysis. What is left to understand is how these sacred and profane values can be measured, how they differ from business management values, and how these differences impact overall IT/business alignment. For these next steps, the research shifts from qualitative to quantitative analysis.

CHAPTER V

PART II – MEASURING ITOC

5.1 Part II Research Objectives

The research objective of Part II is to develop an instrument to measure the meaningful values identified in Part I and then test the instrument. The research questions for Part II are: *What are the measurable dimensions of IT occupational culture? Is IT occupational culture significantly different from business management culture and, if so, how?* Only one study has quantitatively examined occupational differences that included the IT profession's organizational culture preferences (Kwantes & Boglarsky, 2004) but did not identify specific occupational values. Other explorations have been qualitative or theoretical (Guzman, 2006; Scholz, 1990; Nord et al., 2007). Part II of this study quantitatively determines areas of difference based on interpreted values that have deep meaning from Part I. The pilot study indicated great homogeneity among IT professionals in their responses, however it is expected that the relative importance of IT occupational values will be significantly different for non-IT business managers. As evidenced by the literature analysis, the gap in our current understanding of IT occupational culture is due to not having a set of measureable scales at the occupational culture level. Therefore the objective of this research is to develop a set of value dimensions at the occupational level of analysis.

There are a large number of dimensions that have been used previously to measure culture at the organizational level (Pliskin et al., 1993; Ashkanasy et al., 2000). However the goal is to identify those dimensions which have *particular* relevance to IT groups as opposed to general organizational relevance where the proposed dimensions could equally apply to other departments such as Accounting or Human Resources. For example, a dimension that may apply to IT occupational culture but equally applies to other occupational cultures as well might be Leadership, defined as "the role of leaders in directing an organization, maintaining its culture, and serving as role models" (Ashkanasy et al., 2000). Hofstede's approach is a good starting point for examining IT occupational culture in that a) it is possible to measure aspects of culture quantitatively and b) it is possible to create a parsimonious number of scales that are useful and pragmatic in describing cultural differences.

5.1.1 Value Dimensions

There were six values of IT occupational culture identified and refined in Part I that form the acronym ASPIRE.

> **Autonomy** = the level to which members of an occupation believe that they should be empowered with access to tools, access to data, and decision-making for the organization.

> **Structure** = the level to which members of an occupation believe that orderliness and definition are needed in the work environment.

Precision = the level to which members of an occupation believe that communication about work tasks must be detailed, accurate, and exact.

Innovation = the level to which members of an occupation believe that technological improvement, novelty, and creativity are valued

Reverence for Knowledge = the level to which members of an occupation believe that intelligence and increasing technical knowledge determine respect and admiration

Enjoyment = the level to which members of an occupation believe that their job should include play, fun, and socializing.

In addition to the ASPIRE values, 10 occupational values for business managers were used from Posner and Schmidt (1996). This set of values has been used in a series of studies every decade for the past 30 years in order to identify changes in business management values over time. These are Organizational effectiveness, High morale, Organizational reputation, Organizational efficiency, High productivity, Organizational stability, Organizational growth, Organizational value to the community, Profit maximization, and Service to the public.

5.1.2 Part II Research Model

These value dimensions comprise Part II of the overall research model. Figure 14 shows an expanded view of this section of the research model.

Business Management
Shared Values
Org effectiveness, Org efficiency,
Org profitability, Org
productivity, Morale,
Org reputation, Stability,
Growth,
Value to community,
Service to public

ITOC Shared
Values
- Autonomy
- Structure
- Precision
- Innovation
- Reverence for Knowledge
- Enjoyment

Occupational
Cultural
Distance
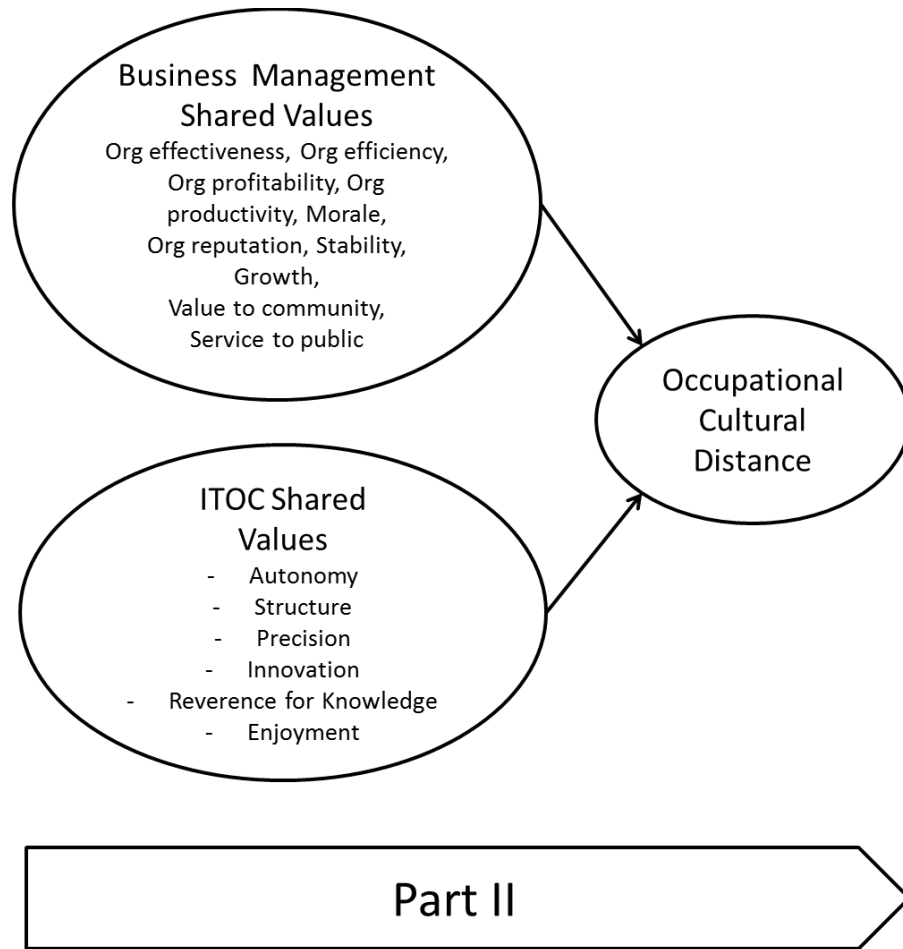
Part II

Figure 14 – Research model for Part II

Because members of an occupation should place greater importance on their own occupational values than those of a different occupation, the following three hypotheses will be tested.

H1: There will be differences in the responses of the two occupational groups.

H2: IT professionals will score the ASPIRE values higher than business managers.

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H3: Business managers will score the business management values higher than IT professionals.

5.2 Part II Methodology

Part II consists of modifications to the survey instrument that was created in the initial pilot using items based on the qualitative interviews of Part I. The instrument also includes previously validated items measuring business management values. Questionnaires are appropriate for cultural studies because they can show differences in answers between groups or categories of respondents. (Hofstede & Hofstede, 2005).

5.2.1 Instrument Creation

The process of creating the survey instrument was similar to other successful dimensional scales such as House et al. (2004) and Smith et al. (1998). Creating the dimensions began with a thorough literature analysis as shown earlier. As stated in Smith et al. (1998), the goal is not to be exhaustive but representative. Smith et al. (1998) identifies three stages of instrument creation and validation. Stage one involves the following three steps: 1) specifying the domain and dimensionality of the constructs of interest based on the literature review, 2) generating a sample of items based on literature, interviews with professionals, and previously validated instruments, and 3) assessing the content validity. Content validity refers to how consistent and representative the items are with the domain on the scale construct (Smith et al., 1996; Straub, 1989). Stage two includes the steps of administering the instrument and then conducting exploratory factor

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analysis on the results. Stage three assesses the internal validity and reliability and may include confirmatory factor analysis. The stages and steps are summarized in Table 32.

Table 32. Summary of Instrument Creation Steps

Stage One	Step 1	Specify the domain
	Step 2	Generate items
	Step 3	Assess content validity
Stage Two	Step 1	Administer instrument
	Step 2	Exploratory factor analysis
Stage Three	Step 1	Assess internal validity Confirmatory factor analysis
	Step 2	Assess reliability

5.2.2 Stage One

Step 1 of stage one, specifying the domain, was addressed through the thorough literature review on culture studies in IS as well as cultural sociology. Step 2 of stage one, generate items, was addressed through both the literature review and the use of interviews with IT professionals in Part I resulting in the ASPIRE values. Each survey item was based on the results of the interviews and the content analysis from Part I. Items measuring business management values from previously validated instruments (Posner & Schmidt, 1992; Posner, 2010) were also added to the instrument. Demographics captured included gender, age, level of education, years of work experience, and job title. Respondents were also asked to identify their role as either 1) "IT employee (non-management)", 2) "non-IT business manager" or 3) "Other" with the option to list their specific role. The complete items from the final instrument are in Appendix D.

The instrument itself was created and hosted in Qualtrics in order to gather responses electronically. The occupational values questions were randomized by Qualtrics such that each respondent would be presented with the questions in a different order. A screenshot of the Qualtrics survey is shown in Figure 9. A Likert scale is one of the most common formats in surveys (DeVellis, 1991) and the instrument used 7-point Likert scales for each item.
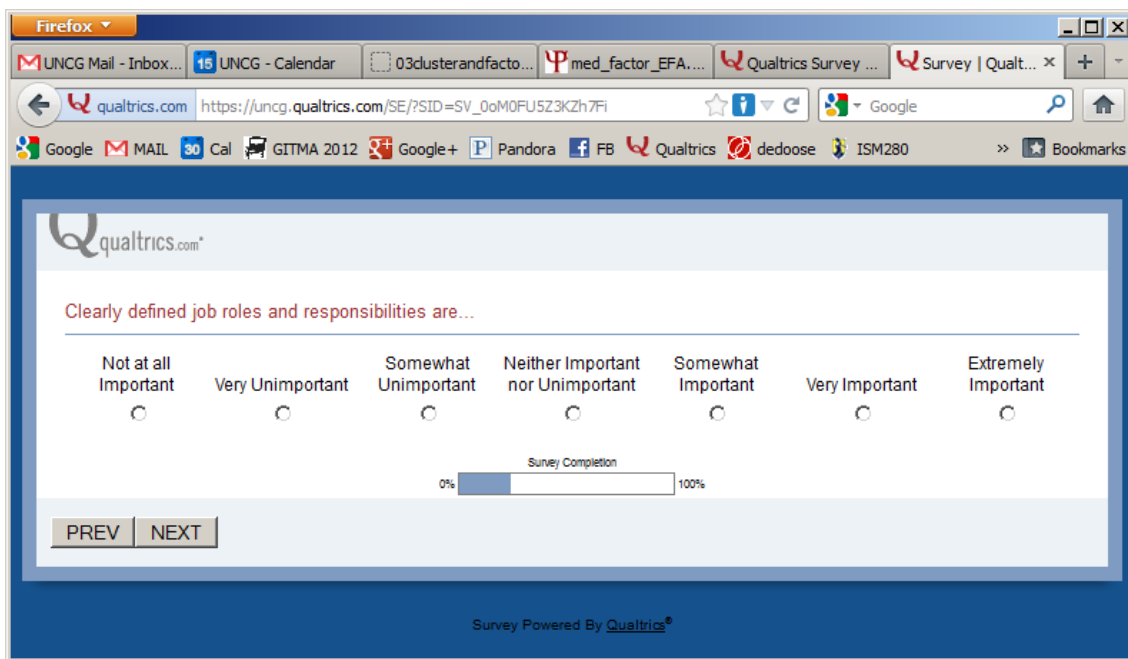
Figure 15 – Qualtrics Screenshot

Content validity in step 3 of stage one was specifically addressed by following a Q-Sort method to rank the items and discarding items that were ranked low. Because the survey items did change from the original pilot items, a new Q-Sort was performed with five PhD students. The students were given a stack of 70 index cards with a survey item

on each card. They were also given seven labeled envelopes in which to place the cards: six envelopes for the six ASPIRE values, plus one envelope for "Unsure". They were asked to complete three distinct steps in the Q-Sort process: 1) Read the definition on each envelope. These corresponded to the definitions of the six ASPIRE values and served as the "condition of instruction" in a typical Q-Sort (McKeown & Thomas, 1988). 2) Assign each index card one at a time to one of the six envelopes or the seventh "Unsure" envelope. And 3) after assigning all the cards to envelopes, take each envelope and stack the cards in order by how strong a link there is between the item and the definition. The results were tallied in Excel with points assigned to the rank order. The highest ranked items across all the participants were kept as valid items to use in the survey instrument and the lowest ranked items, or items consistently misfiled, were discarded.

Before beginning Stage Two, a final pre-test was also performed. The electronic survey was sent to PhD students to ensure again that items were well-worded and unambiguous and that the mechanics of the online survey worked without technical difficulty. DeVellis (1991) cautions that good survey items should not be exceptionally lengthy, have a high reading difficulty level, or include double barreled items. None of the items were negatively worded in order to avoid reversing the items during the analysis.

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5.2.3 Stage Two

Stage two of instrument creation involved administering the instrument to a sample of IT personnel and business managers. A new IRB approval was obtained for this part of the research prior to collecting any data (IRB# 12-0012 dated 1/24/2012. See Appendix F). The IRB office asked that participants be allowed to skip the demographic questions if they chose and this change was made in Qualtrics.

Because Part II uses the same sample as Part III which is at the organizational level of analysis, companies had to be approached to participate in the survey. The objective was to obtain 5 to 10 IT professionals and 5 to 10 non-IT business managers from at least 30 organizations. These organizations needed to be from different industries and include different sizes, but generally needed to be medium to large in order to have enough IT personnel for the study. CIOs and CEOs were approached ahead of time to request their organization's participation in the study. Contacts at organizations were obtained through 1) personal contacts and Linked-In connections, 2) three different Advisory Boards within the Bryan School of Business, and 3) the Lexis-Nexis database of company information in the U.S. Organizations were sent an introductory letter explaining the purpose of the study, requesting their participation, and offering two forms of incentive: an individual incentive for gift card drawings and an executive incentive to share a high level report of the results benchmarking their firm with others.

The executives for each firm had many questions about the study that had to be answered before they would agree to participate. Some wanted to see the questions ahead of time in order to preview, some wanted the gift card incentive removed as an option

due to their company's policy, some wanted the option to receive a copy of the results removed from the survey, some wanted reassurance of confidentiality of the respondents and/or the company name, and one even requested an in-person presentation to their SVP, CIO, and VP of Human Resources. Every attempt was made to accommodate executives' requests to make them comfortable with the process without changing any content in the surveys. Once approval was given to participate, a survey link was sent for distribution. A unique survey link was created in Qualtrics for each company in order to ensure companies were grouped together correctly for Part III. In three cases, the companies provided a list of email addresses and these were used to create "panels" in Qualtrics for automated distribution and reminders which worked well. In all other cases, the executives did not provide email addresses but rather forwarded the survey link that was provided to their staff internally. Verbiage was provided to each executive to include with the survey link. After the survey link was sent, the researcher stayed in close communication with the executive to follow-up on participation levels for their firm and request reminders when necessary.

The first five participating firms were treated as a pilot group. The survey asked an open-ended question about any problems with the survey. There were no negative comments about either the mechanics or the wording, so no changes were made to survey after the pilot. Late in the data collection process, one large firm experienced difficulty in accessing the Qualtrics site with a "server not responding" error message, but they were able to take the survey later after this intermittent problem cleared up. The Qualtrics site remembered their stored answers and they were able to pick up where they left off.

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The next step in Stage Two was conducting Exploratory Factor Analysis (EFA) after all the data had been collected. The intent of factor analysis is to reduce the number of variables and discover the latent constructs that best explain the variance (Rencher, 2002; Cooper & Schindler, 2003). In exploratory factor analysis, every variable loads on every factor without any constraint on which item goes with which factor (Cooper & Schindler, 2003). EFA can help determine if *a priori* dimensions (in this case, the ASPIRE values) should be kept, or if some new dimensions emerge, or if of the dimensions converge so they may be combined (Smith et al., 1996). Note that Confirmatory Factor Analysis was done later in Stage 3. EFA analysis is done with principal-axis factoring in SPSS (Bryman & Cramer, 2001). The results of the EFA are in the Results section below.

5.2.4 Stage Three

Stage three assessed reliability and construct validity of the latent variables as described in the Results section below. Confirmatory Factor Analysis was performed using SAS software to constrain the items to load on the factors identified in the Exploratory Factor Analysis from Stage Two. All responses from all three groups (IT employees, non-IT business managers, and Other) were combined in order to examine the reliability of the instrument items. Cronbach alphas were calculated in SPSS and reported for each latent variable. High Cronbach alphas show the degree of correlation between items and they should be high (over .70) when measuring the same construct (Straub, 1989). Part of the process of purifying the measures is to drop items that may not be

loading on their constructs well in the factor analysis and recalculating the Cronbach alphas (Churchill, 1979).

Construct validity is demonstrated by the correct items loading on the same constructs indicating that the instrument is measuring the right things. High discriminant validity is shown when none of the items are cross-loading on the wrong latent variables and that the dimensions are well-defined and separate from each other. The reliability results and the factor analysis provide evidence to answer the first research question of Part II of what are the measurable dimensions of IT occupational culture.

5.2.5 Norms

In addition to the three stages of scale creation activities, the instrument was used to look at potential norms (Churchill, 1979). The presence of different norms will provide evidence to answer the second research question: Is IT occupational culture significantly different from business management culture and, if so, how? The anticipated norms are reflected in the three hypotheses:

H1: There will be differences in the responses of the two occupational groups.

H2: IT professionals will score the ASPIRE values higher than business managers.

H3: Business managers will score the business management values higher than IT professionals.

The collected data was divided into two groups. Group 1 included IT employees who were not managers and Group 2 included business managers who were not in IT. Note

that the third group "Other" was not used in this part of the analysis. These were mostly IT managers, and thus a hybrid of two occupational groups. Statistical means comparison was done to compare the responses of the IT professionals from all the organizations with the responses of the business managers from all the organizations because the unit of analysis in Part II is the occupational group level.

5.3 Part II Results

5.3.1 Sample Size

Preliminary emails were sent to organizations to determine if they were interested in participating. Two hundred were personal contacts, 30 were from Bryan School Advisory Boards at the University of North Carolina at Greensboro, and 29,310 were from the Lexis-Nexis database of businesses. Of these, 125 expressed initial interest and requested more information. It should be noted that over 50 additional organizations indicated interest but either have outsourced their IT function or had less than the minimum of five IT personnel in their company. A total of 47 organizations agreed to participate in the survey and only then were they sent the survey link. Of the 47 organizations, 38 returned surveys for a response rate of 80%. A response rate over 50% is adequate but over 70% is considered very good (Babbie, 2007).

A total of 582 surveys were submitted into the Qualtrics system. Surveys with missing responses were eliminated resulting in a total of 495 useable surveys. The participation breakdown was as follows. Group 1 of the IT employees totaled 242 in number. Group 2 of the non-IT business managers totaled 197 in number. Group 3 of the

"other" role, typically IT managers and directors, totaled 56 in number. Groups 1, 2, and 3 were combined for the purposes of the factor analysis for the first research question. Groups 1 and 2 were compared for the purposes of the analysis of variance for the second research question. A table showing all the participating organizations and the initial source of contact is shown in the Part III Results that focuses on the organizational level of analysis.

5.3.2 Nonresponse Bias

Nonresponse bias refers to measurement error that can be potentially introduced into a survey-based study where respondents self-select to participate, particularly if the respondents are systematically different from the population of interest (Fowler, 2002). Even though several studies suggest that nonresponse rates do not *necessarily* change survey estimates (Groves, 2006), it is still an important concern to address. The best way to reduce nonresponse bias is to reduce nonresponse (Armstrong & Overton, 1977). In order to reduce nonresponse, incentives were provided by way of gift card drawings and executive summaries to participants, as well as reminders sent out at regular intervals once an organization had agreed to participate. It is important to note that in addition to the incentives, in most cases a sponsoring executive for the participating organization sent the survey request internally which should have added additional motivation to take part in the survey, even for those employees who would otherwise be unwilling to participate.

Nonresponse bias is also mitigated by showing variance in the respondents which is shown under Demographics below for Part II and Part III such that important groups in the population are not excluded. There was variance in gender, age, education, and years of experience for Part II and company size, industry type, and region of the U.S. for Part III. Another way to address nonresponse bias is to compare the results with an external source of verifiable data with the goal of demonstrating that the participants are representative of the population (Groves, 2006). While there is no firm data on the demographics of the "average IT worker", it may help to compare one demographic of gender. The percentage of female IT employees participating in this study was 33% in an industry typically disproportionately dominated by males. Compared to an industry average of 25% females in computing fields (www.ncwit.org), this may be deemed representative of the population. While polling nonrespondents would be the most effective means of determining nonresponse bias, this was not practical due to time constraints.

5.3.3 Demographics

The characteristics of all 495 respondents including both the IT group and the business manager group are shown in Figures 16, 17, 18, and 19.
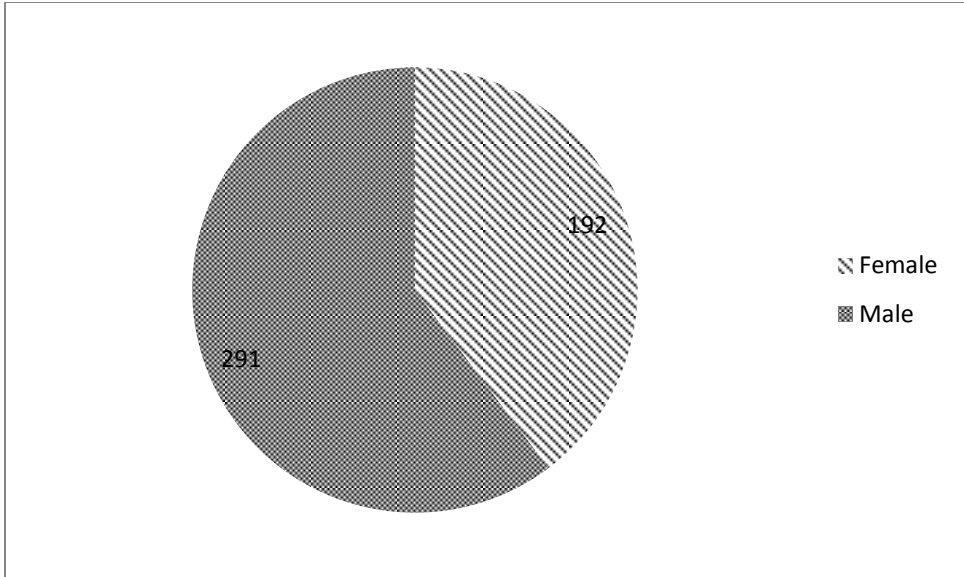
Figure 16 – Demographics by Gender
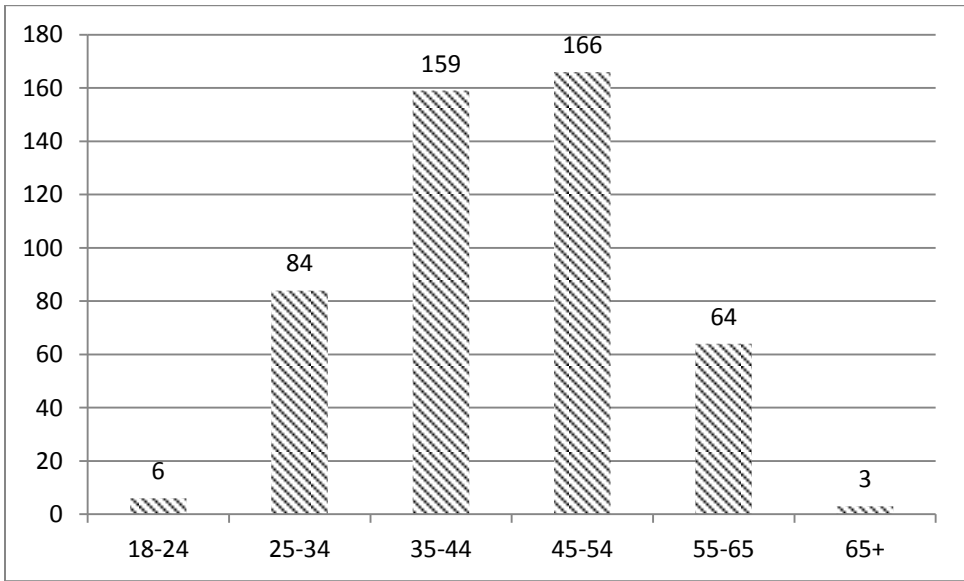
Figure 17 – Demographics by Age Group
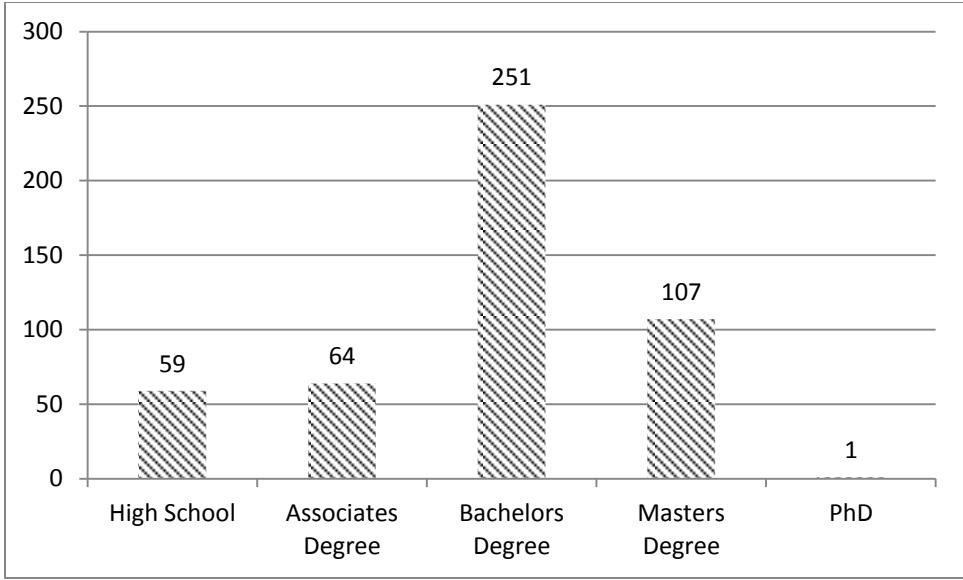
Figure 18 – Demographics by Education
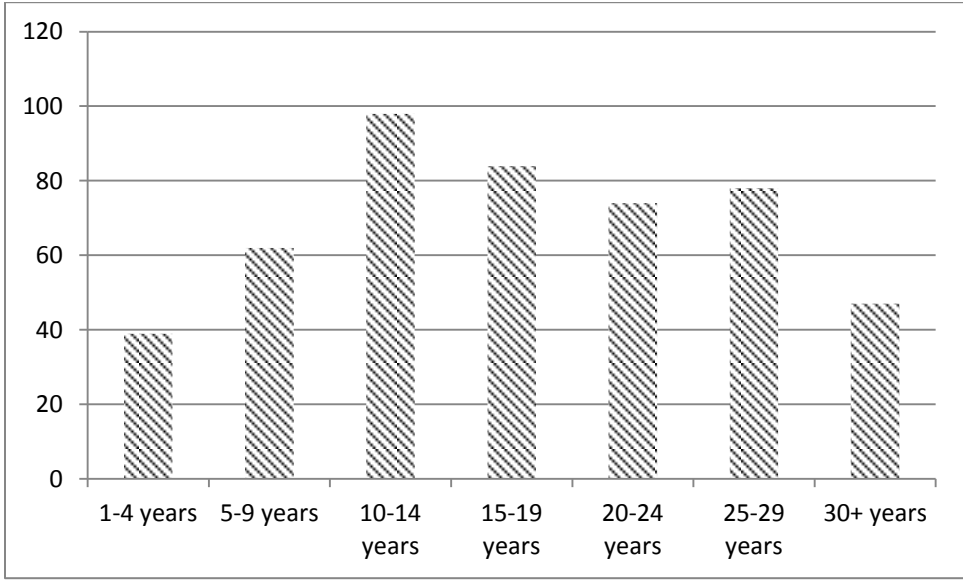
Figure 19 – Demographics by Years of Work Experience

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5.3.4 Construct Validity and Reliability

All responses from all three groups were combined in order to do the factor analysis. Exploratory factor analysis was performed in SPSS v16 to see if the survey items were loading on the appropriate six latent variables in the ASPIRE model. Descriptive statistics with means and standard deviations for all the survey items are shown in Table 33.

Table 33. Descriptive statistics of all items

Descriptive Statistics (n=480)	Mean	Std. Deviation
AUT_bureacracy	5.61	0.93
AUT_freedom	5.90	0.78
AUT_flatter	5.04	1.01
AUT_empower	5.73	0.90
AUT_access	5.22	1.09
STR_standard	5.49	1.04
STR_sticking	4.86	1.19
STR_defined	5.71	1.07
STR_enforce	5.49	0.94
STR_order	5.49	0.89
STR_time	5.85	0.83
PRE_detail	4.52	1.22
PRE_words	5.44	0.98
PRE_precomm	6.03	0.74
PRE_specific	5.88	0.88
PRE_timeline	5.80	0.89
INN_bleed	4.69	1.16
INN_embrace	5.87	0.81
INN_clever	5.48	0.95
INN_creativity	5.68	0.75
INN_better	6.16	0.70

REV_prob	6.06	0.79
REV_crit	6.37	0.67
REV_respect	5.41	1.04
REV_Int	5.30	1.05
REV_learn	5.41	0.91
REV_motivat	5.98	0.73
ENJ_fun	5.47	0.89
ENJ_laugh	5.25	1.00
ENJ_humor	5.67	0.88
ENJ_lunch	4.27	1.20
ENJ_variety	5.39	0.86

The Kaiser-Mayer-Olkin (KMO) test of sample adequacy was .84 where >.9 is
marvelous, >.8 is meritorious, >.7 is middling, and >.6 is mediocre. Bartlett's Test of
Sphericity had an Approximate Chi-Square of 3831.516 with 496 degrees of freedom at a
significance of 0.000. A significance value < .05 shows that the data does not produce an
identity matrix and that the dataset is approximately multivariate normal and therefore
suitable for factor analysis. The complete correlation matrix is shown in Table 34.

Table 34. Correlation Matrix with all items

	AUT_bureacracy	AUT_freedom	AUT_flatter	AUT_empower	AUT_access	STR_standard	STR_sticking	STR_defined	STR_enforce	STR_order	STR_time	PRE_words	PRE_precomm	PRE_timeline	PRE_specific	PRE_detail
AUT_bureacracy	1.00															
AUT_freedom	0.26	1.00														
AUT_flatter	0.34	0.18	1.00													
AUT_empower	0.31	0.36	0.24	1.00												
AUT_access	0.05	0.17	0.11	0.15	1.00											
STR_standard	-0.01	0.02	0.07	-0.02	0.09	1.00										
STR_sticking	0.07	0.05	0.07	0.12	0.01	0.29	1.00									
STR_defined	0.14	0.06	0.10	0.17	0.04	0.35	0.24	1.00								
STR_enforce	0.04	0.05	0.02	-0.02	0.00	0.42	0.19	0.34	1.00							
STR_order	0.06	0.17	0.09	0.11	0.05	0.28	0.22	0.37	0.41	1.00						
STR_time	0.18	0.20	0.12	0.17	0.14	0.30	0.27	0.33	0.22	0.31	1.00					
PRE_words	0.09	0.08	0.13	0.03	0.16	0.25	0.18	0.30	0.31	0.35	0.26	1.00				
PRE_precomm	0.13	0.15	0.10	0.12	0.12	0.16	0.16	0.35	0.25	0.37	0.26	0.42	1.00			
PRE_timeline	0.08	0.09	0.09	0.09	0.13	0.30	0.28	0.41	0.32	0.36	0.25	0.28	0.36	1.00		
PRE_specific	0.15	0.14	0.17	0.13	0.16	0.25	0.23	0.40	0.19	0.31	0.25	0.28	0.35	0.45	1.00	
PRE_detail	0.03	0.08	0.10	0.02	0.29	0.16	0.16	0.08	0.14	0.16	0.11	0.21	0.17	0.22	0.19	1.00
INN_bleed	0.01	0.15	0.13	0.13	0.16	0.23	0.10	0.19	0.13	0.30	0.19	0.24	0.17	0.22	0.24	0.26
INN_embrace	0.15	0.24	0.11	0.23	0.17	0.20	0.09	0.23	0.21	0.29	0.16	0.16	0.22	0.20	0.20	0.16
INN_clever	0.07	0.26	0.08	0.14	0.16	0.11	0.05	0.18	0.24	0.24	0.15	0.18	0.24	0.18	0.14	0.22
INN_creativity	0.12	0.31	0.14	0.26	0.19	0.03	0.06	0.15	0.16	0.24	0.12	0.23	0.25	0.21	0.15	0.13
INN_better	0.21	0.34	0.14	0.29	0.13	0.00	0.01	0.13	0.17	0.17	0.14	0.13	0.27	0.15	0.16	0.00
REV_respect	0.01	0.10	0.08	0.07	0.13	0.07	0.02	0.11	0.17	0.26	0.11	0.12	0.07	0.13	0.15	0.22
REV_Int	0.04	0.10	0.03	0.03	0.14	0.10	0.04	0.10	0.16	0.23	0.11	0.21	0.05	0.13	0.11	0.23
REV_learn	0.04	0.21	0.17	0.21	0.09	0.22	0.10	0.22	0.16	0.24	0.11	0.18	0.17	0.11	0.17	0.21
REV_crit	0.09	0.21	0.02	0.20	0.20	0.14	0.00	0.06	0.17	0.21	0.14	0.13	0.25	0.13	0.11	0.00
REV_motivat	0.02	0.25	0.04	0.19	0.15	0.15	0.05	0.12	0.16	0.25	0.21	0.16	0.20	0.16	0.19	0.11
REV_prob	-0.03	0.09	0.00	0.00	0.20	0.16	0.12	0.03	0.19	0.18	0.20	0.17	0.16	0.16	0.05	0.17
ENJ_fun	0.19	0.33	0.16	0.35	0.08	0.01	0.09	0.25	0.04	0.10	0.24	0.13	0.12	0.09	0.15	0.01
ENJ_laugh	0.12	0.23	0.10	0.24	0.06	0.00	0.07	0.12	-0.02	0.05	0.13	0.12	0.03	0.07	0.11	0.03
ENJ_humor	0.10	0.31	0.08	0.25	0.10	0.03	0.10	0.14	0.00	0.12	0.15	0.10	0.09	0.05	0.12	-0.03
ENJ_lunch	-0.02	0.07	0.10	0.10	0.05	0.00	0.10	0.13	-0.03	0.04	0.12	0.21	0.03	0.08	0.09	0.04
ENJ_variety	0.15	0.29	0.09	0.27	0.09	0.09	0.02	0.09	0.04	0.14	0.11	0.15	0.13	0.11	0.13	0.03

Table 34 (Continued). Correlation Matrix with all items

	INN_bleed	INN_embrace	INN_clever	INN_creativity	INN_better	REV_respect	REV_Int	REV_learn	REV_crit	REV_motivat	REV_prob	ENJ_fun	ENJ_laugh	ENJ_humor	ENJ_lunch	ENJ_variety
AUT_bureacracy																
AUT_freedom																
AUT_flatter																
AUT_empower																
AUT_access																
STR_standard																
STR_sticking																
STR_defined																
STR_enforce																
STR_order																
STR_time																
PRE_words																
PRE_precomm																
PRE_timeline																
PRE_specific																
PRE_detail																
INN_bleed	1.00															
INN_embrace	0.46	1.00														
INN_clever	0.32	0.35	1.00													
INN_creativity	0.19	0.27	0.34	1.00												
INN_better	0.14	0.27	0.36	0.35	1.00											
REV_respect	0.21	0.14	0.26	0.20	0.04	1.00										
REV_Int	0.18	0.12	0.26	0.15	0.07	0.62	1.00									
REV_learn	0.36	0.26	0.30	0.26	0.26	0.16	0.08	1.00								
REV_crit	0.05	0.15	0.19	0.29	0.33	0.15	0.14	0.17	1.00							
REV_motivat	0.22	0.23	0.21	0.27	0.31	0.13	0.10	0.42	0.29	1.00						
REV_prob	0.14	0.16	0.15	0.17	0.10	0.15	0.18	0.13	0.23	0.19	1.00					
ENJ_fun	0.19	0.16	0.21	0.23	0.20	0.04	-0.01	0.22	0.10	0.12	0.02	1.00				
ENJ_laugh	0.15	0.12	0.09	0.16	0.06	0.05	0.02	0.10	0.00	-0.02	0.02	0.52	1.00			
ENJ_humor	0.06	0.19	0.14	0.22	0.14	0.02	0.00	0.14	0.13	0.14	0.08	0.50	0.52	1.00		
ENJ_lunch	0.14	0.06	0.12	0.14	0.05	0.04	0.01	0.12	0.01	0.12	0.04	0.32	0.34	0.21	1.00	
ENJ_variety	0.14	0.07	0.15	0.19	0.23	0.11	0.09	0.20	0.08	0.22	-0.03	0.31	0.21	0.25	0.12	1.00

The correlation matrix gave an early indication that Structure and Precision were cross-loading on each other. The initial EFA rotated factor matrix found 9 factors shown in Table 35.

Table 35. Initial EFA rotated factor matrix

Factor Score Coefficient Matrix									
	Factor								
	1	2	3	4	5	6	7	8	9
AUT_bureacracy	0.018	-0.082	-0.019	0.007	0.408	-0.025	-0.113	-0.021	0.033
AUT_freedom	-0.065	0.027	0.114	0.008	0.156	0.004	0.004	0.020	0.066
AUT_flatter	0.009	-0.027	-0.074	-0.004	0.198	-0.004	0.025	0.054	-0.028
AUT_empower	-0.042	0.015	0.035	-0.010	0.253	-0.030	0.056	-0.017	0.056
AUT_access	-0.038	-0.001	0.043	-0.027	0.039	-0.034	-0.032	0.334	0.011
STR_standard	0.151	-0.037	-0.083	-0.030	-0.015	-0.018	0.101	0.004	0.410
STR_sticking	0.094	0.017	-0.066	-0.027	0.030	-0.041	-0.002	0.044	0.100
STR_defined	0.235	0.022	-0.083	-0.007	0.028	0.010	-0.005	-0.192	-0.041
STR_enforce	0.140	-0.054	0.085	0.035	-0.092	0.056	-0.074	-0.149	0.146
STR_order	0.144	-0.014	0.051	0.047	-0.045	0.028	-0.008	-0.108	0.017
STR_time	0.087	0.019	0.004	-0.017	0.052	-0.070	-0.025	0.059	0.146
PRE_detail	0.020	-0.031	-0.103	0.010	0.025	0.046	0.022	0.295	-0.043
PRE_words	0.135	0.045	0.001	0.000	-0.064	-0.051	-0.009	0.089	-0.135
PRE_precomm	0.200	-0.036	0.145	-0.073	-0.038	-0.043	-0.099	0.049	-0.261
PRE_specific	0.158	-0.017	-0.074	-0.022	0.088	-0.060	0.034	0.048	-0.120
PRE_timeline	0.184	-0.017	-0.018	-0.020	0.006	-0.038	-0.038	0.053	-0.072
INN_bleed	-0.011	0.003	-0.161	-0.012	-0.020	0.345	0.129	0.094	-0.048
INN_embrace	-0.045	-0.034	0.034	-0.066	0.032	0.456	-0.149	-0.010	0.092
INN_clever	-0.025	0.010	0.085	0.039	-0.049	0.194	-0.027	-0.019	-0.078
INN_creativity	-0.011	0.029	0.155	0.009	-0.016	0.030	-0.013	0.043	-0.099
INN_better	-0.027	-0.051	0.274	-0.037	0.075	0.056	0.020	-0.109	-0.108
REV_prob	-0.004	0.009	0.113	-0.014	-0.101	-0.017	-0.074	0.194	0.153
REV_crit	-0.022	-0.023	0.275	-0.009	-0.044	-0.090	-0.034	0.045	0.089
REV_respect	-0.036	0.002	-0.035	0.496	0.022	-0.033	0.041	-0.046	-0.021
REV_lnt	-0.018	-0.010	0.005	0.454	0.005	-0.049	-0.074	0.028	0.020
REV_learn	-0.037	-0.013	-0.032	-0.014	-0.004	0.081	0.413	-0.026	0.007
REV_motivat	-0.021	-0.006	0.150	-0.034	-0.065	-0.105	0.345	0.034	0.048
ENJ_fun	0.000	0.313	-0.017	-0.003	0.039	-0.018	0.037	-0.088	0.001
ENJ_laugh	-0.011	0.404	-0.098	0.018	-0.061	0.026	-0.129	0.032	0.011
ENJ_humor	-0.026	0.248	0.089	-0.014	-0.055	-0.029	-0.077	-0.016	0.117
ENJ_lunch	0.025	0.125	-0.050	-0.008	-0.070	-0.033	0.072	0.053	-0.091
ENJ_variety	-0.006	0.051	0.015	0.028	0.053	-0.063	0.121	-0.052	-0.043
Extraction Method: Principal Axis Factoring. Rotation Method: Varimax with Kaiser Normalization.									

Items with loadings under .4 were dropped one at a time in order to purify the instrument as per Churchill (1979) and Nunnally (1978) until there was a solution with high loadings of items on the appropriate constructs and low cross-loadings on other constructs. The refined exploratory factor analysis with the lowest items eliminated showed only five factors, not six as predicted by the ASPIRE model in Part 1.   The rotated factor matrix clearly showed that structure and precision were loading on each other. The decision was made to allow Structure and Precision to be represented as a single factor representing one underlying latent variable (to be interpreted in the Discussion below). This may indicate that the instrument itself will need further adjustment in the future in order to effectively separate Structure from Precision. The updated rotated factor matrix with five factors is shown in Table 36. While two of the Autonomy items did correlate highly with Innovation items, the decision was made to keep them with their respective constructs.

Table 36. Refined Rotated Factor Matrix

Rotated Factor Matrix					
	Factor				
	1	2	3	4	5
AUT_bureacracy	0.08	0.04	0.11	-0.01	**0.62**
AUT_flatter	0.11	0.07	0.06	0.04	**0.45**
AUT_empower	0.02	0.25	0.30	0.00	**0.47**
AUT_freedom	0.01	0.24	0.45	0.05	**0.33**
STR_defined	**0.62**	0.16	0.04	0.02	0.12
STR_enforce	**0.50**	-0.07	0.19	0.11	-0.09
STR_order	**0.57**	0.03	0.22	0.19	0.01
PRE_words	**0.52**	0.12	0.11	0.10	0.00
PRE_precomm	**0.57**	0.01	0.25	-0.05	0.08
PRE_specific	**0.56**	0.09	0.02	0.05	0.22
PRE_timeline	**0.62**	0.03	0.07	0.05	0.08
INN_clever	0.21	0.10	**0.56**	0.22	-0.03
INN_creativity	0.20	0.17	**0.48**	0.12	0.11
INN_better	0.14	0.02	**0.60**	-0.05	0.21
INN_embrace	0.26	0.10	**0.40**	0.08	0.12
REV_respect	0.14	0.02	0.10	**0.79**	0.03
REV_Int	0.14	-0.02	0.11	**0.74**	0.01
ENJ_fun	0.09	**0.68**	0.20	-0.04	0.21
ENJ_laugh	0.02	**0.76**	0.03	0.03	0.11
ENJ_humor	0.04	**0.63**	0.20	-0.02	0.10
ENJ_lunch	0.10	**0.43**	0.02	0.02	-0.02

Reliability scores were measured using Cronbach alphas and are shown in Table 37.

Internal consistency or reliability refers to the homogeneity of the items that comprise a

scale and should correlate well with each other if they share a common latent variable

(DeVellis, 1991). Cronbach alpha scores of .90 are considered excellent, .80 are good, .70

are reasonable and .6 are questionable. While the reliability of the Autonomy items was

lower than would be desired, the weight of evidence from Part I that the items are

connected helps justify what might be considered a suspicious number otherwise.

Cronbach alphas above .60 have been treated as acceptable, as in other social science

research (Henseler et al., 2009).

Table 37. Reliability scores

Latent Variable	Cronbach Alpha
Autonomy	0.61
Structure/Precision	0.78
Innovation	0.66
Reverence for Knowledge	0.76
Enjoyment	0.71

The last step of stage 3 of scale development was to do a full Confirmatory Factor

Analysis (CFA). Unlike exploratory factor analysis where the items are allowed to load

on any factor and the number of factors in unconstrained, in CFA the items are forced to

load on their respective factor and the number of factors is constrained. An initial CFA of

all the items on the original six factors showed the same issues of Structure and Precision

loading on each other with the same items needing to be eliminated. Because the number

of factors in the exploratory factor analysis revealed five factors, the CFA model was

constrained to the same five factors. SAS version 9.3 was used for the CFA. The factor

loadings are shown in Table 38.

Table 38. CFA factor loadings

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
AUT_bureacracy	0.448				
AUT_freedom	0.634				
AUT_flatter	0.366				
AUT_empower	0.617				
STR_defined		0.615			
STR_enforce		0.518			
STR_order		0.632			
PRE_words		0.546			
PRE_precomm		0.600			
PRE_specific		0.566			
PRE_timeline		0.617			
INN_embrace			0.532		
INN_clever			0.591		
INN_creativity			0.589		
INN_better			0.567		
REV_respect				0.794	
REV_Int				0.777	
ENJ_fun					0.759
ENJ_laugh					0.708
ENJ_humor					0.677
ENJ_lunch					0.400

Except for one Autonomy item, the loadings were above the generally accepted cutoff of

0.4 (Hulland, 1999). Cronbach alpha scores for reliability were calculated again in SAS

with the same results as reported for the EFA in SPSS.

There are several measures of goodness of fit for evaluating the degree of

correspondence between concepts and their respective item measures (Smith et al., 1996).

The overall adequacy of fit tests in SAS showed a GFI (Goodness-of-Fit Index) of .931,

an RMSR (Root Mean Square Residual) of .049 and an RMSEA of .047. There are no

hard-and-fast rules for GFI cutoffs, but greater than .90 is generally acceptable (Hatcher,

1994). On the other hand, both the RMSR and RMSEA goodness of fit tests were under

the generally accepted cutoff of 0.05 (Kline, 2005), which indicates that the five factor

model shows good adequacy of fit.

Convergent validity refers to the degree to which multiple measures of a

construct agree with each other (Campbell & Fiske, 1959). Convergent validity can be

demonstrated by examining the t values of the factor loadings (Smith et al., 1996;

Hatcher, 1994) to see if they are significant. If all t tests are significant, then this shows

that all the indicators are effectively measuring the same construct (Anderson & Gerbing,

1988). Table 39 shows that all t values for the factor loadings are above the critical value

of 3.29 for p=0.001 (Hatcher, 1994).

Table 39. t values for convergent validity

AUT_bureacracy	9.68
AUT_freedom	15.66
AUT_flatter	7.51
AUT_empower	15.09
STR_defined	17.59
STR_enforce	13.16
STR_order	18.51
PRE_words	14.30
PRE_precomm	16.85
PRE_specific	15.20
PRE_timeline	17.70
INN_embrace	12.78
INN_clever	15.04

INN_creativity	14.94
INN_better	14.11
REV_respect	13.37
REV_Int	13.26
ENJ_fun	25.00
ENJ_laugh	22.07
ENJ_humor	20.39
ENJ_lunch	8.97

Discriminant validity refers to the degree to which measures of different constructs are distinct from each other (Campbell & Fiske, 1959). One way to determine discriminant validity is to examine the correlation table and count the number of violations where a violation is an item loading higher on another construct other than the one intended. Table 40 shows the correlation table for the final survey items with a violation count at the bottom and on the left. Only fifteen out of 210 possible correlations were higher for items measuring a different variable. Because the total number of correlations is above the generally accepted cutoff of 50% (Doll & Torkzadeh, 1988), there is evidence of reasonable discriminant validity.

Table 40. Correlations for discriminant validity

	Viola tion count	AUT _bure acrac y	AUT _free dom	AUT _flatt er	AUT _emp ower	STR_ define d	STR_ enfor ce	STR_ order	PRE_ words	PRE_ preco mm	PRE_ specif ic
AUT _bure acrac y	0	1.000									
AUT _free dom	0	0.263	1.000								

AUT_flatter	**0**	0.330	0.198	1.000						
AUT_empower	**0**	0.303	0.371	0.229	1.000					
STR_defined	**0**	0.135	0.059	0.088	0.142	1.000				
STR_enforce	**0**	0.012	0.047	-0.004	-0.022	0.299	1.000			
STR_order	**0**	0.044	0.160	0.090	0.113	0.363	0.409	1.000		
PRE_words	**0**	0.087	0.087	0.117	0.014	0.285	0.319	0.338	1.000	
PRE_precomm	**0**	0.144	0.143	0.124	0.106	0.324	0.233	0.351	0.450	1.000
PRE_specific	**0**	0.130	0.164	0.152	0.087	0.383	0.164	0.273	0.282	0.360	1.000
PRE_timeline	**0**	0.062	0.066	0.105	0.102	0.406	0.292	0.342	0.311	0.346	0.461
INN_embrace	**0**	0.157	**0.244**	0.119	0.270	0.244	**0.221**	**0.309**	0.170	0.240	0.212
INN_clever	**0**	0.062	**0.278**	0.112	0.158	0.197	**0.220**	0.245	0.209	0.241	0.150
INN_creativity	**3**	0.126	**0.295**	0.194	**0.256**	0.154	0.139	**0.252**	**0.237**	0.240	0.130
INN_better	**2**	0.179	**0.328**	0.150	**0.313**	0.142	0.172	0.186	0.153	**0.284**	0.208
REV_respect	**0**	-0.017	0.091	0.077	0.039	0.133	0.171	0.271	0.141	0.082	0.164
REV_Int	**0**	0.044	0.103	0.032	0.027	0.127	0.155	0.218	0.198	0.064	0.135
ENJ_fun	**0**	0.186	**0.315**	0.123	0.333	0.262	0.043	0.080	0.140	0.094	0.185
ENJ_laugh	**0**	0.127	**0.209**	0.091	0.215	0.128	-0.021	0.063	0.127	0.041	0.118
ENJ_humor	**0**	0.113	**0.287**	0.061	0.245	0.124	0.024	0.129	0.101	0.082	0.115

	Violation count	PRE_timeline	INN_embrace	INN_clever	INN_creativity	INN_better	REV_respect	REV_Int	ENJ_fun	ENJ_laugh	ENJ_humor
ENJ_lunch	**0**	-0.021	0.036	0.098	0.061	0.166	-0.016	0.073	0.227	0.061	0.119
Violation count		**0**	**7**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**0**

Table 40. Correlations for discriminant validity (continued)

	Violation count	PRE_timeline	INN_embrace	INN_clever	INN_creativity	INN_better	REV_respect	REV_Int	ENJ_fun	ENJ_laugh	ENJ_humor
PRE_timeline	**0**	1.000									
INN_embrace	**0**	0.205	1.000								
INN_clever	**0**	0.175	0.336	1.000							
INN_creativity	**3**	0.200	0.226	0.301	1.000						
INN_better	**2**	0.184	0.280	0.371	0.383	1.000					
REV_respect	**0**	0.133	0.156	0.178	0.180	0.007	1.000				
REV_Int	**0**	0.127	0.151	0.205	0.106	0.079	0.605	1.000			
ENJ_fun	**0**	0.119	0.140	0.201	0.245	0.206	0.025	0.027	1.000		
ENJ_laugh	**0**	0.088	0.100	0.065	0.120	0.075	0.057	0.044	0.510	1.000	
ENJ_humor	**0**	0.062	0.180	0.168	0.229	0.163	0.005	0.038	0.491	0.494	1.000
ENJ_lunch	**0**	0.118	0.047	0.117	0.133	0.065	0.031	0.019	0.320	0.297	0.189
Violation count		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Discriminant validity can also be demonstrated by a confidence interval test (Anderson & Gerbing, 1988). If a confidence interval of plus or minus two standard errors around the correlation between two different factors does not include 1.0, then discriminant validity has been effectively demonstrated (Hatcher, 1994). Because one correlation, between Factor 4 and Factor 5, does include 1.0 in its confidence interval as shown in Table 41, there may be a significant correlation in this relationship. However, since Factor 4 is Reverence for Knowledge and Factor 5 is Enjoyment, the theoretical discrimination between the two constructs should be reasonably clear. Yet it is an interesting result that these two factors may be correlated. All of the other pairs of correlations show good discriminant validity.

**Table 41. Standardized correlations between variables**

Standardized Results for Correlations Among Exogenous Variables						lower boundary of confidence interval	upper boundary of confidence interval
Var1	Var2	Parameter	Estimate	Standard Error	t Value		
F1	F2	COVF1F2	0.308	0.061	5.053	0.186	0.430
F1	F3	COVF1F3	0.680	0.053	12.617	0.572	0.788
F1	F4	COVF1F4	0.146	0.065	2.247	0.016	0.276
F1	F5	COVF1F5	0.580	0.052	11.103	0.476	0.685
F2	F3	COVF2F3	0.583	0.049	11.812	0.484	0.681

F2	F4	COVF2F4	0.313	0.054	5.729		
						0.203	0.422
F2	F5	COVF2F5	0.238	0.056	4.256		
						0.126	0.350
F3	F4	COVF3F4	0.351	0.059	5.935		
						0.233	0.470
F3	F5	COVF3F5	0.397	0.057	6.914		
						0.282	0.512
F4	F5	COVF4F5	0.040	0.059	0.688		
						-0.077	0.159

These results offer an answer to the first research question in terms of what are the measureable values of ITOC. Five factors, namely Autonomy, Structure/Precision, Innovation, Reverence for Knowledge, and Enjoyment, are measureable with good construct validity and acceptable reliability and these are the ones used in the remaining analysis.

5.3.5 Norms

The final step of analysis in Part II is to look at potential norms (Churchill, 1979). An index was created for each of the five latent variables using a sum of the items. In order to visually inspect for normality, histograms were created for each latent variable. Histograms are a common method of checking visually for a normal distribution curve shape. Figures 20 through 24 show the histograms for the five latent variables.
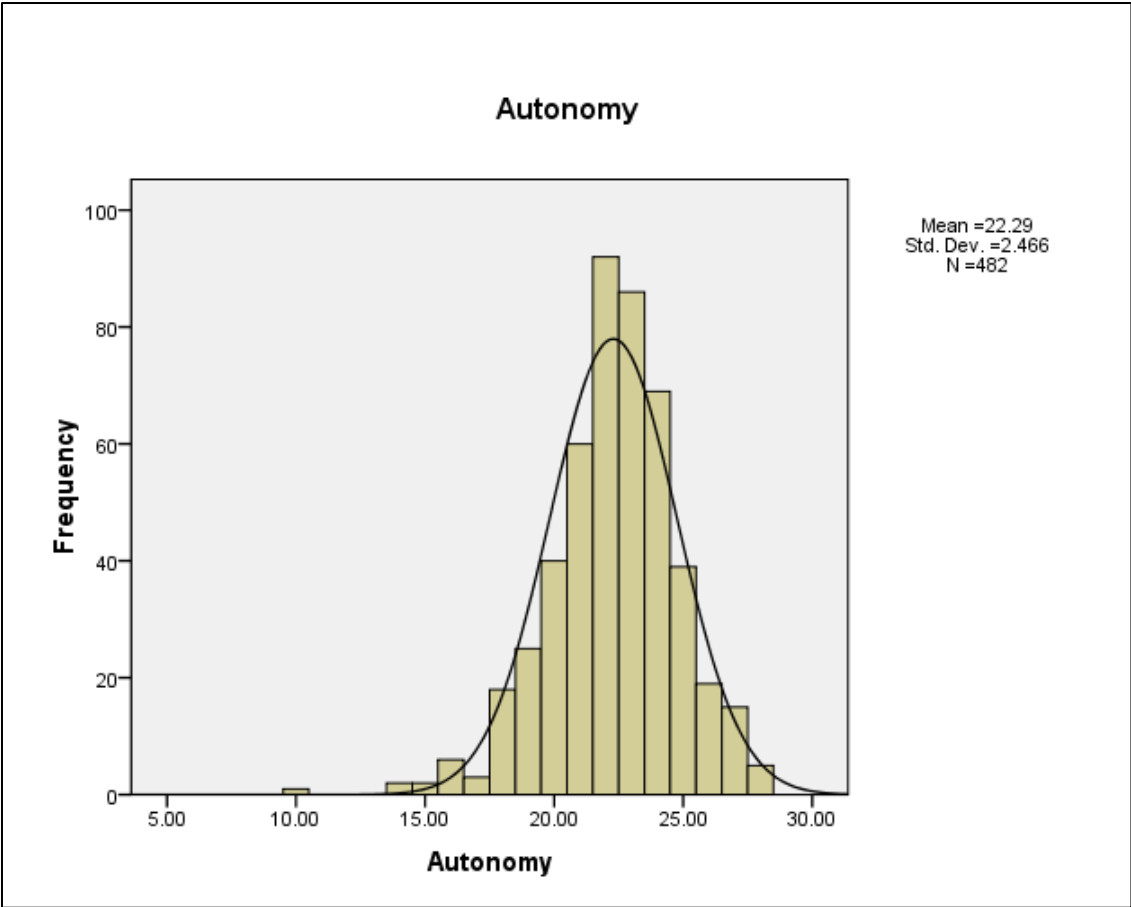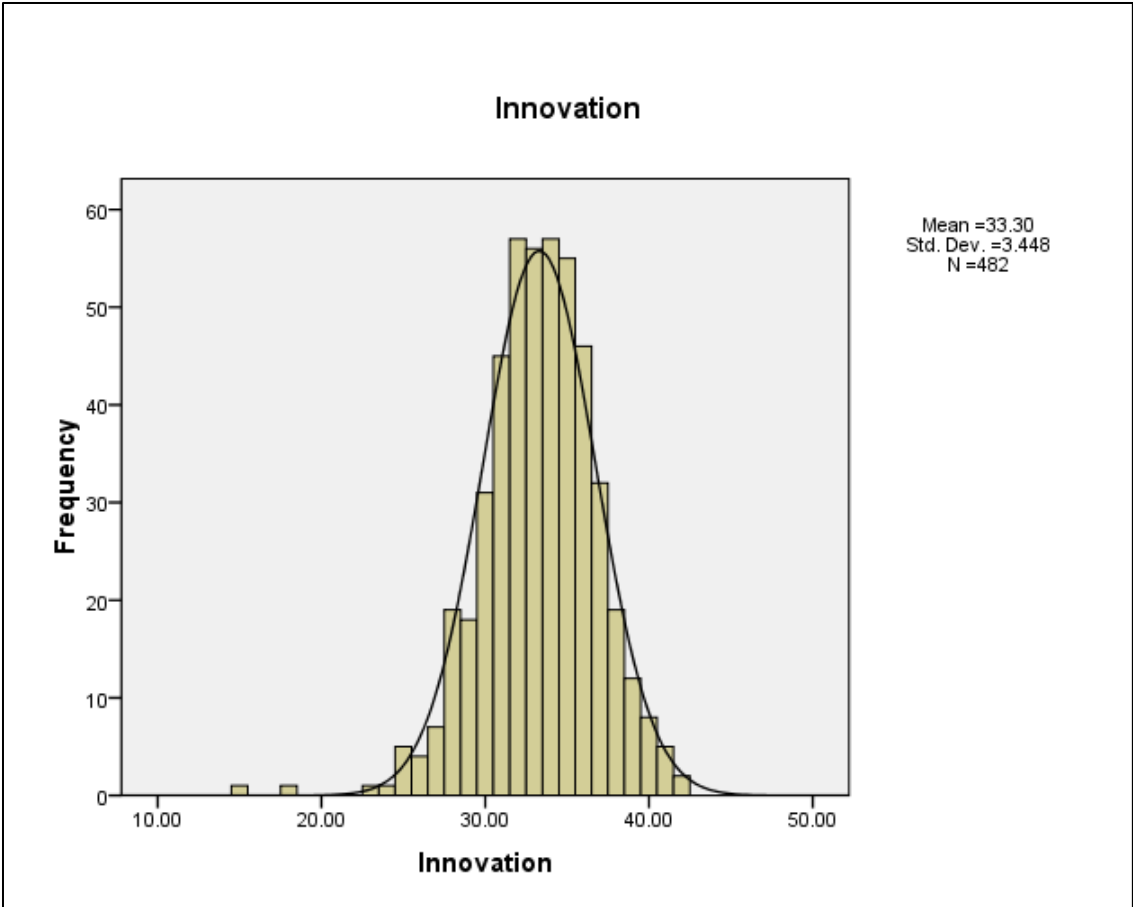
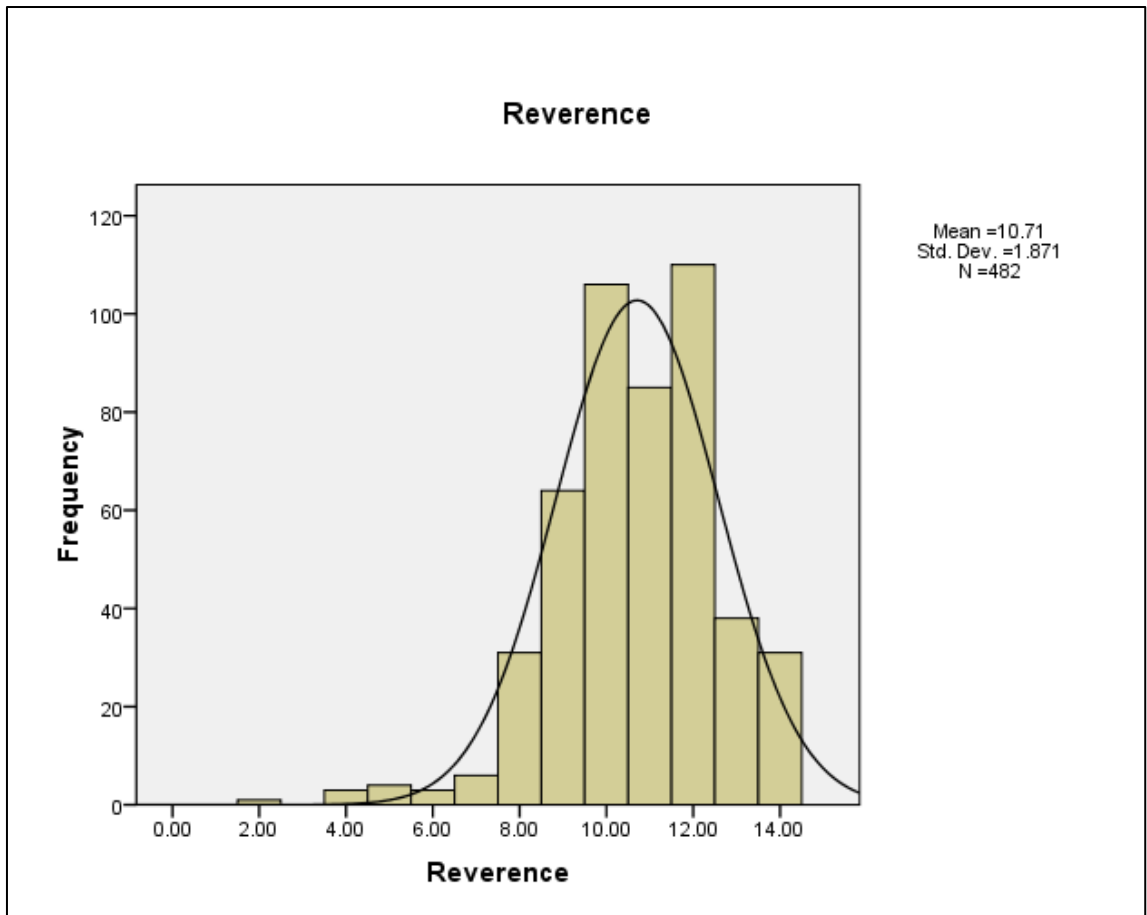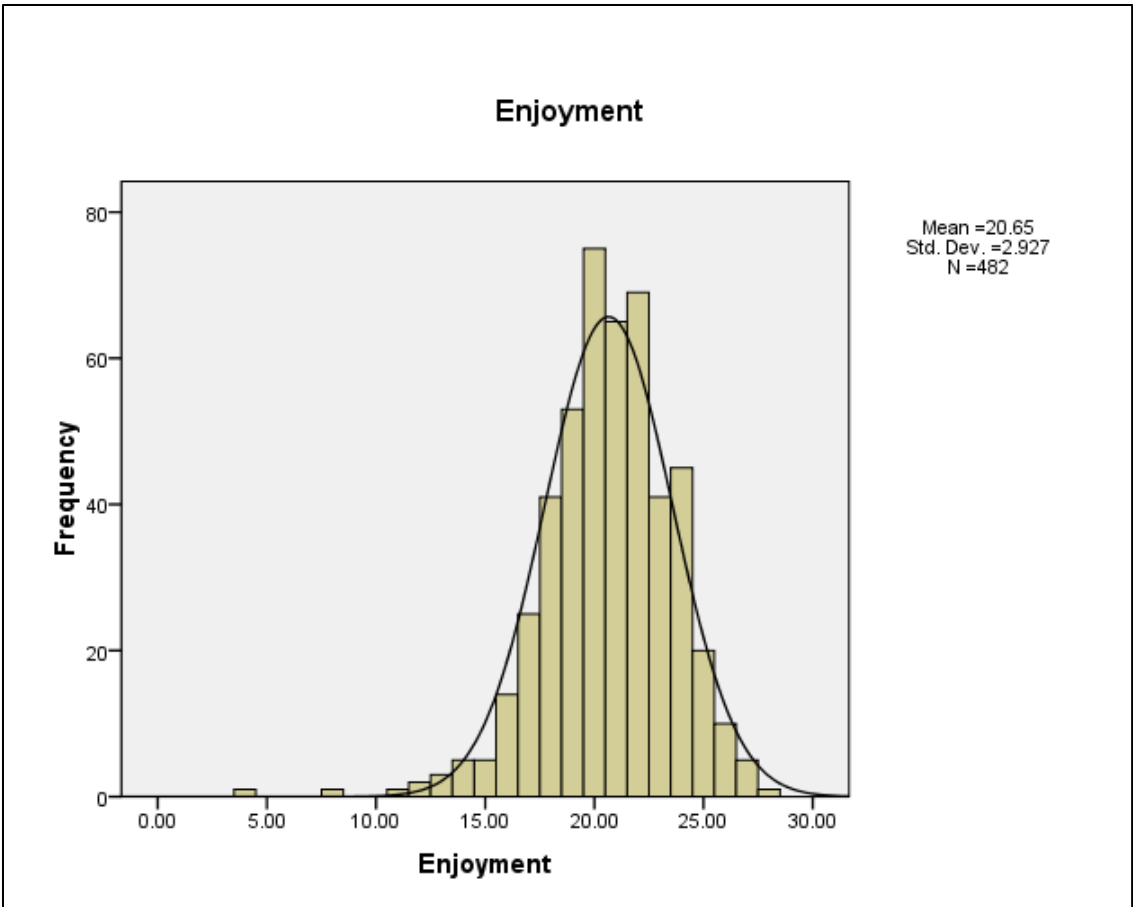**Figure 20 – Normality histogram for Autonomy**
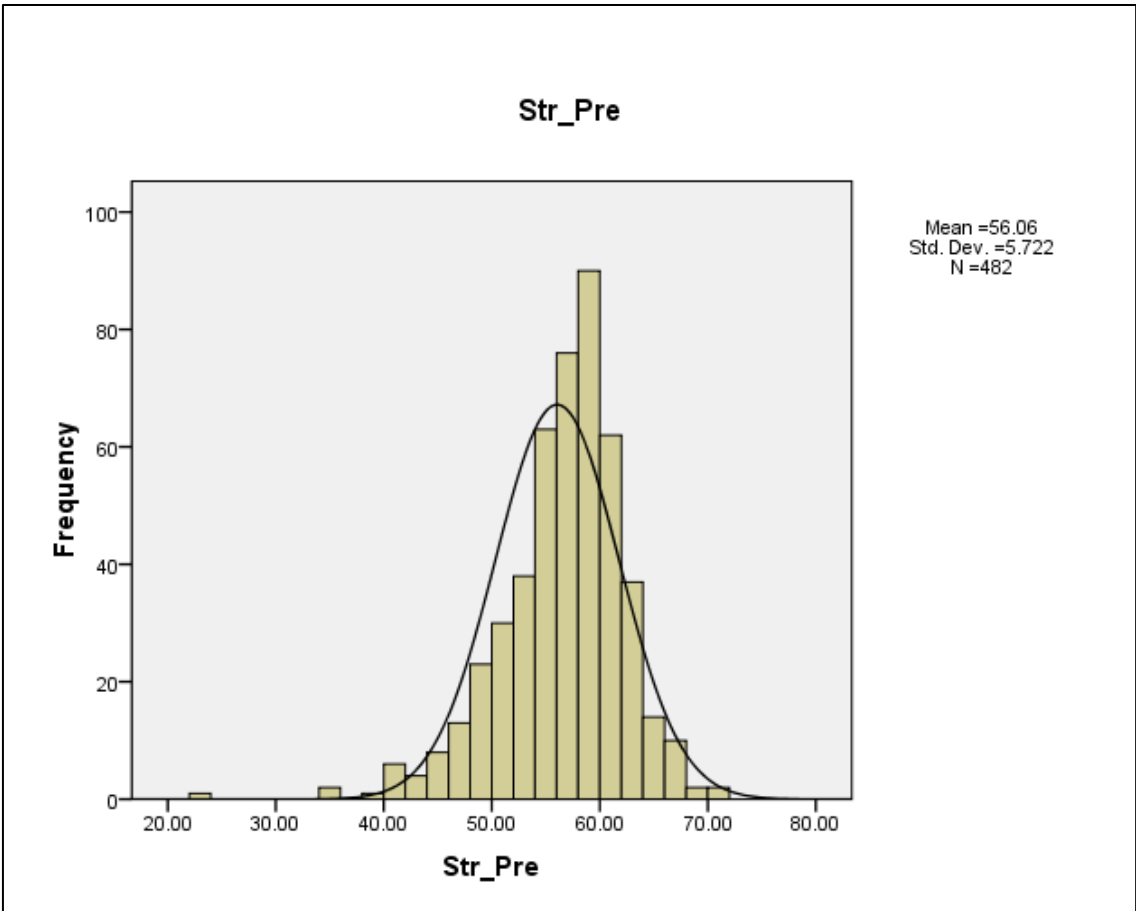
Figure 21 – Normality histogram for Structure/Precision

Figure 22 – Normality histogram for Innovation

Figure 23 – Normality histogram for Reverence for Knowledge

Figure 24 – Normality histogram for Enjoyment

All five variables showed good normality and the results of the descriptive statistics are

shown in Table 42. Normality allows for parametric tests of interval scales.

Table 42. Descriptive statistics for all values

Descriptive Statistics N=482						
		Minimum	Maximum	Mean	Std. Deviation	Variance
BUS_effective		1	7	5.948	0.867	0.751
BUS_morale		1	7	6.076	0.879	0.773
BUS_reputation		1	7	5.840	0.985	0.970

BUS_efficiency		1	7	5.991	0.833	0.694
BUS_productivity		1	7	6.024	0.817	0.668
BUS_stability		1	7	5.977	0.944	0.891
BUS_growth		1	7	5.715	1.019	1.039
BUS_community		1	7	5.419	1.170	1.370
BUS_profit		1	7	5.651	1.142	1.304
BUS_service		1	7	5.381	1.253	1.571
Innovation		15	42	33.300	3.447	11.886
Autonomy		10	28	22.294	2.465	6.079
Str_Pre		22	70	56.056	5.721	32.739
Reverence		2	14	10.707	1.870	3.500
Enjoyment		4	28	20.651	2.927	8.568

A MANOVA analysis (multivariate analysis of variance) can show if there are significant differences when there are multiple independent variables and multiple dependent variables (Bryman & Cramer, 2001). A MANOVA was run in SPSS to determine if there were significant differences between the IT employee responses and the non-IT manager responses, once for the ITOC values and once for the business management values. The results are shown in Table 43 and Table 44.

Table 43. MANOVA results for ITOC values

Multivariate Tests						
Effect		**Value**	**F**	**Hypothesis df**	**Error df**	**Sig.**
Intercept	Pillai's Trace	0.995	14031.704	5	386	0
	Wilks' Lambda	0.005	14031.704	5	386	0
	Hotelling's Trace	181.758	14031.704	5	386	0
	Roy's Largest Root	181.758	14031.704	5	386	0
new_role_code	Pillai's Trace	0.059	4.852	5	386	0.0003
	Wilks' Lambda	0.941	4.852	5	386	0.0003
	Hotelling's Trace	0.063	4.852	5	386	0.0003
	Roy's Largest Root	0.063	4.852	5	386	0.0003

Table 44. MANOVA results for business management values

Multivariate Tests		Value	F	Hypothesis df	Error df	Sig.
Effect		**Value**	**F**	**Hypothesis df**	**Error df**	**Sig.**
Intercept	Pillai's Trace	0.988	3020.679	10	381	0
	Wilks' Lambda	0.012	3020.679	10	381	0
	Hotelling's Trace	79.283	3020.679	10	381	0
	Roy's Largest Root	79.283	3020.679	10	381	0
new_role_code	Pillai's Trace	0.071	2.909	10	381	0.002
	Wilks' Lambda	0.929	2.909	10	381	0.002
	Hotelling's Trace	0.076	2.909	10	381	0.002
	Roy's Largest Root	0.076	2.909	10	381	0.002

The results indicated that there was indeed an overall significant difference ($p<0.00$) between the two groups. Additional tests were done to determine which specific dimensions were significantly different.

A t-test is a common way of comparing the means of two unrelated groups with normal distributions to see if the means are significantly different or not (Bryman & Cramer, 2001). The two groups, the IT employees in Group 1 and the business managers in Group 2, were compared using t-tests in SPSS to see if there were any significant differences between the occupational groups. The initial group statistics and independent samples tests showed no differences except for Autonomy which the business managers scored higher.

When the data was examined to see why there were no differences between the two occupational groups, it was discovered that many of the respondents in Group 1 who had self-identified as IT were, in fact, IT managers who had should have been coded

"Other". Similarly, many of the respondents in Group 2 who had self-identified as non-IT business managers had IT-related job titles. This confounded the distinction between the two groups. The data was reclassified in order to ensure that respondents were in the correct groups based on their job title. Tables 45 and 46 show a clearer picture of two distinct occupational groups.

Table 45. Differences in IT occupational values

Group Statistics					
	new_role_code	N	Mean	Std. Deviation	Std. Error Mean
Autonomy	1	189	22.084	2.379	0.173
	2	203	22.522	2.494	0.175
Str_Pre	1	189	56.513	5.159	0.375
	2	203	55.389	5.956	0.418
Innovation	1	189	33.693	3.078	0.223
	2	203	32.625	3.648	0.256
Reverence	1	189	10.904	1.653	0.120
	2	203	10.418	2.023	0.142
Enjoyment	1	189	20.656	2.860	0.208
	2	203	20.586	2.872	0.201

Table 46. Significance of differences in IT occupational values

	t-test for Equality of Means	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Innovation	3.119	390	0.002	1.068	0.342	0.395	1.740
Autonomy	-1.774	390	0.077	-0.438	0.247	-0.922	0.047
Structure/Precision	1.991	390	0.047	1.124	0.565	0.014	2.234
Reverence	2.592	390	0.010	0.486	0.187	0.117	0.855
Enjoyment	0.241	390	0.810	0.070	0.290	-0.500	0.640

The results of the means comparison show that three values, Structure/Precision, Innovation, and Reverence for Knowledge were significantly different, while Autonomy and Enjoyment showed no significant differences. So there is partial support for Hypothesis 1 with regards to three of the five variables being significantly different between occupational groups. Because Structure/Precision, Innovation, and Reverence for Knowledge were all significantly higher for the IT employees than the business managers, there is partial support for Hypothesis 2 that the IT employees would rank the ASPIRE values higher. For Hypothesis 3, responses between the same two reclassified groups were compared on business management values. The results are shown in Tables 47 and 48.

Table 47. Differences in business management values

Group Statistics					
	new_role_code	N	Mean	Std. Deviation	Std. Error Mean
BUS_effective	1	189	5.735	0.907	0.066
	2	203	6.084	0.837	0.059
BUS_morale	1	189	5.942	0.876	0.064
	2	203	6.182	0.868	0.061
BUS_reputation	1	189	5.640	1.035	0.075
	2	203	6.015	0.936	0.066
BUS_efficiency	1	189	5.868	0.892	0.065
	2	203	6.084	0.825	0.058
BUS_productivity	1	189	5.937	0.776	0.056
	2	203	6.094	0.899	0.063
BUS_stability	1	189	5.952	1.007	0.073
	2	203	6.039	0.927	0.065
BUS_growth	1	189	5.656	1.012	0.074
	2	203	5.754	1.057	0.074
BUS_community	1	189	5.339	1.149	0.084
	2	203	5.517	1.140	0.080
BUS_profit	1	189	5.471	1.218	0.089
	2	203	5.847	1.104	0.077
BUS_service	1	189	5.333	1.296	0.094
	2	203	5.478	1.175	0.082

Table 48. Significance of differences in business management values

	t-test for Equality of Means	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
BUS_effective	-3.953	390	0.000	-0.348	0.088	-0.522	-0.175
BUS_morale	-2.728	390	0.007	-0.240	0.088	-0.414	-0.067
BUS_reputation	-3.762	390	0.000	-0.375	0.100	-0.570	-0.179
BUS_efficiency	-2.490	390	0.013	-0.216	0.087	-0.387	-

							0.045
BUS_productivity	-1.846	390	0.066	-0.157	0.085	-0.324	0.010
BUS_stability	-0.891	390	0.374	-0.087	0.098	-0.279	0.105
BUS_growth	-0.932	390	0.352	-0.098	0.105	-0.303	0.108
BUS_community	-1.544	390	0.123	-0.179	0.116	-0.406	0.049
BUS_profit	-3.208	390	0.001	-0.376	0.117	-0.607	-0.146
BUS_service	-1.158	390	0.248	-0.144	0.125	-0.390	0.101

The business managers scored all ten business values higher, and 5 out of the 10 values were significantly higher. These included Organizational Effectiveness, Organizational Morale, Organizational Reputation, Organizational Efficiency, and Organizational Profitability. Therefore, there is fairly strong support for Hypothesis 3 that business managers will score business values higher than IT employees.

5.3.6 Discussion

The finding that the occupational values of Structure and Precision correlated highly is not entirely surprising for two reasons. First, as was shown in the interviews, all of the IT occupational values are interconnected and therefore a certain amount of statistical correlation is to be expected. Second, there is an intuitive sense that the values of Structure and Precision will correlate. A strong preference for precision in communication is perhaps related to a kind of precision in action that reflects Structure. This does not invalidate the findings of Part I that Structure and Precision are separate areas because the qualitative evidence separating the two is still strong. Further refinement of the instrument may be necessary. But clearly the five-factor model showed better construct validity than the original six-factor model when analyzed. It is possible to

speculate that given the high correlation there is a higher order factor that is driving both occupational values. Perhaps it is an overarching need for rationality or understandability that influences both.

Another troublesome area was in the low reliability in some variables, especially the Autonomy variable. Given that the reliabilities from the pilot instrument were so high, this was a surprise. This result may have been due to the fact that the questions in the pilot were not randomized, i.e., all of the Enjoyment questions were asked on the same page. In the full study, all of the questions were fully randomized which may have driven reliability downwards. Future improvements in the instrument will help with the reliability of the Autonomy measurement.

One might make the objection that everybody obviously wants Autonomy at work and therefore this is not an important aspect of occupational culture. However, there are several answers to this. First, it is a matter of degree. The IT professionals continually came back to the idea of wanting less bureaucracy and more freedom at work in the Part I interviews. This is not to say that Autonomy is not important for other occupations, but it seems especially important for IT employees. Second, if managers readily understood the importance of autonomy in the workplace then why is micromanaging still such a frequent and vehement complaint of IT employees? Despite the low statistical reliability, there is still ample evidence that this is a core value for the IT occupation.

Overall, the results successfully demonstrated differences in values between the two occupations. What is remarkable about the results is that the three IT variables with significant differences were Reverence for Knowledge, Structure, and Innovation. Recall

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that these three were identified in Part I as the sacred values of IT and labeled as the Promethean virtues. The Part II results, therefore, lent unexpected weight to the interpretation in Part I. In light of the sacred/profane interpretation in Part I, it is not surprising that significant differences in the profane values of Autonomy and Enjoyment were not found between the two occupational groups.

With regard to the differences in business management values between the two groups, it was certainly expected that business managers would rank these higher. The specific values of Organizational effectiveness, Morale, Organizational reputation, Organizational efficiency, and Organizational profitability that were shown to be significantly different provide some guidance on the important areas where IT employees and business managers diverge. While it would be ideal to have an explanatory theory that explained why these particular business management values were significantly different, it is nonetheless helpful for practitioners to have a predictive model that indicates what areas to focus on first. This is more helpful than the familiar platitude of "IT needs to understand the business better" because there are specific areas that should be considered further based on the Part II results.

In general, if business managers care about organizational success more than IT employees do, this can potentially lead to a mismatch of priorities ultimately resulting in poor IT/Business alignment and poor organizational outcomes. Similarly, if business managers do not understand what is truly important for IT personnel, i.e., the Promethean virtues, then this can exacerbate the cultural gap between the two occupational groups

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and further impede alignment. Measuring this occupational cultural distance and its

impact on organizational outcomes is addressed fully in Part III.

CHAPTER VI

PART III – IMPACT OF ITOC

6.1 Part III Research Objective

The research objective of Part III was to ascertain the impact of IT occupational culture on organizational outcomes. Specifically, the outcome of IT/Business alignment is an issue that has relevance to IT occupational culture but this relationship has not been empirically demonstrated in the literature yet.

Based on the literature above, Part III asks the research question: *What is the impact of occupational culture differences on IT/business alignment and IT value?*

6.1.1 Independent Variable: Occupational Cultural Distance

The independent variable is not just occupational culture itself, but *differences* in occupational culture. These differences can be examined by comparing responses to the value statements in Part II between IT professionals and business managers for different organizations. The differences in mean responses along each dimension can be aggregated into a single cultural distance number. Where Kogut & Singh (1988) and Sarala (2010) used aggregated distance for national culture, to date this has not been done for occupational culture. Based on Leidner & Kayworth's (2006) Theory of IT-Culture Conflict, the more that values differ between two groups, the more cultural conflict will result. This study proposes that, based on the cultural antecedents of alignment (Reich &

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Benbasat, 2000; Farrell, 2003; Chan & Reich, 2007) and the Theory of IT-Culture

Conflict (Leidner& Kayworth, 2006), that as the distance between two occupational

cultures increases, the level of IT/Business alignment within an organization will

decrease. As values become more out of alignment, so too should actual alignment

deteriorate. Therefore, the relationship between cultural distance and IT/Business

alignment should be negative. Leidner & Kayworth (2006) say explicitly that there is

very little research devoted to examining the role of culture and its impact on achieving

IT/Business alignment. This study proposes to reframe the discussion of IT/Business

alignment in a novel way, previously unexamined in the literature.

>*H1: Occupational cultural distance will have a negative relationship with*
>
>*IT/Business alignment.*

6.1.2 Independent Variable: IT Organizational structure

For comparison purposes, the study will also include a more traditional antecedent

of IT/Business Alignment: IT organizational structure. Organizational structure of IT is a

common factor examined in the alignment literature in terms of whether the IT group is

1) centralized, 2) decentralized or 3) federated (Chan & Reich, 2007; Luftman, 2000;

Papp & Brier, 1999; Pankratz, 1991). Federated IT organizational structures tend to be

highly correlated with higher IT/Business Alignment maturity (Luftman & Ben-Zvi,

2010). A highly centralized IT organizational structure is characterized by co-located

infrastructure and application support, typically in a corporate headquarters. A highly

decentralized IT organizational structure is characterized by infrastructure and

application support being distributed to separate geographic locations, typically to different business units. Finally, a federated IT organizational structure is a combination of centralized and decentralized such that the infrastructure is centralized but application support is decentralized. There is a relationship between IT organizational structure and alignment in that organizations with a federated IT have shown significantly higher alignment than those with highly centralized or decentralized structures (Luftman & Kempaiah, 2007). Therefore, it is expected that federated IT organizations will show higher perceived levels of IT/Business Alignment, confirming past findings.

> *H2: Federated organizational structures will have a positive relationship with IT/Business alignment.*

6.1.3 Mediating Variable: IT/Business Alignment

IT/Business Alignment typically refers to the level of fit between the IT strategy and the business strategy (Tallon, 2007/2008) where strategy includes the mission, objectives, and plans for the organization (Reich & Benbasat 1996). The strategic necessity of having IT closely aligned with the business has been a top concern for business and IT executives (Luftman & Kempaiah, 2008; Luftman & Ben-Zvi, 2010) because the greater the alignment, the greater the business value from IT in terms of firm performance (Tallon, 2007/2008; Chan et al., 2006). Furthermore, alignment between the firm's strategy, organizational structure, and information technology is the key to competing successfully on a global level (Pankratz, 1991). Because IT/Business alignment leads to increased profits for an organization and is significantly correlated

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with perceived business performance (Chan & Reich, 2007), IT/Business Alignment

mediates the relationship between Occupational Cultural Distance and IT Value.

6.1.4 Dependent Variable: IT Value

As indicated above, it has previously been shown that IT Value increases when

IT/Business Alignment increases based on Tallon (2007/2008) and Luftman (2000).

"Whilst managers are keen to address 'soft' people issues by introducing intervention

programs such as personal and career development, participative management, team-

building, etc., these areas may only be regarded as worthy of attention if they can be

shown to *make a significant and measurable difference* [emphasis in original] to the

performance of the organization itself" (Brewerton & Milward, 2001, p. 135). Adding

value to the business is what is ultimately important. IT value is typically characterized as

IT contributing business value either through increased productivity, increased

profitability, or increasing intangible benefits (Jacks et al., 2011). Venkatraman &

Ramanuiam (1987) found that executive *perceptions* of firm performance are highly

correlated with actual financial performance. Furthermore, top managers can serve as

reliable key informants for an entire organization (Lubatkin et al., 1998). This means that

gathering perceptions of IT/Business Alignment and IT Value from executives of firms

should be a reasonable proxy for actual IT Value and actual IT/Business Alignment. As

IT/Business Alignment increases, overall IT value should also increase.

H3: IT/Business Alignment will have a positive relationship with IT value.

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Furthermore, because cultural values directly affect individual behavior (Karahanna et al., 2005; Swidler, 1986), there may be a direct relationship between occupational cultural distance and IT value that is not mediated by IT/Business alignment. National cultural values have previously been shown to directly affect organizational outcomes (Li et al., 2001; Leidner & Kayworth, 2006). Also, national cultural *distance* has been shown to directly impact business decisions such as mode of entry into a new market (Brouthers & Brouthers, 2001; Tihanyi et al., 2005). It seems reasonable, therefore, to assert that occupational cultural distance will also have a direct effect on IT Value. This relationship would be further evidence of the measurable benefits of minimizing occupational cultural distance as much as possible.

> *H4: Occupational cultural distance will have a negative relationship with IT value.*

6.1.5 Control Variables

Control variables will include the size of each organization measured by number of employees, age of the organization, industry type, and the CIO reporting structure.

6.1.6 Part III Research Model

The research design of Part III will answer the research question of what is the impact of IT occupational values on IT/business alignment and IT value. The research model for Part III fits into the overall research model as shown below in Figure 25.
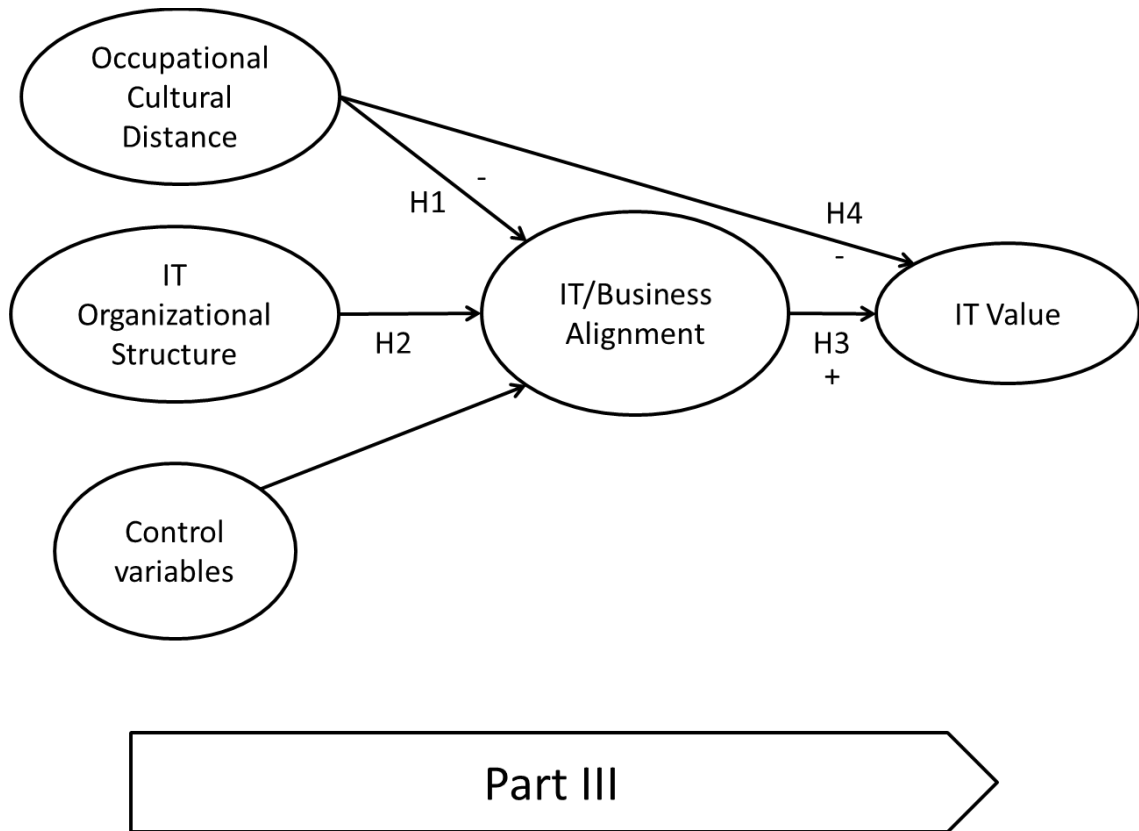
Figure 25 – Research Model for Part III

6.2 Part III Methodology

Part III of this study used the same data as Part II to measure Occupational

Cultural Distance but included an additional step. An executive for each organization,

typically their CIO, completed an executive survey that measured the organization's

actual level of IT/Business Alignment and IT Value. Combining the two sets of data

addresses the relationships between occupational cultural distance and IT/business

alignment and IT value. Because IT/Business alignment or lack thereof manifests itself in

inter-department relationships within an organization, the level of analysis changes in

Part III to the organizational level in order to answer the research question of *What is the impact of occupational cultural distance on IT/business alignment and IT value?*

6.2.1 Occupational Cultural Distance

Occupational Cultural Distance refers to the mathematical distance of aggregated cultural variables between occupations in order to measure their differences, or literally how far apart they are from one another. Distance measures have been used before in cultural research. Kogut & Singh (1988) developed a method of aggregating Hofstede's national cultural dimensions into a composite number for comparison purposes where cultural distance was a measure of national culture. While their measure demonstrates the usefulness of examining overall cultural distance as a construct in cultural research, this particular method is not suited to occupational culture as every country's culture was measured as the distance from that of the United States. Kogut and Singh's approach has also been critiqued as not being intuitively meaningful and difficult to interpret (Evans & Mavondo, 2001). The overall approach is still appropriate and the idea of measuring cultural distance is very popular in International Business studies (Evans & Mavondo, 2001). To date, aggregate cultural distance has not been examined at the level of occupational culture.

A simple way to measure this distance is through profile analysis. Profile analysis is used to see how similar or dissimilar two profiles are from one another. Nunnally & Bernstein (1994) say that one possible measure of distance between profiles is to simply calculate the sum of the absolute differences in scores. Thus, a difference of zero means

identical profiles and grows larger as profiles differ in level, dispersion, or shape.

However, while this method makes descriptive sense, it is not conducive to further

mathematical analysis (Nunnally & Bernstein, 1994). A better way of measuring profile

similarity is the distance measure D. "D is the generalized Pythagorean distance between

two points in Euclidian space" (Nunnally & Bernstein, 1994, p. 602). This distance can

be easily graphed in two-dimensional space if there are only two variables. In the case of

more than two variables, this distance cannot be graphed in two-dimensional space but it

can still be calculated using the same Pythagorean formula. Thus, in the case of the latent

variables measured in Part II, let X_1 be the first dimension of Autonomy, X_2 be

Innovation and so forth. Let *a* represent the IT group and *b* represent the business group.

The differences in the two profiles can then be represented algebraically as

$$\mathbf{D^2_{ab} = (X_{a1} - X_{b1})^2 + (X_{a2} - X_{b2})^2 + \ldots + (X_{an} - X_{bn})^2}$$

or more simply as

$$D = \sqrt{\sum_{i=1}^{n}(a_i - b_i)^2}.$$

where the square root of D^2_{ab} is the total distance between the IT group, *a*, and the

business group, *b*, for each organization with *n* dimensions. Nunnally and Bernstein

(1994) recommend that D be used as a measure of distance between two profiles because

it accounts for level, dispersion, and shape as well as lending itself to mathematical

analysis. Smaller Ds have similar profiles while larger Ds have dissimilar profiles.

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Tatsuoka (1974) recommends modifying the classic D calculation by dividing each

variable's squared distance by its variance such that

$$\mathbf{D^2_{ab}} = \frac{(\mathbf{X_{a1}} - \mathbf{X_{b1}})^2}{\sigma \, X_1^2} + \frac{(\mathbf{X_{a2}} - \mathbf{X_{b2}})^2}{\sigma \, X_2^2} + \ldots + \frac{(\mathbf{X_{an}} - \mathbf{X_{bn}})^2}{\sigma \, X_n^2}$$

This modified D score is what was used to calculate Occupational Cultural Distance. The

squared differences of the IT occupational values and the business management values,

divided by their variances, were summed in order to create an aggregated Occupational

Cultural Distance index for each organization. Because there were multiple respondents

for the two occupational groups for each organization, the mean of each value was used

for the calculation.

Objections have been raised about aggregating cultural distance in this way. For

example, Shenkar (2001) identifies some methodological problems such as the

assumption of equivalence. It is not necessarily the case that every cultural value is

equally important. Another problem is the illusion of discordance (Shenkar, 2001).

Cultural differences may not always result in conflict and it is possible that certain

differences may even be complementary and have a positive impact on organizational

performance. Nevertheless, despite these criticisms, the method of measuring cultural

distance presented is commonly used in International Marketing literature in order to

measure national cultural distance (Brouthers & Brouthers, 2001; Morosini et al., 1998;

Tihanyi et al., 2005) and should be just as useful in measuring occupational cultural

distance.

6.2.2 IT Organizational Structure

The variable of IT Organizational Structure was measured by a single item asking about the organization's IT structure being more centralized, decentralized, or federated, based on criteria in Luftman & Brier (1999). The three choices were: 1) "Our IT organization is highly centralized", 2) "Our IT organization is highly decentralized", or 3) "Our IT organization is highly federated (centralized infrastructure with decentralized application support)". Because this is nominal data, a categorical variable with three categories required a set of two dummy variables using binary coding to represent every option (Hardy, 1993). The centralized group was the reference group. The regression coefficient for the other two groups expresses the difference between the two group means (Lewis-Beck, 1995). The variable of organizational structure was used in the same way as in Johansson & Yip (1994).

6.2.3 IT/Business Alignment

The variable of IT/Business Alignment was measured with previously validated items for IT/Business alignment. The researcher is grateful to Dr. Luftman for sharing his original items from his alignment assessment tool in Luftman (2000) and the alignment items in the instrument are based on his. There were six categories of questions including 1) Effectiveness of IT and Business Communications, 2) Measurement of the Competency and Value of IT, 3) IT Governance, 4) Partnerships Between IT and Business Functions, 5) Scope and Architecture of the IT Infrastructure, and 6) Human Resource Skills. All the items were aggregated into a single index for the actual level of

IT/Business Alignment within each organization. Creating a single IT/Business

Alignment score for an organization is consistent with the approach used in Luftman

(2000) and Luftman et al. (2008). The complete list of IT/Business Alignment items is

shown in Appendix D.

6.2.4 IT Value

IT/Business alignment or lack thereof can affect perceived IT business value

(Tallon, 2007). Actual IT value was measured with previously validated items from

Bradley et al.'s (2006) items which are based on DeLone & McLean's (1992) model of

IS success. IT Value is frequently measured using items for profitability and productivity

(Jacks et al., 2010). The instrument will include common items for IT's impact on an

organization's market share, market dominance, core business strength, administrative

efficiency and productivity. Examples of items include "IT has enabled our company to

expand its market share", "IT has enabled our company to increase its market

dominance", and "IT has enabled our company to improve productivity" based on

previously validated items in Bradley et al. (2006). Both IT/Business Alignment and IT

Value will use composite indicators or single-item measures. Composite indicators are

mathematical combinations of single quantitative indicators that represent different

dimensions of a construct (Saisana et al., 2005).

6.2.5 Control Variables

Control variables gathered in the survey included size of the organization (measured as the number of total employees), age of the organization, and industry type.

6.2.6 Response Bias

There may be response bias due to self-reporting. On the one hand, it is certainly possible for executives to inflate their success when self-reporting. However, Dess & Robinson (1984) and Venkatraman & Ramanujam (1986) have previously demonstrated that self-reported performance measures typically have high reliability.

6.2.7 Data Collection

The executive survey for Part III was distributed at the same time as the occupational values survey used in Part II. The executive survey was also covered under IRB approval prior to collecting any data (IRB# 12-0012 dated 1/24/2012). The objective was to obtain participation from at least 30 organizations in order to provide the dataset for III. These organizations were from different industries and different sizes, but generally needed to be medium to large in order to have enough IT personnel for the study. CIO and CEOs were approached ahead of time to request their organization's participation in the study. Contacts at organizations were obtained through 1) personal contacts and Linked-In connections, 2) three different Advisory Boards within the Bryan School of Business, and 3) the Lexis-Nexis database of company information in the U.S. Organizations were sent an introductory letter explaining the purpose of the study, requesting their participation, and offering two forms of incentive: an individual incentive

for gift card drawings and an executive incentive to share a high level report of the results benchmarking their firm with others.

The executives for each firm had many questions about the study that had to be answered before they would agree to participate. Some wanted to see the questions ahead of time in order to preview, some wanted the gift card incentive removed as an option due to their company's policy, some wanted the option to receive a copy of the results removed from the survey, some wanted reassurance of confidentiality of the respondents and/or the company name, and one even requested an in-person presentation to their SVP, CIO, and VP of Human Resources. Every attempt was made to accommodate executives' requests to make them comfortable with the process without changing any content in the surveys. Once approval was given to participate, a survey link was sent for distribution. A unique survey link was created in Qualtrics for each company and each executive in order to ensure companies were grouped together correctly. After the survey link was sent, the researcher stayed in close communication with the executive to follow-up on participation levels for their firm and request reminders when necessary.

It should be noted that in some cases, the executive would ask for a list of people who had taken the occupational culture survey simply in order to remind those who had not taken it within their organization. But these requests were refused and it was explained to them that any identifying information had to be kept confidential and the executives appreciated this.

The first five participating executives were treated as a pilot group. The survey asked an open-ended question about any problems with the survey. Early feedback from

executives taking the survey was that it felt too long. The format in Qualtrics was then changed from multiple questions per screen to only one question per screen with a progress bar at the bottom and less clutter on the screen. An additional screen indicating the half-way point and allowing them to take a break was also added in order to reduce fatigue. Feedback was more positive after these changes were made. Late in the data collection process, one large firm experienced difficult in accessing the Qualtrics site with a "server not responding" error message, but they were able to take the survey later after this intermittent problem cleared up. The Qualtrics site remembered their stored answers and they were able to continue where they left off.

6.2.8 Measurement

The first step in the analysis was to create an index for the IT/Business Alignment measure which included all six categories of IT/Business Alignment from the Luftman Alignment model. This was done by aggregating the responses into a single-item measure. Aggregation was additive with each item weighted equally. The second step was to create the index for IT Value. This was also done by aggregating the responses to the five items of IT Value into a single-item measure. Combining multiple items into a single item index of value has been previously done with useful results at the organizational level (Kalafut & Low, 2001).

Both IT/Business Alignment and IT Value measurements were based on data from the executive survey. In three cases, where multiple executives from the same organization took the survey, the means of their responses for each item were used for

their organization. The control variables also came from the executive survey. Because the measures for IT occupational cultural distance were gathered from different sources than those used for measuring IT/Business Alignment and IT Value, the risk of common method variance or conflation of response-response correlations (Campbell & Fiske, 1959) was minimized for the overall model. Gathering data from executives on IT/Business Alignment and IT Value should be accurate proxies for actual Alignment and actual Value because executive perceptions of firm performance are highly correlated with actual firm performance (Venkatraman & Ramanuiam, 1987).

The third step was to create the index for Occupational Cultural Distance based on the data in Part II. This was done by calculating the modified D score for each organization as described above. The squared differences of all the ITOC values and all the business management values, divided by their variances, were summed in order to create the index for each organization. This then became a single-item measure for Partial Least Squares (PLS) path analysis.

PLS is a structured equation modeling technique that is more appropriate for small sample sizes than LISREL (Hulland, 1999). Where LISREL is covariance-based, PLS is variance-based. PLS is also appropriate for early stages of theoretical development for testing exploratory models (Henseler et al., 2009). SmartPLS software was used to do the path analysis using PLS regression in order to test support for the research model. PLS regression can be used to reject the null hypothesis of no-effect by showing high R^2 values and significant t-values as in linear regression and is suitable for both prediction and theory building especially when the sample size is small (Gefen,

Straub, and Boudreau, 2000). Good model fit in PLS is supported by significant path

coefficients and high R^2 values (Gefen, Straub, and Boudreau, 2000) Results of the path

model analysis include a correlational matrix of variables, the significant paths,

coefficients of those paths and whether they are positive or negative, and R^2 values for

the constructs of IT/Business Alignment and IT Value. Path analysis can show whether or

not there is support for the four proposed hypotheses.

6.3 Part III Results

6.3.1 Sample Size

Preliminary emails were sent to organizations to determine if they were interested

in participating in this study. Two hundred were personal contacts, 30 were from Bryan

School Advisory Boards at the University of North Carolina at Greensboro, and 29,310

were from the Lexis-Nexis database of businesses. Of these, 125 expressed initial interest

and requested more information. It should be noted that over 50 additional organizations

indicated interest but either outsourced their IT function or had less than the required

minimum of five IT personnel in their company. A total of 47 executives agreed to

participate in the survey and only then were they sent the two survey links. 43 executives

completed the executive survey with 3 cases of multiple executives from the same

organization resulting in 39 organizations. Of those, 32 organizations had a complete set

of surveys from all three groups necessary for the Part III analysis (IT employees,

business managers, and at least one executive). Table 49 shows the 32 participating

organizations, their general description, and the source of initial contact.

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Table 49. Participating organizations

No.	Organization Description	Source
1	Large agricultural company in NC	Bryan School Advisory Board
2	Medium non-profit healthcare company in NC	Bryan School Advisory Board
3	Large bank in NC	Bryan School Advisory Board
4	Large clothing manufacturer in NC	CARS Advisory Board
5	Very large Fortune 500 food industry company in NC	Faculty contact
6	Medium-sized publisher in NC	Interviewee
7	Large financial company in NC	ISOM Advisory Board
8	Large financial company in NC	ISOM Advisory Board
9	Large transportation company in AL	Lexis-Nexis
10	Medium-sized manufacturer in IN	Lexis-Nexis
11	Medium-sized manufacturer in MS	Lexis-Nexis
12	Medium-sized retail company in MO	Lexis-Nexis
13	Medium-sized manufacturer in MI	Lexis-Nexis
14	Large healthcare company in SC	Lexis-Nexis
15	Medium-sized food industry company in LA	Lexis-Nexis
16	Large clothing manufacturer in CA	Lexis-Nexis
17	Medium-sized financial company in WI	Lexis-Nexis
18	Medium-sized health care company in IL	Lexis-Nexis
19	Medium-sized manufacturer in OH	Lexis-Nexis
20	Large energy consulting company in NY	Lexis-Nexis
21	Medium-sized professional association in CA	Lexis-Nexis
22	Medium-sized education company in WA	Lexis-Nexis
23	Large healthcare company in MN	Lexis-Nexis
24	Medium-sized government consulting company in VA	Lexis-Nexis
25	Medium-sized state government	Lexis-Nexis
26	Medium-sized Insurance company in GA	Personal contact
27	Very large Fortune 50 Retail company in NC	Personal contact
28	Medium-sized Technology services company in TX	Personal contact
29	Large Technology Services company in KY	Personal contact
30	Medium-sized transportation company in NC	Personal contact
31	Medium-sized retail company in NC	Personal contact
32	Medium-size Community College in NC	Student

6.3.2 Demographics

The frequency tables of important demographic information for the 32 participating organizations are shown Tables 50, 51, 52, and 53.

Table 50. Type of Industry

Industry	Frequency
Manufacturing	7
Financial	6
Retail	4
Health care	3
Technology	3
Education	2
Consulting	2
Other	2
Transportation	2
Publishing	1

Table 51. Size of organization by number of employees

Organization size	Frequency
1-99	0
100-999	19
1,000-9,999	7
10,000-99,999	4
100,000-999,999	2

Table 52. Type of IT organizational structure

IT Organizational Structure	Frequency
Centralized	24
Federated	6
Decentralized	2

Table 53. CIO Reporting Structure

CIO Reporting Structure	Frequency
CIO reports to CEO	11
CIO reports to CFO	8
No CIO	7
CIO reports to COO	4
CIO reports to different executive	2

A summary of the alignment indices, success indices, and D scores is shown in Table 54. The calculation of these scores was addressed earlier in the Part III Methodology section.

Table 54. Alignment index, Success index, and D score

D score	Alignment Index	Success Index	Org Size	IT Org Structure	Dummy Federated	Dummy Decentral
1.090	235	30	2	1	0	0
1.143	267	27	2	1	0	0
1.910	240	25	2	1	0	0
2.090	274	31	4	1	0	0
2.487	229	24	2	1	0	0
2.764	262	30	4	3	1	0
2.824	220	32	2	1	0	0
2.849	258	26	5	1	0	0
2.974	204	29	2	3	1	0
3.071	243	27	2	1	0	0
3.250	220	32	3	1	0	0
3.479	212	30	4	1	0	0
3.597	200	25	2	1	0	0
3.975	249	27	3	1	0	0
4.061	261	30	2	1	0	0
4.185	220	17	2	1	0	0

4.292	269	35	3	3	1	0
4.294	205	26	2	1	0	0
4.580	195	17	2	1	0	0
4.605	250	35	2	3	1	0
4.633	240	26	5	1	0	0
4.653	229	25	3	2	0	1
4.771	239	32	2	2	0	1
4.810	200	25	3	1	0	0
4.895	256	29	4	3	1	0
4.907	228	10	2	1	0	0
4.907	227	15	3	1	0	0
4.938	271	29	2	1	0	0
5.366	226	26	2	3	1	0
5.443	191	11	2	1	0	0
5.575	215	27	3	1	0	0
5.661	219	26	2	1	0	0

6.3.3 PLS Analysis

The PLS analysis tested the four hypotheses proposed in the Research Objectives above. PLS analysis typically involves two stages of examining the outer model measurement and then the inner structural model. In this case, all of the variables are single-item measures as described in the Part II methodology earlier, so there are no outer model measurements to report. As shown in Figure 20 below, the relationship between Occupational Cultural Distance and IT/Business Alignment was negative and significant (coefficient: -0.332, t value=3.90), supporting Hypothesis 1 that higher Occupational Cultural Distance is negatively related to IT/Business Alignment. The relationship between the dummy variable of Federated IT Organizational Structure and IT/Business Alignment was positive and significant (coefficient=0.261, t value=2.65). The relationship between the dummy variable of Decentralized IT Organizational Structure

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and IT/Business Alignment was also positive and significant (coefficient=0.118, t value=2.07). The regression coefficient for the dummy variables expresses the difference in means between the dummy variable and the reference group of Centralized IT Organizational Structure. Because the Federated dummy variable was significantly different from the reference group, there is some support for Hypothesis 2 that Federated IT organizational structures have a positive relationship with IT/Business Alignment, even though the Decentralized dummy variable was also significant.

An additional *post hoc* test was performed to see which IT organizational structure had the highest levels of IT/Business Alignment. An ANOVA test between the three groups (Centralized, Decentralized, and Federated) was performed. The results are shown in Table 55. While the means show that the Federated structure had the highest level of alignment with a mean of 244.5, the ANOVA test did not find statistically significant differences between the three groups with a p value of 0.53. This may indicate only partial support for Hypothesis 2.

Table 55. ANOVA of Organizational Structure and Alignment

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
1 - Centralized	24	232.71	22.69	4.63	223.13	242.29	195	274
2 - Decentralized	2	234.00	7.07	5.00	170.47	297.53	229	239
3 - Federated	6	244.50	24.70	10.09	218.57	270.43	204	269
Total	32	235.00	22.44	3.97	226.91	243.09	195	274

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	669.54	2.00	334.77	0.65	0.53
Within Groups	14942.46	29.00	515.26		
Total	15612.00	31.00			

For the last two hypotheses, the relationship between IT/Business Alignment and IT Value was positive and significant (coefficient=.418, t value=6.09) supporting Hypothesis 3 that higher levels of IT/Business Alignment lead to higher levels of IT Value. Finally, the relationship between Occupational Cultural Distance and IT Value was negative and significant (coefficient=-0.184, t value = 2.54), supporting Hypothesis 4 that higher Occupational Cultural Distance is associated with lower IT Value. It should also be noted that the only control variable that showed a significant impact on IT/Business Alignment was Organizational Size measured by number of employees (coefficient=0.283, t value=3.93). The overall variance explained in the model is reflected in the R^2 score of 0.252 for IT/Business Alignment and 0.256 for IT Value. In

other words, 25% of the variance in the dependent variable of IT Value is accounted for

by the PLS model shown in Figure 26.
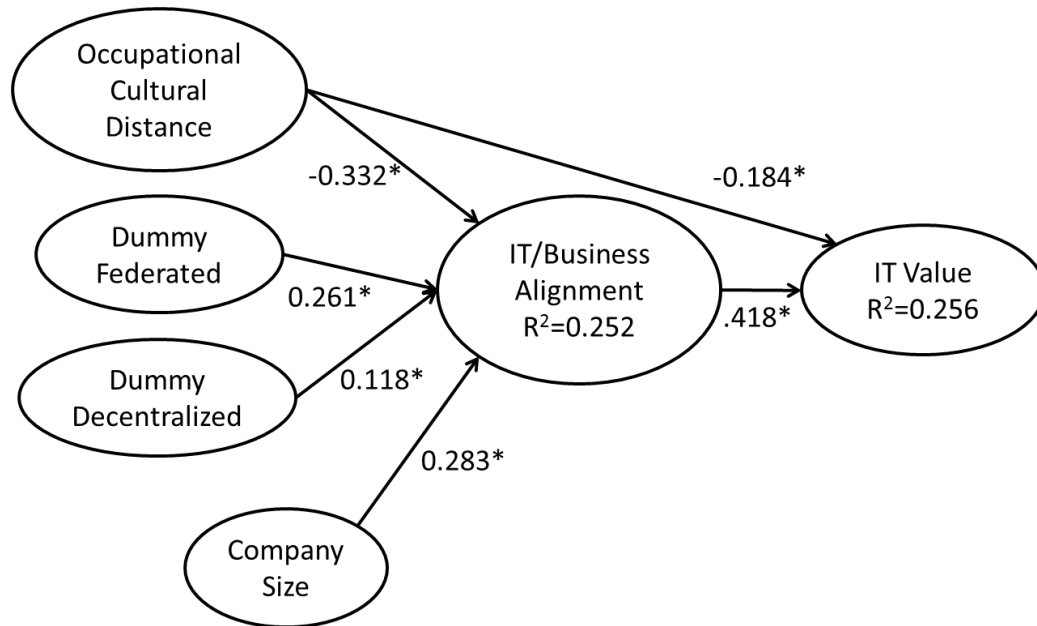
Figure 26 – PLS path model results

6.3.4 Discussion

These findings are important for two reasons. 1) The results confirm previous

findings with regard to IT/Business Alignment research. Greater alignment leads to

greater IT value to the business including profitability and productivity. Also, IT

organizational structure has a significant impact on alignment such that federated

structures seem to be more conducive to better alignment. More importantly, we have

new knowledge about a novel factor that leads to better IT/business alignment, namely

Occupational Cultural Distance. Firms should continue to focus on federated models but there is also benefit to be had from focusing on getting occupational values in sync. If executives can close the gap of occupational values between IT and business managers, there are clear benefits to be had for the bottom line. Surprisingly, Occupational Cultural Distance also significantly impacts organizational outcomes directly such that the greater the distance in values, the worse the business outcomes are for organizations.

If this is true, then how can business leaders change occupational cultural differences if these values originate outside of their organizations? The reasonable answer would be that organizational cultural differences may be a force that unifies employees together with a common set of values, whereas occupational culture, if left unchecked, can become a divisive force. Changes in organizational culture, led by their executives, may be able to overcome occupational cultural differences just as organizational culture can potentially overcome national cultural differences (see Jacks et al. forthcoming) within an organization, but this is an area for future empirical research.

Just as an automobile runs more smoothly and more efficiently in the long run when the individual tires are properly aligned, so too must the individual departments within a business be properly aligned with the overall organization. In order for this cultural change to take place, it is important for business managers to recognize and appreciate the Promethean virtues of IT. At the same time, it is also necessary for IT to embrace common business values in order for the organization to thrive long-term.

If business leaders are unsure how to proceed with aligning occupational values in order to achieve organization success, some guidance can be provided based on the

results of Part II. Managers would benefit from education on the ASPIRE values in order

to better understand their IT employees in terms of what is truly important to them at

work. Because the Promethean virtues of Reverence for Knowledge, Innovation, and

Structure showed significant difference, these are potential areas of focus. Launching

organization-wide programs that recognize and reward outstanding knowledge

contribution or innovation or new process creation are steps that can be taken that should

have a direct impact on both overall IT/Business Alignment and organizational success.

Furthermore, hiring decisions and project team selection should be influenced by the

findings of Parts II and III. If organizations want more successful outcomes, they should

look closely at the characteristics of the people they put in charge of IT departments

and/or IT projects. Leaders who do not have a heavy background in technology will be

especially challenged to gain the respect of IT teams. At the same time, leaders with a

strong business background can help educate IT personnel on the benefits of focusing on

organizational profitability and productivity and not just knowledge and innovation for

their own sake. In these ways, closing the occupational distance gap can achieve

tremendous benefits.

CHAPTER VII

CONTRIBUTIONS TO KNOWLEDGE

There are several potential and important outcomes of this research. No empirical measurements have thus-far been attempted specifically on IT occupational culture. Nor has the relationship between IT occupational culture and IT/Business alignment been examined. This study answered the call that "research is needed that seeks to operationalize IT values, to discover which values in fact are most appropriate to consider, as well as the to discover how values might cluster together to form some higher order constructs of IT culture." (Leidner & Kayworth, 2006, p. 371)

7.1 Contribution to Practice

Kaarst-Brown & Robey (1999) suggest that understanding IT culture better will assist managers in recognizing the difficulties of implementing change in the organization, something that firms still wrestle with today. A better understanding of IT occupational culture will have the practical value of 1) facilitating smoother interactions between IT and business (and other departments within an organization), 2) helping managers better understand resistance to change within the organization and within the IT department, and 3) leading to a better understanding of the cultural determinants of IT Value. Another contribution for practice is the evidence that these value dimensions are common across the IT occupation. Hence, managers who understand these values and

know how to effectively manage them in one company should be able to do so in another company as they change jobs and progress through their career.

7.2 Contribution to Research

There are several specific contributions to research. The contribution of Part I was a meaningful cultural portrait of IT occupational culture that included a validated framework for examining occupational values in their proper context which can be used by future researchers. Furthermore, the use of cultural sociology as a theoretical lens for IS research was, itself, a novel contribution. The lens of the sacred/profane division is a powerful one and helps explain the depth of occupational cultural conflict. The contribution of Part II was a validated instrument measuring occupational values and identifying areas of significant differences between IT employees and business managers. Future researchers may use the ASPIRE values as a starting point in order to examine other aspects of IT occupational culture. The contribution of Part III was empirical evidence of the impact of occupational cultural differences on IT/Business Alignment and IT Value. Future researchers may extend the research model used in Part III to explain additional phenomena related to occupational culture. The overall contribution of the three Parts together forms a unified whole that provides both new and enhanced knowledge about IT occupational culture and fills a significant gap in research.

CHAPTER VIII

FUTURE RESEARCH

There are a number of areas for future research in IT occupational culture beyond the three studies presented here. This dissertation launches a complex and powerful stream of future research. Future research questions may include:

- Which occupational values can be influenced by managers and how exactly can they influence them?

- How might occupational values be influenced at the occupational level by professional organizations such as AIS, SIM, IEEE, or AITP?

- What are the differences in occupational cultural values between IT groups based in different countries? Are IT occupational values being exported from the U.S.?

- How does occupational culture affect employee retention?

- What is the relationship between national culture, organizational culture and occupational culture?

- How can IT occupational culture be further subdivided into different subgroups such as programmers/developers, networking/server support, hardware support, software support, security, project managers, etc.?

- What are the rites, rituals and practices of IT occupational culture that lead to group cohesion and career success?

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- How is IT occupational culture impacting society at large?

- Are there significant differences in occupational values based on gender?

- How can the ASPIRE instrument be further refined for increased reliability?

CHAPTER IX

LIMITATIONS

The main limitation of this study is the objection noted in Schein (1985) that culture can only be measured with qualitative methods such as ethnography and case study over extended periods of time in an organization rather than with quantitative methods. This fundamental objection may be mitigated because initial qualitative studies have been successful in identifying the initial components of IT occupational culture for further quantitative (survey-based) investigation. Furthermore, Hofstede (1980), House et al. (2004), and Iivari & Huisman (2007) have already demonstrated the viability of the survey method in studying culture. There is a tradeoff in research methods between breadth and depth. Because the initial qualitative research has been done to obtain rich examples from ethnographic interviews, the risk of not measuring the right things (construct validity) is lessened. Furthermore, what the quantitative approach lacks in richness, it gains in measurability, which was one of the stated research objectives. The key assumption of this research is that IT occupational culture can be measured. But in the tradition of cultural sociology, culture must also be deeply meaningful, not simply numeric. Both positivist and interpretive approaches are necessary in order to advance research in this important area of study. Each helps offset the limitations of the other.

Another limitation for Part II is the need for further refinement of the instrument measuring the ASPIRE values. Even though the survey items were based on the

qualitative interviews with a follow-up Q-Sort to determine the best items, the instrument still had very high correlation between Structure and Precision. The reliability of the Autonomy variable was also low. These are concerns which will be addressed as part of the ongoing research stream.

A final limitation is the sample size in Part III. A sample size of 32 companies is admittedly small; however the difficulty in getting executives from different organizations to participate in a research study is tremendous. CEOs and CIOs are extremely busy and getting them to champion a survey within their organization takes a great deal of convincing. Because of this difficulty, getting 32 companies to participate in a relatively short amount of time is actually quite an achievement. All of the participating executives saw value in this research. Further research will be able to add to the sample size.

CHAPTER X

CONCLUSION

Past IS studies on culture have primarily focused on two levels of analysis: national culture and organizational culture. The gap in our knowledge of culture was in the area of the occupational culture of IT professionals. Occupational culture, unlike organizational culture, is not bounded by a single organization, but rather forms itself around specific expertise, similar tasks, and a sense of itself as a distinct occupational group with distinct values. An initial pilot identified the SCORRE values of IT occupational culture, including Structure of Power, Control, Open Communication, Risk, Reverence for Knowledge, and Enjoyment. These values were transformed into the ASPIRE values of Autonomy, Structure, Precision, Innovation, Reverence for Knowledge, and Enjoyment in the full study in Part I. Part I used the 'strong program' of cultural sociology to examine and interpret the meaning of the core values of the IT occupation through a cultural web framework of shared language, shared history, and shared context. A hermeneutic interpretation of the qualitative data was offered using the lens of the sacred and the profane which was distilled into three sacred values described as the Promethean virtues: Reverence for Knowledge, Structure, and Innovation with three profane values of Autonomy, Precision, and Enjoyment.

The interview results informed the creation of a survey instrument in Part II to measure the ASPIRE values and ten typical business management values. Significant

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differences were found between the responses of IT professionals and non-IT business managers in 32 companies in the U.S. IT employees rated IT occupational values higher than non-IT business managers and rated traditional business values lower. Significant differences were found with the three sacred Promethean virtues of Reverence for Knowledge, Structure, and Innovation.

Part III measured the level of IT/Business Alignment and IT Value for the 32 firms and measured the Occupational Cultural Distance within each company. A PLS analysis revealed evidence that occupational cultural distance does significantly impact both IT/Business Alignment and IT Value. As Occupational Cultural Distance increases, both IT/Business Alignment and IT Value decrease. This adds an important antecedent of IT/Business Alignment to the literature -- one that has not been previously explored.

Together, the three parts enhance our understanding of IT occupational culture as a whole. We now have a meaningful interpretation of IT occupational culture, a set of measureable values, and evidence of the impact of occupational cultural distance on organizational outcomes.

REFERENCES

1. Aeschylus. *Prometheus Bound*. Penguin Books: London, 1961.

2. Akbulut-Baily, A. "A Measurement Instrument for Understanding Student Perspectives on Stereotypes of IS Professionals." *Communications of the AIS* (25:29) 2009.

3. Alexander, J. "The Sacred and Profane Information Machine: Discourse about the Compduter as Ideology." *Archives de Sciences Sociales des Religions* (69) 1990, pp. 161-171.

4. Alexander, J. *The Meanings of Social Life: A Cultural Sociology.* Oxford University Press: New York, 2003.

5. Allan, G. *The Patterns of the Present.* State University of New York Press: Albany, 2001.

6. Armstrong, J. and Overton, T. "Estimating Nonresponse Bias in Mail Surveys." *Journal of Marketing Research* (14) 1977, pp. 396-402.

7. Ashkanasy, N., Broadfoot, L., and Falkus, S. "Questionnaire Measures of Organizational Culture" in Ashkanasy, N., Wilderom, C., and Peterson, M. (eds.) *Handbook of Organizational Culture & Climate.*. Sage Publications: Thousand Oaks, CA, 2000.

8. Babbie, E. *The Practice of Social Research*. Sixth edition. Wadsworth Publishing: Belmont, CA, 1992.

9. Bernard, R. *Research Methods in Anthropology: Qualitative and Quantitative Approaches*. Second edition. Alta Mira Press: Walnut Creek, CA, 1995.

10. BLS. "Overview of the 2008-18 Projections." http://www.bls.gov/oco/oco2003.htm. *Bureau of Labor Statistics.* Retrieved on 4/28/2011.

11. Borsook, P. *Cyberselfish: A Critical Romp Through the Terribly Libertarian Culture of High-Tech*. Public Affairs: New York, 2000.

12. Bradley, R., Pridmore, J., and Byrd, T. "Information Systems Success in the Context of Different Corporate Cultural Types: An Empirical Investigation." *Journal of Management Information Systems* (23:2) Fall, 2006, pp. 267-294.

13. Brewerton, P. and Millward, L. *Organizational Research Methods: A Guide for Students and Researchers*. Sage Publications: Thousand Oaks, CA, 2001.

14. Brief, A., and Nord, W. (Eds.) *Meanings of Occupational Work*. Lexington Books: Lexington, MA, 1990.

15. Brouthers, K., and Brouthers, L. "Explaining the National Cultural Distance Paradox." *Journal of International Business Studies* (32:1) 2001, pp. 177-189.

16. Bryman, A. and Cramer, D. *Quantitative Data Analysis with SPSS Release 10 for Windows: A Guide for Social Scientists*. Routledge: Philadelphia, PA, 2001.

17. Caillois, R. *Man, Play and Games.* Translated by Barash, M. University of Illinois Press: Chicago, 1961.

18. Cameron, K. and Quinn, R. *Diagnosing and Changing Organizational Culture: Based on the Competing Values Framework.* Jossey-Bass: San Francisco, 2006.

19. Campbell, D. and Fiske, D. "Convergent and Discriminant Validation by the Multitrait-Multimethod Matrix." *Psychological Bulletin* (56), 1959, pp. 81-105.

20. "Candor: A Sustainable IT Culture." *InformationWeek*, June 10, 2009.

21. Carmines, E. and Zeller, R. *Reliability and Validity Assessment.* Sage Publications: Thousand Oaks, CA, 1979.

22. Chan, Y., and Reich, B. "IT Alignment: What Have We Learned?" *Journal of Information Technology* (22) 2007, pp. 297-315.

23. Claver, E., Llopis, J., Gonzalez, M., and Gasco, J. "The Performance of Information Systems Through Organizational Culture." *Information Technology & People* (14:3) 2001, pp. 247-260.

24. Connerton, P. *How Societies Remember.* Cambridge University Press: Cambridge, 1989.

25. Cooper, D., and Schindler, P. *Business Research Methods*. McGraw-Hill: New York, 2003.

26. Daynes, Sarah. *Time and Memory in Reggae Music: The Politics of Hope.* Manchester University Press: New York, 2010.

27. Deal, T. and Kennedy, A. *Corporate Cultures: The Rites and Rituals of Corporate Life*. Addison-Wesley: Reading, MA, 1982.

28. Delone, W. and McLean, E. (1992), "Information Systems Success: The Quest for the Dependent Variable", *Information Systems Research* (3:1) 1992, pp. 60-95.

29. Dess, G. and Robinson, R. "Measuring Organizational Performance in the Absence of Objective Measures: The Case of the Privately-Held Firm and Conglomerate Business Unit." *Strategic Management Journal* (5:3) 1984, pp. 265-273.

30. DeVellis, R. *Scale Development: Theory and Applications*. Sage Publications: Thousand Oaks, CA, 1991.

31. Doll, W., and Torkzadeh, G. "The Measurement of End-User Computing Satisfaction." *MIS Quarterly* (June) 1988, pp. 259-274.

32. Duliba, K. and Baroudi, J. "IS Personnel: Do They Form an Occupational Community?" *ACM CPR* 1991, pp. 111-118.

33. Dubé, L., and Robey, D. "Software Stories: Three Cultural Perspectives on the Organizational Practices of Software Development." *Accounting, Management and Information Technologies* (9) 1999, pp. 223-259.

34. Dunteman, G. *Principal Components Analysis*. Sage Publications: Thousand Oaks, CA, 1989.

35. Durkheim, E. *The Elementary Forms of the Religious Life: A Study in Religious Sociology*. Free Press: New York, 1965.

36. Durkheim, E. *The Rules of Sociological Method and Selected Texts on Sociology and its Method.* Lukes, S. (Ed.) and Halls, W. (Trans.). The Free Press: New York, 1982.

37. Durkheim, E. *The Division of Labor in Society.* Coser, L. (Ed.) and Halls, W. (Trans.). The Free Press: New York, 1984.

38. Eliade, M. *The Sacred and The Profane*. Harcourt, Brace & World, Inc.: New York, 1959.

39. Evans, J. and Mavondo, F. "An Alternative Operationalisation of Cultural Distance." Australian and New Zealand Marketing Academy, 2001. http://smib.vuw.ac.nz:8081/WWW/ANZMAC2001/anzmac/AUTHORS/pdfs/Evans3.pdf. Retrieved on 3/25/2011.

40. Ferrante, J. *Sociology: A Global Perspective*. Wadsworth/Thomason Learning: Belmont, CA, 2003.

41. Fine, G. *Kitchens: The Culture of Restaurant Work*. University of California Press: Berkeley, CA, 1996.

42. Flyvbjerg, B. *Making Social Science Matter*. Cambridge University Press: New York, 2001.

43. Fowler, F. *Survey Research Methods*. 3rd ed. Sage Publications: Thousand Oaks, CA, 2002.

44. Gallivan, M., and Srite, M. "Information Technology and Culture: Identifying Fragmentary and Holistic Perspectives of Culture." *Information and Organization* (15) 2005, pp. 295-338.

45. Gefen, D., Straub, D., and Boudreau, M. "Structural Equation Modeling and Regression: Guidelines for Research Practice", *Communications of the Association for Information Systems*, (4:7), 2000, pp. 1-77.

46. Geertz, C. *The Interpretation of Culture.* Basic Books: New York, 1973.

47. Geertz, C. *Local Knowledge: Further Essays in Interpretive Anthropology*. 3rd Edition. Basic Books: New York, 1983.

48. Geertz, C. "Thick Description: Toward an Interpretive Theory of Culture" in *Cultural Sociology*. Spillman, L. (Ed.) Blackwell Publishers: Oxford, 2002.

49. Glen, P. "IT, the Business and the Clash of Cultures." *Computer World* (March 21, 2011), p. 44.

50. Gregory, K. "Native-View Paradigms: Multiple Cultures and Culture Conflicts in Organizations." *Administrative Science Quarterly* (28) 1983, pp. 359-376.

51. Grint, K. *The Sociology of Work: An Introduction*. Polity Press: Cambridge, 1991.

52. Grindley, K. "Information Systems Issues Facing Senior Executives: The Culture Gap." *Journal of Strategic Information Systems* (1:2) 1992, pp. 57-62.

53. Griswold, W. *Cultures and Societies in a Changing World*. 2nd ed. Sage Publications: Thousand Oaks, CA, 2004.

54. Griswold, W. "The Sociology of Culture: Four Good Arguments (and One Bad One." *Acta Sociologica* (35) 1992, pp. 323-328.

55. Groves, R. "Nonresponse rates and Nonresponse Bias in Household Surveys." *Public Opinion Quarterly* (70:5) 2006, pp. 646-675.

56. Guzman, I. "'As You Like I.T.': Occupational Culture and Commitment of New Information Technologists." Unpublished dissertation. 2006.

57. Guzman, I., Joseph, D., Papamichail, K., and Stanton, J. "RIP – Beliefs about IT Culture: Exploring National and Gender Differences." *SIGMIS-CPR 2007*.

58. Guzman, I. and Kaarst-Brown, M. "Organizational Survival and Alignment: Insights into Conflicting Perspectives on the Role of the IT Professional." *SIGMIS, April 2004.*

59. Guzman, I., and Stanton, J. "Culture Clash! The Adverse Effects of IT Occupational Subculture on Formative Work Experiences of IT Students." *Americas Conference on Information Systems, 2004.*

60. Guzman, I., Stanton, J. Stam, K., Vijayasri, V., Yamodo, I., Zakaria, N., and Caldera, C. "A Qualitative Study of the Occupational Subculture of Information Systems Employees in Organizations." *SIGMIS 2004, Tucson, Arizona.*

61. Halbwachs, M. *On Collective Memory*. The University of Chicago Press: Chicago, 1992.

62. Hall, E.T. *Beyond Culture*. Anchor Press: New York. 1976.

63. Hall, R. *Organizations: Structures, Processes, and Outcomes.* 7th ed. Prentice Hall: Upper Saddle River, NJ, 1999.

64. Hansen, C. "Occupational Cultures: Whose Frame Are We Using?" *Journal for Quality & Participation* (18:3) June 1995, p. 60.

65. Hardy, M. *Regression with Dummy Variables*. Sage Publications: Thousand Oaks, CA, 1993.

66. Harper, D. and Lawson, H. (Eds.) *The Cultural Study of Work*. Rowman & Littlefield Publishers: New York, 2003.

67. Harvey, L**. "**A genealogical exploration of gendered genres in IT cultures." *Information Systems Journal* (7:2) April 1997, pp. 153-172.

68. Hatcher, L. *A Step-by-Step Approach to Using the SAS System for Factor Analysis and Structural Equation Modeling*. SAS Institute: Cary, NC, 1994.

69. Henseler, J., Ringle, C., Sinkovics, R. "The Use of Partial Least Squares Path Modeling in International Marketing." *Advances in International Marketing* (20) 2009, pp. 277-319.

70. Hirschheim, R., and Newman, M. "Symbolism and Information Systems Development: Myth, Metaphor and Magic." *Information Systems Research* (2:1) 1991, pp. 29-62.

71. Hofstede, G. *Cultural Consequences: International Differences in Work Related Values*. Beverly Hills: Sage, 1980.

72. Hofstede, G., Neuijen, B., Ohayv, D., and Sanders, G. "Measuring Organization Cultures: A Qualitative and Quantitative Study across Twenty Cases," *Administrative Science Quarterly* (35) 1990, pp. 286-316.

73. Hofstede, G. and Hofstede, J. *Cultures and Organizations: Software of the Mind*. New York: McGraw-Hill. 2005.

74. Hofstede, G. and Bond, M. "The Confucius Connection: From Cultural Roots to Economic Growth," *Organizational Dynamics* (16:4), 1988, pp. 4-21.

75. Hooker, J. *Working Across Cultures*. Stanford Business Books: Stanford, California. 2003.

76. House, R., Hanges, P., Javidan, M., Dorfman, P., and Gupta, V. *Culture, Leadership, and Organizations*. Sage publications: Thousand Oaks, CA, 2004.

77. Hulland, J. "Use of Partial Least Squares (PLS) in Strategic Management Research: A Review of Four Recent Studies." *Strategic Management Journal* (20) 1999, pp. 195-204.

78. Huysman, M. and Wulf, V. (Eds.) *Social Capital and Information Technology*. MIT Press: Cambridge, MA, 2004.

79.	Ignatow, G. "'Idea Hamsters' on the 'Bleeding Edge': Profane Metaphors in High Technology Jargon." *Poetics* (31) 2003, pp. 1-22.

80.	Iivari, J. and Huisman, M. "The Relationship Between Organizational Culture and the Deployment of Systems Development Methodologies." *MIS Quarterly* (31:1) March 2007, pp. 35-58.

81.	Jacks, T., and Palvia, P. "Research-In-Progress: Measuring Dimensions of IT Occupational Culture," Proceedings - Global Information Technology Management Association World Conference, Washington, D.C., USA, June 2010.

82.	Jacks, T., Palvia, P., Schilhavy, R., and Wang, L. "A Framework for the Impact of IT on Organizational Performance." *Business Process Management Journal* (17:5) 2011, pp. 846-870.

83.	Jacks, T., Wallace, S., and Nemati, H. "Impact of Culture on Knowledge Management – A Meta-Analysis." *Journal of Global Information Technology Management* (Forthcoming in October, 2012).

84.	Johansson, J. and Yip, G. "Exploiting Globalization Potential: U.S. and Japanese Strategies." *Strategic Management Journal* (15:8) 1994, pp. 579-601.

85.	Johnson, S., Koh, H., and Killough, L. "Organizational and Occupational Culture and the Perception of Managerial Accounting Terms: An Exploratory Study Using Perceptual Mapping Techniques." *Contemporary Management Research* (5:4) 2009, pp. 317-342.

86.	Joseph, D., Ng, K., Koh, C., and Ang, S. "Turnover of Information Technology Professionals: A Narrative Review, Meta-Analytic Structural Equation Modeling, and Model Developmnt." *MIS Quarterly* (31:3) 2007, pp. 547-577.

87.	Kaarst-Brown, M. and Guzman, I. "Who is 'the IT workforce'?: Challenges Facing Policy Makers, Educators, Management, and Research. *SIGMIS-CPR 2005.*

88.	Kaarst-Brown, M.L. and Robey, D. (1999) "More on Myth, Magic and Metaphor: Cultural Insights into the Management of Information Technology in Organizations." *Information, Technology and People* (12:2) 1999, pp. 192-217.

89.	Kappos, A. and Rivard, S. "A Three-Perspective Model of Culture, Information Systems, and their Development and Use". *MIS Quarterly* (32:3) September 2008, pp. 601-634.

90. Karahanna, E., Evaristo, J., and Srite, M. "Levels of Culture and Individual Behavior: An Integrative Perspective." *Journal of Global Information Management* (13:2) 2005, pp. 1-20.

91. Katz, J. and Townsend, J. "The Role of Information Technology in the 'Fit' Between Culture, Business Strategy and Organizational Structure of Global Firms." *Journal of Global Information Management* (8:2) 2000, pp. 24.

92. Kim, J. and Mueller, C. *Factor Analysis: Statistical Methods and Practical Issues.* Sage Publications: Thousand Oaks, CA, 1978.

93. Klein, H. and Myers, M. "A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information System." *MIS Quarterly* (23:1) 1999, pp. 67-94.

94. Kline, R. *Principles and Practice of Structural Equation Modeling.* 2nd ed. The Guilford Press: New York, 2005.

95. Kogut, B. and Singh, H. "The Effect of National Culture on the Choice of Entry Mode." *Journal of International Business Studies* (19:3), 1988, pp. 411-432.

96. Korczynski, M., Hodson, R., and Edward, P. (Eds.) *Social Theory at Work.* Oxford University Press: Oxford, 2006.

97. Krippendorff, K. *Content Analysis: An Introduction to its Methodology.* Sage Publications: Thousand Oaks, CA, 2004.

98. Kwantes, C., and Boglarsky, C. "Do Occupational Groups Vary in Expressed Organizational Culture Preferences? A Study of Six Occupations in the United States." *International Journal of Cross Cultural Management* (4:3) 2004, pp. 335-354.

99. Lee, A. "Electronic Mail as a Medium for Rich Communication: An Empirical Investigation Using Hermeneutic Interpretation." *MIS Quarterly* (18:2) 1994, pp. 143-157.

100. Lee, A. "Integrating Positivist and Interpretive Approaches to Organizational Research." *Organization Science* (2:4), 1991, pp. 342-365.

101. Leidner, D., and Kayworth, T. "A Review of Culture in Information Systems Research: Toward a Theory of Information Technology Culture Conflict." *MIS Quarterly* (30:2), June 2006, pp. 357-399.

102. Levy, S. *Hackers: Heroes of the Computer Revolution*. O'Reilly: Cambridge, 2010.

103. Lewis-Beck, M. *Data Analysis: An Introduction*. Sage Publications: Thousand Oaks, CA, 1995.

104. Li, J., Lam, K., and Qian, G. "Does Culture Affect Behavior and Performance of Firms? The Case of Joint Ventures in China." *Journal of International Business Studies* (32:1) 2001, pp. 115-131.

105. Locke, J. *An Essay Concerning Human Understanding*. Routledge and Sons: New York, 1910.

106. Lubatkin, M., Calori, R., Very, P., and Veiga, J. "Managing Mergers Across Borders: A Two-Nation Exploration of a Nationally Bound Administrative Heritage." *Organization Science* (9:6) 1998, pp. 670-684.

107. Luftman, J. "Assessing Business-IT Alignment Maturity." Communications of the AIS (4:14) December, 2000, pp. 1-51.

108. Luftman, J. and Brier, T. "Achieving and Sustaining Business-IT Alignment, "California Management Review (1) Fall, 1999, pp. 109-122.

109. Luftman, J., and Kempaiah, R. "An Update on Business-IT Alignment: 'A Line' Has Been Drawn", MISQ Executive (6:3) 2007, pp. 165-177.

110. Luftman, J. and Kempaiah, R. "Key Issues for IT Executives," *MIS Quarterly Executive* (7:2) June 2008, pp. 99-112.

111. MacDonald, K. *The Sociology of the Professions.* Sage Publications: Thousand Oaks, CA, 1995.

112. Markus, M. and Bjorn-Andersen, N. "Power Over Users: Its Exercise by System Professionals." *Communications of the ACM* (30:6) 1987, pp. 498-504.

113. Martin, J. *Organizational Culture: Mapping the Terrain*. Sage Publications, Thousand Oaks, CA, 2002.

114. McGee, M. "IT Culture: Too Safe For Comfort." *InformationWeek*, January 29, 2007.

115. McKeown, B., and Thomas, D. *Q Methodology*. SAGE Publications: Newbury Park, 1988.

116. Morosini, P., Shane, S., and Singh, H. "National Cultural Distance and Cross-Border Acquisition Performance." *Journal of International Business Studies* (29:1) 1998, pp. 137-158.

117. Nord, J., Nord, G., Cormack, S., and Cater-Steel, A. "IT Culture: Its Impact on Communication and Work Relationships in Business." *International Journal of Intercultural Information Management* (1:1) 2007, pp. 85-107.

118. Nunnally, J. and Bernstein, I. *Psychometric Theory*. Third edition. McGraw-Hill: New York, 1994.

119. Orlikowski, W. "Integrated Information Environment or Matrix of Control? The Contradictory Implications of Information Technology" *Accounting, Management and Infromation Technologies* (1:1) 1991, pp. 9-42.

120. Orlikowski, W. And Baroudi, J. "Studying Information Technology in Organizations: Research Approaches and Assumptions." *Information Systems Research* (2:1) 1991, pp. 1-28.

121. Orlikowski, W. And Baroudi, J. "The Information Systems Profession: Myth or Reality?" *Office: Technology & People* (4) 1989, pp. 13-30.

122. Palvia, P. and Jacks, T. "An Examination of National Culture and IS Values." Tenth Annual Global Information Technology Management Association (GITMA) Conference 2009.

123. Parsons, T. And Shils, E. (Eds.) *Toward a General Theory of Action*. Harper Torchbooks: New York, 1951.

124. Patten, K., Fjermestad, J., and Whitworth, B. "How CIOs Use Flexibility to Manage Uncertainty in Dynamic Business Environments.". *AMCIS 2009 Proceedings.*

125. Pavalko, R. (Ed.) *Sociological Perspectives on Occupations*. F.E. Peacock Publishers: Itasca, Illinois, 1972.

126. Peacock, J. "Durkheim and the Social Anthropology of Culture." *Social Forces* (59:4) 1981, pp. 996-1008.

127. Penley C. and Ross, A. (eds.) *Technoculture*. University of Minnesota Press: Minneapolis, 1991.

128. Pliskin, N., Romm, T., Lee, A., and Weber, Y. "Presumed Versus Actual Organizational Culture; Managerial Implications for Implementation of Information Systems," *The Computer Journal* (36:2) 1993, pp. 143-152.

129. Podsakoff, P. and Organ, D. "Self-reports in Organizational Research: Problems and Prospects." *Journal of Management* (12:4), 1986, pp. 531-544.

130. Posner, B. and Schmidt, W. "The Values of Business and Federal Government Executives: More Different Than Alike." *Public Personnel Management* (25:3) 1996, pp. 277-289.

131. Quinn, R. and Rohrbaugh, J. "A Spatial Model of Effectiveness Criteria: Toward a Competing Values Approach to Organizational Analysis." *Management Science* (29) 1983, pp. 363-377.

132. Ramachandran, S. and Rao, S. "An Effort Towards Identifying Occupational Culture among Information Systems Professionals." *ACM SIGMIS-CPR 2006.*

133. Raykov, T. and Marcoulides, G. *A First Course in Structural Equation Modeling*. Lawrence Erlbaum Associates, Publishers: Mahwah, New Jersey, 2006.

134. Reich, B. and Benbasat, I. "Factors That Influence the Social Dimension of Alignment Between Business and Information Technology Objectives." *MIS Quarterly* (24:1) 2000, pp. 81-113.

135. Rencher, A. *Methods of Multivariate Analysis*. 2nd edition. Wiley-Interscience: Hoboken, NJ, 2002.

136. Reynolds, H. *Analysis of Nominal Data*. 2nd ed. Sage Publications: Beverly Hills, CA, 1984.

137. Richards, L. *Handling Qualitative Data: A Practical Guide.* Sage Publications: Thousand Oaks, CA, 2005.

138. Riley, A. *Impure Play: Sacredness, Transgression, and the Tragic in Popular Culture*. Lexington Books: Lanham, MD, 2010.

139. Robey, D. and Markus, M. "Rituals in Information System Design," *MIS Quarterly* (8) 1984, pp. 5-15.

140. Robey, D., Smith, L., Vijayasarathy, L. "Perceptions of Conflict and Success in Information Systems Department Projects," *Journal of Management Information Systems* (10:1), 1993.

141. Robinson, C., and Betz, N. "A Psychometric Evaluation of Super's Work Values Inventory – Revised". *Journal of Career Assessment* (16:4) 2008, pp. 456-473.

142. Rogers, E., and Larsen, J. *Silicon Valley Fever: Growth of High-Technology Culture*. Basic Books: New York, 1984.

143. Romm, T., Pliskin, N., Weber, Y., and Lee, A. "Identifying Organizational Culture Clash in MIS Implementation." *Information & Management* (21) 1991, pp. 99-109.

144. Roszak, T. *The Cult of Information*. University of California Press: Berkeley, CA, 1994.

145. Rubin, H. and Rubin, I. *Qualitative Interviewing: The Art of Hearing Data*. Sage Publications: Thousand Oaks, CA, 1995.

146. Saisana, M., Saltelli, A., and Tarantola, S. "Uncertainty and Sensitivity Analysis Techniques as Tools for the Quality Assessment of Composite Indicators." *Journal of the Royal Statistical Society* (168:2), pp. 1-17.

147. Saldana, J. *The Coding Manual for Qualitative Researchers.* Sage Publications: Thousand Oaks, CA, 2009.

148. Sarala, R. "The Impact of Cultural Differences and Acculturation Factors on Post-Acquisition Conflict." *Scandinavian Journal of Management* (26) 2010, pp. 38-56.

149. Schein, E. *Organizational Culture and Leadership*. Jossey-Bass Publishers: San Francisco, 1985.

150. Schein, E. *The Corporate Culture Survival Guide*. Jossey-Bass Publishers: San Francisco, 1999.

151. Scholz, C. "The Symbolic Value of Computerized Information Systems" in Gagliardi, P. (Ed.), *Symbols and Artifacts: Views of the Corporate Landscape*. Aldine de Gruyter: New York, 1990.

152. Shenkar, O. "Cultural Distance Revisited: Towards a More Rigorous Conceptualization and Measurement of Cultural Differences." *Journal of International Business Studies* (32:3) 2001, pp. 519-535.

153. Shore, B. "Cultural Asymmetries and the Challenge of Global Enterprise Integration" in Palvia, P., Palvia, S., and Harris, A. (Eds.), *Managing Global Information Technology: Strategies and Challenges.* Ivy League Publishing, 2007.

154. Shore, B. and Venkatachalam, V. "Prototyping: A Metaphor for Cross-Cultural Transfer and Implementation of IS Applications." *Information & Management* (27) 1994, pp. 175-184.

155. Smith, H, Milberg, S., and Burke, S. "Information Privacy: Measuring Individuals' Concerns About Organizational Practices," *MIS Quarterly* (20:2) 1996, pp. 167-196.

156. Smith, P., and Riley, A. *Cultural Theory: An Introduction*. 2nd Edition. Blackwell Publishing: Oxford, 2009.

157. Spillman, L. "Introduction: Culture and Cultural Sociology" in *Cultural Sociology*. Spillman, L. (Ed.) Blackwell Publishers: Oxford, 2002.

158. Straub, D. "Validating Instruments in MIS Research." *MIS Quarterly* (June) 1989, pp. 147-169.

159. Straub, D., Loch, K., Evaristo, R., Karahanna, E., and Srite, M. "Toward a Theory-Based Measurement of Culture." *Journal of Global Information Management* (Jan-Mar) 2002, pp. 13-23.

160. Subramanian, R. "India and Information Technology: A Historical & Critical Perspective." *Journal of Global Information Technology Management* (9:4) 2006.

161. Swidler, A. "Culture in Action: Symbols and Strategies." *American Sociological Review* (51:2) 1986, pp. 273-286.

162. Tallon, P. "A Process-Oriented Perspective on the Alignment of Information Technology and Business Strategy." *Journal of Management Information Systems* (24:3) 2007/2008, pp. 227-268.

163. Tatsuoka, M. *Classification Procedures: Profile Similarity*. Institute for Personality and Ability Testing: Champaign, IL, 1974.

164. Tihanyi, L., Griffith, D., and Russell, C. "The Effect of Cultural Distance on Entry Mode Choice, International Diversification, and MNE Performance: A Meta-Analysis." *Journal of International Business Studies* (36) 2005, pp. 270-283.

165. Timasheff, N. Sociological *Theory: Its Nature and Growth.* Random House: New York, 1967.

166. Trice, H. *Occupational Subcultures in the Workplace*. ILR Press: Ithaca, New York, 1993.

167. Trompenaars, F. Riding the Waves of Culture. Nicholas Brealey: London. 1993.

168. Venkatraman, N. and Ramanujam, V. " Measurement of Business Performance in Strategy Research: A Comparison of Approaches." *The Academy of Management Review* (11:4) 1986, pp. 801-814.

169. Venkatraman, N. and Ramanujam, V. "Measurement of Business Economic Performance: An Examination of Method Convergence." *Journal of Management* (13:1), 1987, pp. 109-122.

170. Von Meier, A. "Occupational Cultures as a Challenge to Technological Innovation." *IEEE Transactions on Engineering Management* (46:1) 1999, pp. 101-114.

171. Walsh, I. "Development of an Instrument to Assess Individual IT Culture." *Proceedings of the Fifteenth Americas Conference on Information Systems, San Francisco, California August 6th – 9th 2009.*

172. Walsh, I. and Kefi, H. "Developing the Concept of Individual IT-Culture: The Spinning Top Metaphor." *Proceedings of the Fourteenth Americas Conference on Information Systems, Toronto, ON, Canada August 14th – 17th 2008.*

173. Walsh, I. and Kefi, H. "The Role of IT Culture in IT Management: Searching for Individual Archetypal IT Culture Profiles." *Proceedings of the Fourteenth Americas Conference on Information Systems, Toronto, ON, Canada August 14th – 17th 2008.*

174. Walsh, I. and Kefi, H. "The Spinning Top Model, a New Path to Conceptualize Culture and Values: Applications to IS Research." *Twenty Ninth International Conference on Information Systems, Paris 2008.*

175. Ward, J. and Peppard, J. "Reconciling the IT/Business Relationship: A Troubled Marriage in Need of Guidance." *Strategic Information Systems* (5:2) 1996, pp. 37-65.

176. Weber, M. *The Theory of Social and Economic Organisation.* Parsons, T. (Trans.) Hodge: London, 1947.

177. Weber, M. *Economy and Society*. Roth, G. and Wittich, C. (Eds.) Bedminster Press: London, 1968.

178. Weber, M. *The Protestant Ethic and the Spirit of Capitalism*. Parsons, T. (Trans.) Routledge: London, 1992.

179. Weber, R. *Basic Content Analysis*. 2nd ed. Sage Publications: Thousand Oaks, CA, 1990.

180. Webster, J. and Martocchio, J. "Microcomputer Playfulness: Development of a Measure with Workplace Implications." MIS Quarterly (June) 1992, pp. 201-226.

181. Wuthnow, R. *Meaning and Moral Order: Explorations in Cultural Analysis*. University of California Press: Berkeley, CA, 1987.

182. Yin, R. *Case Study Research: Designs and Methods.* Sage Publications: Thousand Oaks, CA, 2003.

APPENDIX A

PILOT INTERVIEW QUESTIONS

1) *Tell me about your background in IT.*
2) *What do you like about working in IT?*
3) *What do you not like about working in IT?*
4) *In what ways do you think IT people are different from people in other departments in your organization?*
5) *Have you worked in an IT department in any other companies? If so, how were things different there?*
6) *What were relationships like with other groups outside IT?*
7) *Name five adjectives that describe your IT group.*
8) *How does that differ from your first IT job?*
9) *What do you think is important to IT people? What do we like and dislike at work?*
10) *What changes have you seen in IT culture over time?*

APPENDIX B

FULL STUDY INTERVIEW QUESTIONS

Ask about anonymity preference. Explain recording and transcription process. Explain purpose of study.

Ask about demographic information. Age, years of experience, current job title, level of education, size of organization, size of IT department

1) *Tell me about your background in IT. How did you start and where are you now? How does your current role differ from your first IT job?*
2) *Tell me about your job responsibilities today. What is a typical day like?*
3) *What do you like about working in IT? What do you not like about working in IT?*
4) *In what ways do you think IT people are different from people in other departments?*
5) *Have you worked in an IT department in any other companies? If so, how were things different there?*
6) *What were relationships like with other groups outside IT? What groups do you like to work with or not work with and why?*
7) *Name five adjectives that describe IT people.*
8) *What do you think is important to IT people? What do we like and dislike at work?*
9) *What changes have you seen in IT culture over time?*
10) *Who are some of your personal IT heroes and why? Who do you look up to? Are there any IT villains?*
11) *What historical events do you feel have really impacted IT professionals?*
12) *How exactly is the language you use different from non-IT people?*
13) *What highly specialized skills and abilities are required in your profession?*

14) Does your job involve extreme or unusual demands?
15) Do you have a strong sense of who is and who is not an IT person? How can you tell?
16) How much does your job take over you after-work life?
17) Are you proud to be in IT? Why or why not?
18) Who do you refer to at work in order to gauge how well you are doing?
19) What sorts of phrases or activities do you find you don't have to explain to fellow IT workers but you do have to explain to non-IT people?
20) Some of the IT values that have been previously identified include the following. What do you think of each one and can you think of examples? (Provide definitions for structure of power, control, open communication, risk, reverence for knowledge, enjoyment.) What would you add to this list?
21) What does IT/business alignment mean to you? IT success?
22) Is your work meaningful or not? Please elaborate.

PILOT SURVEY INSTRUMENT

Quick Definitions:
What do you mean by "IT"? IT refers to the Information Technology department or Information Systems department within your organization. If you report up through a CIO, you work in IT.
What do you mean by "non-IT"? Non-IT refers to other departments outside of IT such as Accounting, Human Resources, or Marketing.
What do you mean by "the business"? The business is defined as the core business of your organization (for example, manufacturing, banking, retail).
What do you mean by "end users"? End users are people in the organization that use IT services but do not work in the IT department.

This survey is intended for IT professionals who are not in management. If you do not work in an IT field or you work in management, please do not complete this survey.

Instructions: Indicate your level of agreement with the following statements. Your responses should be based on your own beliefs and values.

COMM1	Good communication between IT and the end user community is vital.
COMM2	Communication with non-IT groups should be open.
COMM3	The IT group should translate technical ideas in terms that non-IT people can understand.
COMM4	Communication with non-IT groups should exhibit full disclosure about problems and opportunities.
COMM5	Communication with non-IT groups should be frank.
CON1	IT processes should be documented.
CON2	IT processes should be standardized.
CON3	IT processes should be formalized.
CON4	IT processes should be governed by policies.
CON5	It is important to follow the documented policies and procedures consistently.
CON6	IT personnel should maintain tight control of systems.
ALI1	IT should have a good understanding of the organization's business environment.
ALI2	IT should have a strong partnership with the business.
ALI3	IT should integrate closely with the business
ALI4	IT's primary job is to respond to the business environment.
ALI5	Strategic business planning should be done with IT participation.
ALI6	Strategic IT planning should be done with business participation.
RIS1	It is better to play it safe in IT.

RIS2	It is not good for IT to take chances.
RIS3	Risk taking in IT is not rewarded.
RIS4	IT should not make mistakes.
POW1	IT should have fewer levels of management.
POW2	IT should be more decentralized.
POW3	Power should be concentrated at the top of the organization. REVERSED
POW4	IT organizations should be more flat.
POW5	IT should have less hierarchy in the organization.
KNO1	People with IT technical knowledge should get respect.
KNO2	Technical knowledge is power.
KNO3	The person with the most knowledge should be making the decisions.
KNO4	One should defer to people who have more technical knowledge.
KNO5	People with IT expertise are to be revered.
KNO6	People with IT expertise are to be admired.
ENJ1	IT work should express creativity.
ENJ2	IT work should give a sense of satisfaction.
ENJ3	IT work should be personally fulfilling.
ENJ4	IT work should be challenging.
ENJ5	IT work should be fun.
ENJ6	IT work should involve getting to play with new toys.
VAL1	IT has enabled our company to expand its market share.
VAL2	IT has enabled our company to increase its market dominance.
VAL3	Our company has strengthened its core business due to IT.
VAL4	IT has enabled our company to improve administrative efficiency.
VAL5	IT has enabled our company to improve productivity.
Org1	Our IT organization is highly centralized.
Org2	Our IT organization is highly decentralized.
Org3	Our IT organization is highly federated (centralized infrastructure with decentralized application support)
Gender	
Age	
Education	
Experience	
Job_title	
Feedback	

APPENDIX D

FULL STUDY INSTRUMENT - ITOC

IT Occupational Culture Survey

UNIVERSITY OF NORTH CAROLINA AT GREENSBORO
Project Title: Measuring IT Occupational Culture

Project Director: Dr. Prashant Palvia and Tim Jacks
Please take a moment to carefully review this consent form in its entirety. Remember that participation in this study is entirely voluntary and you may choose not to participate or to withdraw at any time. Please note that you must be at least 18 years of age to participate in this study. If you are under the age of 18, you are asked not to participate.

What is the study about?
This is a research project. The purpose of this research is to learn more about Information Technology (IT) professionals and their experiences working in the field of information technology. This study contributes to the research on occupational culture by identifying ways of measuring the relevant dimensions of occupational culture for IT professionals and their impact on firm performance. This study also contributes to practitioners by delivering a better understanding of how IT occupational culture can differ from organizational business culture and where conflicts of values and assumptions can take place.

Why are you asking me?
Criteria for inclusion in the survey include: 1) your organization has agreed to participate in this study and 2) you are either an IT professional (non-managerial) or a business manager (non-IT) within your organization.

What will you ask me to do if I agree to be in the study?
You are being asked to fill out a short online survey which should take approximately 15 minutes to complete.

What are the dangers to me?
The Institutional Review Board at the University of North Carolina at Greensboro has determined that participation in this study poses minimal risk to participants.
If you have any concerns about your rights, how you are being treated or if you have questions, want more information or have suggestions, please contact Eric Allen in the Office of Research Compliance at UNCG toll-free at (855)-251-2351. Questions, concerns or complaints about this project or benefits or risks associated with being in this study can be answered by Tim Jacks who may be contacted at (276) 206-7067 or tfjacks@uncg.edu.

Are there any benefits to me for taking part in this research study?
There are no direct benefits to participants in this study.

Will I get paid for being in the study? Will it cost me anything?
There are no costs to you or payments made for participating in this study. However there will be four random drawings for a $50 gift card to Amazon.com for the participants at the conclusion of the study.

How will you keep my information confidential?
Your answers will be kept strictly confidential and will not be released in any form that can be identified with you individually. Results of the survey may be published in aggregate form only, without identifying any individual. Data will be kept until the results are disseminated in aggregate form.
Data files will be stored on a password-protected computer and deleted from the computer after the study is complete. It is important that you answer the questions honestly and accurately.
All information obtained in this study is strictly confidential unless disclosure is required by law.

Absolute confidentiality of data provided through the Internet cannot be guaranteed due to the limited protections of Internet access.

Please be sure to close your browser when finished so no one will be able to see what you have been doing.

What if I want to leave the study?

You have the right to refuse to participate or to withdraw at any time, without penalty. If you do withdraw, it will not affect you in any way. If you

choose to withdraw, you may request that any of your data which has been collected be destroyed unless it is in a de-identifiable state.

What about new information/changes in the study?

If significant new information relating to the study becomes available which may relate to your willingness to continue to participate, this information will be provided to you.

Voluntary Consent by Participant:

By submitting your survey responses you are agreeing that you have read and fully understand the contents of this document and you willingly consent to take part in this study. All of your questions concerning this study have been answered. You are agreeing that you are 18 years of age or older and are agreeing to participate.

You should print this form for your records. By submitting your responses you are indicating your consent to participate in the project described to you in this document.

What is your gender?

Male Female

What is your age in years? (If you are under 18, please do not complete this survey.)

18-24 25-34 35-44 45-54 55-65 65+

What is your highest level of education?

High School Associate's degree Bachelor's degree Masters degree PhD

How many years of work experience do you have in your current career?

1-4 5-9 10-14 15-19 20-24 25-29 30+

What is the name of your company? (This will be kept confidential.)

What is your current job title?

Instructions: Please indicate your level of agreement with the following statements. Your responses should be based on your own beliefs and values.

Having less bureaucracy for getting approval to take action is...
- Not at all
- Important Very Unimportant
- Somewhat Unimportant
- Neither Important nor Unimportant
- Somewhat Important
- Very Important
- Extremely Important

Having a high level of freedom in order to do my job well is...

Having a "flatter" organizational structure (i.e., fewer layers of management) is...

Empowerment for employees to make decisions independently of management is...

Having a high level of access to raw data is...

Having everyone consistently adhere to hardware and software standards is...

Sticking to the original project plan (instead of making last minute change requests) is...

Clearly defined job roles and responsibilities are...

Enforcing rules is...

Orderliness is...

Ensuring that timelines and deadlines are reasonable, not rushed, is...

A high level of technical detail when communicating with others in the organization is...

Using exactly the right words when speaking is...

Precision in communication is...

Communicating specific expectations, instead of general expectations, is...

Communication of precise project timelines is...

Playing with the latest "bleeding edge" technology is...

Embracing new technology is...

Building clever new solutions is...

Showing creativity is...

Figuring out a better way to do things is...

Technical problem solving skills are...

Critical thinking skills are...

Earning respect based on intelligence is...

Being known for my intelligence is...

Learning new skills every day is...

Being motivated to learn new skills on your own is...

Having fun at work is...

Laughing and joking with others at work is...

Having a sense of humor is...

Going out to lunch with my co-workers is...

Variety in my daily tasks is...

Instructions: The following is a list of typical business management values. How important are the following items to you in your day-to-day work life?

Not at all Important
Very Unimportant
Somewhat Unimportant
Neither Important nor Unimportant
Somewhat Important
Very Important
Extremely Important

- Organizational effectiveness
- High morale
- Organizational reputation
- Organizational efficiency
- High productivity
- Organizational stability
- Organizational growth
- Organizational value to community
- Profit maximization
- Service to the public

If you had any problems or concerns with this survey or if any wording was unclear, please provide your feedback here. [optional]

If you would like to enter the drawing for a $50 gift card to Amazon.com, please enter your email address here.
[optional]
If you would like a copy of the aggregated results when published, please provide your email address here.
[optional]

*** Thank you for your help in this research effort! ***

APPENDIX E

FULL STUDY INSTRUMENT - EXECUTIVE

Executive Survey on IT/Business Alignment and IT Value

UNIVERSITY OF NORTH CAROLINA AT GREENSBORO
Project Title: Measuring IT Occupational Culture

Project Director: Dr. Prashant Palvia and Tim Jacks

Please take a moment to carefully review this consent form in its entirety. Remember that participation in this study is entirely voluntary and you may choose not to participate or to withdraw at any time. Please note that you must be at least 18 years of age to participate in this study. If you are under the age of 18, you are asked not to participate.

What is the study about?

This is a research project. The purpose of this research is to learn more about Information Technology (IT) professionals and their experiences working in the field of information technology. This study contributes to the research on occupational culture by identifying ways of measuring the relevant dimensions of occupational culture for IT professionals and their impact on firm performance. This study also contributes to practitioners by delivering a better understanding of how IT occupational culture can differ from organizational business culture and where conflicts of values and assumptions can take place.

Why are you asking me?

Criteria for inclusion in the survey include: 1) your organization has agreed to participate in this study and 2) you are either an IT professional (non-managerial) or a business manager (non-IT) within your organization.

What will you ask me to do if I agree to be in the study?

You are being asked to fill out an online survey which should take approximately 30 minutes to complete.

What are the dangers to me?

The Institutional Review Board at the University of North Carolina at Greensboro has determined that participation in this study poses minimal risk to participants.

If you have any concerns about your rights, how you are being treated or if you have questions, want more information or have suggestions, please contact Eric Allen in the Office of Research Compliance at UNCG toll-free at (855)-251-2351. Questions, concerns or complaints about this project or benefits or risks associated with being in this study can be answered by Tim Jacks who may be contacted at (276) 206-7067 or tfjacks@uncg.edu.

Are there any benefits to me for taking part in this research study?

There are no direct benefits to participants in this study.

Will I get paid for being in the study? Will it cost me anything?

There are no costs to you or payments made for participating in this study. However there will be four random drawings for a $50 gift card to Amazon.com for the participants at the conclusion of the study.

How will you keep my information confidential?

Your answers will be kept strictly confidential and will not be released in any form that can be identified with you individually. Results of the survey may be published in aggregate form only, without identifying any individual. Data will be kept until the results are disseminated in aggregate form.

Data files will be stored on a password-protected computer and deleted from the computer after the study is complete. It is important that you answer the questions honestly and accurately.

All information obtained in this study is strictly confidential unless disclosure is required by law.

Absolute confidentiality of data provided through the Internet cannot be guaranteed due to the limited protections of Internet access.

Please be sure to close your browser when finished so no one will be able to see what you have been doing.

What if I want to leave the study?
You have the right to refuse to participate or to withdraw at any time, without penalty. If you do withdraw, it will not affect you in any way. If you choose to withdraw, you may request that any of your data which has been collected be destroyed unless it is in a de-identifiable state.

What about new information/changes in the study?
If significant new information relating to the study becomes available which may relate to your willingness to continue to participate, this information will be provided to you.

Voluntary Consent by Participant:
By submitting your survey responses you are agreeing that you have read and fully understand the contents of this document and you willingly consent to take part in this study. All of your questions concerning this study have been answered. You are agreeing that you are 18 years of age or older and are agreeing to participate.

You should print this form for your records. By submitting your responses you are indicating your consent to participate in the project described to you in this document.

Instructions:
This survey asks in-depth questions about your organization which will make the outcome equally in-depth.
Please try to find a quiet place to take the survey where you will not be interrupted. Allow 20-30 minutes to complete it.
If you have to stop the survey before you are finished, you can pick up where you left off if you are on the same PC.
Instructions: This survey is intended to be completed by an Executive within your organization.

What is your current job title?
CEO CIO CFO COO SVP VP Other (please indicate)

What is your gender?
Male Female

What is your age in years? (If you are under 18, please do not complete this survey.)
18-24 25-34 35-44 45-54 55-64 65+

What is your highest level of education?

How many years of work experience do you have in your current career?
1-4 5-9 10-14 15-19 20-24 25-29 30+

What is the name of your company? (This will be kept confidential.)

How would you categorize your company's industry?

Approximately how many employees does your company have?
1-99 100-999 1,000-9,999 10,000-99,999 100,000-999,999

What is the approximate age of your company (in years)?
1-9 10-19 20-29 30-39 40-49 50+

Please describe your Information Technology (IT) organizational structure.
- Our IT organizational structure is best described as centralized . ("Centralized" means more of our IT infrastructure and IT personnel are located at central corporate locations.)
- Our IT organizational structure is best described as decentralized . ("Decentralized" means more of our IT infrastructure and IT personnel are distributed to each individual location.)
- Our IT organizational structure is best described as federated. ("Federated" means more of the IT infrastructure is
- centralized while IT personnel are distributed to each location for application support.)
- Other

Please describe your Chief Information Officer (CIO) reporting structure.
- Our CIO reports directly to the CEO.
- Our CIO reports directly to the CFO.
- Our CIO reports directly to the COO.
- Our CIO reports directly to a different executive. (Please identify their title.)
- Our organization does not have a CIO.

Instructions:
The next six sections assess your firm's current level of strategic alignment maturity by measuring your response to items related to your IT and business organization's:
   1. Communications
   2. Competency and value of IT
   3. IT governance decisions
   4. Partnerships
   5. IT infrastructure
   6. Skills resources
For each of the questions in these sections, you are asked to choose the one response that most closely represents your opinion of the effectiveness of your organization's management practices and strategic choices. If you are unsure how to answer a question without guessing, or if the item is not applicable to your organization, mark the "N/A or don't know" box and add comments as necessary.

1. Effectiveness of IT and Business Communications

To what extent does IT understand the organization's business environment (e.g., its customers, competitors, processes, partners/alliances):
- Senior and mid-level IT managers do not understand the business.
- Senior and mid-level IT managers have a limited understanding of the business.
- Senior and mid-level IT managers have a good understanding of the business.
- Understanding of the business by all IT members is encouraged and promoted by senior managers.
- Understanding of the business is required (e.g., tied to performance appraisals) throughout the IT function.
- N/A or don't know

To what extent do the business organizations understand the IT environment (e.g., its current and potential capabilities, systems, services, processes):
- Senior and mid-level business managers do not understand IT.
- Senior and mid-level business managers have a limited understanding of IT.
- Senior and mid-level business managers have a good understanding of IT.
- Understanding of IT by all employees is encouraged and promoted by senior management.
- Understanding of IT is required (e.g., tied to performance appraisals) throughout the business.

- N/A or don't know

The following statements pertain to methods in place to promote organizational education/learning (e.g., of experiences, problems, objectives, critical success factors). Organizational learning occurs primarily through:
- Ad-hoc/casual methods (employee observation, anecdote sharing, peer meetings, etc.)
- Informal methods (newsletters, bulletin board notices, computer reports, group e-mail, fax, etc.)
- Regular, clear methods (training, e-mail, phone-mail, intranet, department meetings, etc.) from mid-level management
- Formal, unifying, bonding methods from senior and mid-level management
- Formal, unifying, bonding methods from senior and mid-level management, with feedback measures to monitor and
- promote effectiveness of learning
- N/A or don't know

The following question pertains to communications protocol. The IT and business communication style tends to be:
- One-way, from the business; formal and inflexible
- One-way, from the business; moderately informal and moderately flexible
- Two-way; formal and inflexible
- Two-way; moderately informal and moderately flexible
- Two-way; informal and flexible
- N/A or don't know

The following statements pertain to the extent in which there is knowledge sharing between IT and business:
- Knowledge sharing is on an ad-hoc basis.
- Knowledge sharing is somewhat structured and/or structure is beginning to be created.
- There is structured sharing around key functional unit processes.
- There is formal sharing at the functional unit level and at the corporate level.
- There is formal sharing at the functional unit level, at the corporate level, and with business partners/alliances.
- N/A or don't know

The following statements pertain to the role and effectiveness of IT and business liaisons:
- We do not use liaisons, or if we do, we do so on an ad-hoc, as needed basis.
- We regularly use liaisons to transfer IT knowledge to the business and business knowledge to IT. They are the primary contact point for interactions between IT and the business. Liaisons are not usually used to facilitate relationship development.
- We regularly use liaisons to transfer IT knowledge to the business and business knowledge to IT. They occasionally facilitate relationship development.
- We regularly use liaisons to facilitate the transfer of IT knowledge to the business and business knowledge to IT. Their primary objective is to facilitate internal relationship development.
- We regularly use liaisons to facilitate the transfer of IT knowledge to the business and external partners and business knowledge to IT. Their primary objective is to facilitate relationship development across the business and its external partners.
- N/A or don't know

2. Measurement of the Competency and Value of IT

The following statements pertain to the metrics and processes used to measure IT's contribution to the business.
- The metrics and processes we have in place to measure IT are primarily technical (e.g., system availability, response time).
- We are equally concerned with technical and cost efficiency measures. We have limited or no formal feedback processes in place to review and take action based on the results of our measures.
- We formally assess technical and cost efficiency using traditional financial measures, such as return on investment (ROI) and activity-based costing (ABC). We are starting to put formal feedback processes in place to review and take action based on the results of our measures.
- We formally assess technical, cost efficiency, and cost effectiveness using traditional financial measures (e.g., ROI, ABC). We have formal feedback processes in place to review and take action based on the results of our measures.
- We use a multi-dimensional approach with appropriate weights given to technical, financial, operational, and human-related measures. We have formal feedback processes in place to review and take action based on the results of our measures. These measures are extended to our external partners (e.g., vendors, outsourcers, customers).
- N/A or don't know

The following statements pertain to the use of business metrics to measure contribution to the business.
- We do not measure the value of our business investments, or do so on an ad-hoc basis.
- We are concerned with cost efficiency measures at the functional organization level only. We have limited or no formal feedback processes in place to review and take action based on the results of our measures.
- We formally use traditional financial measures, such as return on investment (ROI) and activity-based costing (ABC), across functional organizations. We are starting to have formal feedback processes in place to review and take action based on the results of our measures.
- We formally measure value based on the contribution to our customers. We have formal feedback processes in place to review and take action based on the results of our measures and to assess contributions across functional organizations.
- We use a multi-dimensional approach with appropriate weights given to technical, financial, operational, and human-related measures. We have formal feedback processes in place to review and take action based on the results of our measures. These measures are extended to our external partners (e.g., vendors, outsourcers, customers).
- N/A or don't know

The following statements pertain to the use of integrated IT and business metrics to measure IT's contribution to the business.
- We do not measure the value of our IT business investments, or do so on an ad-hoc basis.
- The value measurements for IT and business are not linked. We have limited or no formal feedback processes in place to review and take action based on the results of our measures.
- The value measurements for IT and business are starting to be linked and formalized. We are also starting to have formal feedback processes in place to review and take action based on the results of our measures.
- We formally link the value measurements of IT and business. We have formal feedback processes in place to review and take action based on the results of our measures and to assess contributions across functional organizations.
- We use a multi-dimensional approach with appropriate weight given to IT and business measures. We have formal feedback processes in place to review and take action based on the results of our

measures. These measures are extended to our external partners (e.g., vendors, outsourcers, customers).
- N/A or don't know

The following statements pertain to the use of service level agreements (SLAs):
- We do not use SLAs or do so sporadically.
- We have SLAs which are primarily technically oriented (response time, length of computer downtime, etc.), between the IT and functional organizations.
- We have SLAs which are both technically oriented and relationship-oriented (user/customer satisfaction, IT's commitment to the business, etc.) that are between the IT and functional organizations and also emerging across the enterprise.
- We have SLAs which are both technically-oriented and relationship-oriented, between the IT and functional organizations as well as enterprise wide.
- We have SLAs which are both technically-oriented and relationship-oriented, between the IT and functional organizations as well as at enterprise wide and with our external partners/alliances.
- N/A or don't know

The following statements pertain to benchmarking practices. Informal practices include informal interviews, literature searches, company visits, etc. Formal practices include environmental scanning, data gathering and analysis, determining best practices, etc.
- We seldom or never perform either informal or formal benchmarks.
- We occasionally or routinely perform informal benchmarks.
- We occasionally perform formal benchmarks and seldom take action based on the findings.
- We routinely perform formal benchmarks and usually take action based on the findings.
- We routinely perform formal benchmarks and have a regulated process in place to take action and measure the changes.
- N/A or don't know

The following statements pertain to the extent of assessment and review of IT investments.
- We do not formally assess and/or review.
- We assess and/or review only after we have a business or IT problem (i.e., failed IT project, market share loss).
- Assessments and/or reviews are becoming routine occurrences.
- We routinely assess and/or review and have a formal process in place to make changes based on the results.
- We routinely assess and/or review and have a formal process in place to make changes based on the results and measure the changes. Our external partners are included in the process.
- N/A or don't know

The following statements pertain to the extent to which IT-business continuous improvement practices (e.g., quality circles, quality reviews) and effectiveness measures are in place.
- We do not have any continuous improvement practices in place.
- We have a few continuous improvement practices in place, but no effectiveness measures are in place.
- We have a few continuous improvement practices in place and the use of effectiveness measures is emerging.
- We have many continuous improvement practices in place and we frequently measure their effectiveness.
- We have well established continuous improvement practices and effectiveness measures in place.
- N/A or don't know

The demonstrated contribution that the IT function has made to the accomplishment of the organization's strategic goals is:

- Very weak
- Somewhat weak
- Neither weak nor strong
- Somewhat strong
- Very strong
- N/A or don't know

The following statements pertain to strategic business planning with IT participation.

- We do no formal strategic business planning or, if it is done, it is done on an as-needed basis.
- We do formal strategic business planning at the functional unit level with slight IT participation.
- We do formal strategic business planning at the functional unit levels with some IT participation. There is some interorganizational planning.
- We do formal strategic business planning at the functional unit and across the enterprise with IT participation.
- We do formal strategic business planning at the functional unit, across the enterprise, and with our business partners/alliances with IT participation.
- N/A or don't know

The following statements pertain to strategic IT planning with business participation.

- We do no formal strategic IT planning or, if it is done, it is done on an as-needed basis.
- We do formal strategic IT planning at the functional unit level with slight business participation.
- We do formal strategic IT planning at the functional unit levels with some business participation. There is some interorganizational planning.
- We do formal strategic IT planning at the functional unit and across the enterprise with the business.
- We do formal strategic business planning at the functional unit, across the enterprise, and with our business partners/alliances.
- N/A or don't know

The following statements pertain to IT budgeting. Our IT function is budgeted as a:

- Cost center, with erratic/inconsistent/irregular/changeable spending
- Cost center, by functional organization
- Cost center with some projects treated as investments
- Investment center
- Profit center, where IT generates revenues
- N/A or don't know

The following statements pertain to IT investment decisions. Our IT investment decisions are primarily based on IT's ability to:

- Reduce costs.
- Increase productivity and efficiency as the focus.
- Traditional financial reviews. IT is seen as a process enabler.
- Business effectiveness is the focus. IT is seen as a process driver or business strategy enabler.
- Create competitive advantage and increase profit. Our business partners see value.
- N/A or don't know

The following statements pertain to IT steering committee(s) with senior level IT and business management participation.
- We do not have formal/regular steering committee(s).
- We have committee(s) which meet informally on an as-needed basis.
- We have formal committees, which meet regularly and have emerging effectiveness.
- We have formal, regular committee meetings with demonstrated effectiveness.
- We have formal, regular committee meetings with demonstrated effectiveness that include strategic business partners sharing decision-making responsibilities.
- N/A or don't know

The following statements pertain to how IT projects are prioritized. Our IT project prioritization process is usually:
- In reaction to a business or IT need.
- Determined by the IT function.
- Determined by the business function.
- Mutually determined between senior and mid-level IT and business management.
- Mutually determined between senior and mid-level IT and business management and with consideration of the priorities of any business partners/alliances.
- N/A or don't know

The ability of the IT function to react/respond quickly to the organization's changing business needs is:
- Very weak
- Somewhat weak
- Neither weak nor strong
- Somewhat strong
- Very strong
- N/A or don't know

4. Partnerships Between IT And Business Functions

IT is perceived by the business as:
- A cost of doing business
- Emerging as an asset
- A fundamental enabler of future business activity
- A fundamental driver of future business activity
- A partner with the business that co-adapts/improvises in bringing value to the firm
- N/A or don't know

The following statements pertain to the role of IT in strategic business planning.
- IT does not have a role.
- IT is used to enable business processes.
- IT is used to drive business processes.
- IT is used to enable or drive business strategy.
- IT co-adapts with the business to enable/drive strategic objectives.
- N/A or don't know

The following statements pertain to the sharing (by IT and business management) of the risks and rewards (e.g., bonuses) associated with IT-based initiatives (i.e., a project is late and over budget because of business requirement changes).
- IT takes all the risks and does not receive any of the rewards.
- IT takes most of the risks with little reward.
- Sharing of risks and rewards is emerging.
- Risks and rewards are always shared.
- Risks and rewards are always shared and we have formal compensation and reward systems in place that induce managers to take risks.
- N/A or don't know

The following statements pertain to formally managing the IT/business relationship. To what extent are there formal processes in place that focus on enhancing the partnership relationships that exist between IT and business (e.g., cross-functional teams, training, risk/reward sharing):
- We don't manage our relationships.
- We manage our relationships on an ad-hoc basis.
- We have defined programs to manage our relationships, but IT or the business does not always comply with them.
- Conflict is seen as creative rather than disruptive.
- We have defined programs to manage our relationships and both IT and the business comply with them.
- We have defined programs to manage our relationships, both IT and the business comply with them, and we are continuously improving them.
- N/A or don't know

The following statements pertain to IT and business relationship and trust.
- There is a sense of conflict and mistrust between IT and the business.
- The association is primarily an "arm's length" transactional style of relationship.
- IT is emerging as a valued service provider.
- The association is primarily a long-term partnership style of relationship.
- The association is a long-term partnership and valued service provider.
- N/A or don't know

The following statements pertain to business sponsors/champions. Our IT-based initiatives:
- Do not usually have a senior level IT or business sponsor/champion.
- Often have a senior level IT sponsor/champion only.
- Often have a senior level IT and business sponsor/champion at the functional unit level.
- Often have a senior level IT and business sponsor/champion at the corporate level.
- Often have a senior level IT and the CEO as the business/sponsor champion.
- N/A or don't know

5. Scope And Architecture of the IT Infrastructure

The following statements pertain to the scope of your IT systems. Our primary systems are:
- Traditional office support (e.g., e-mail, accounting, word processing, legacy systems)
- Transaction-oriented (e.g., back office support)
- Business process enablers (IT supports business process change)
- Business process drivers (IT is a catalyst for business process change)
- Business strategy enablers/drivers (IT is a catalyst for changes in the business strategy)
- N/A or don't know

The following statements pertain to the articulation of and compliance with IT standards. Our IT standards are:

- Non-existent or not enforced
- Defined and enforced at the functional unit level but not across different functional units
- Defined and enforced at the functional unit level with emerging coordination across functional units
- Defined and enforced across functional units
- Defined and enforced across functional units, and with joint coordination among our strategic business partners/alliances
- N/A or don't know

The following statements pertain to the scope of architectural integration. The components of our IT infrastructure are:

- Not well integrated
- Integrated at the functional unit with emerging integration across functional units
- Integrated across functional units
- Integrated across functional units and our strategic business partners/alliances
- Evolving with our business partners
- N/A or don't know

The following statements pertain to the level of disruption caused by business and IT changes (e.g., implementation of a new technology, business process, merger/acquisition). Most of the time, a business or IT change is:

- Not readily transparent (very disruptive)
- Transparent at the functional level only
- Transparent at the functional level and emerging across all remote, branch, and mobile locations
- Transparent across the entire organization
- Transparent across the organization and to our business partners/alliances
- N/A or don't know

The following statements pertain to the scope of IT infrastructure flexibility to business and technology changes. Our IT infrastructure is viewed as:

- A utility providing the basic IT services at minimum cost
- Emerging as driven by the requirements of the current business strategy
- Driven by the requirements of the current business strategy
- Emerging as a resource to enable fast response to changes in the marketplace
- A resource to enable and drive fast response to changes in the marketplace
- N/A or don't know

6. Human Resource Skills

The following statements pertain to the extent the organization fosters an innovative entrepreneurial environment. Entrepreneurship is:

- Discouraged
- Moderately encouraged at the functional unit level
- Strongly encouraged at the functional unit level
- Strongly encouraged at the functional unit and corporate levels
- Strongly encouraged at the functional unit, corporate level, and with business partners/alliances
- N/A or don't know

The following statements pertain to the cultural locus of power in making IT-based decisions. Our important IT decisions are made by:

- Top business management or IT management at the corporate level only
- Top business or IT management at corporate level with emerging functional unit level influence
- Top business management at corporate and functional unit levels, with emerging shared influence from IT management
- Top management (business and IT) across the organization and emerging influence from our business partners/alliances.
- Top management across the organization with equal influence from our business partners/alliances.
- N/A or don't know

The following statements pertain to your organization's readiness for change.

- We tend to resist change.
- We recognize the need for change and change readiness programs are emerging.
- Change readiness programs providing training and necessary skills to implement change are in place at the functional unit level.
- Change readiness programs are in place at the corporate level.
- Change readiness programs are in place at the corporate level and we are proactive and anticipate change.
- N/A or don't know

The following statements pertain to career crossover opportunities among IT and business personnel.

- Job transfers rarely or never occur.
- Job transfers occasionally occur within the functional organization.
- Job transfers regularly occur for management level positions usually at the functional level.
- Job transfers regularly occur for all position levels and within the functional units.
- Job transfers regularly occur for all position levels, within the functional units, and at the corporate level.
- N/A or don't know

The following statements pertain to employee opportunities to learn about and support services outside the employee's functional unit (e.g., programmers trained in product/service production functions, customer service trained in systems analysis) using programs such as cross training and job rotation. The organization:

- Does not provide opportunities to learn about support services outside the employee's functional unit.
- Opportunities are dependent on the functional unit.
- Formal programs are practiced by all functional units.
- Formal programs are practiced by all functional units and across the enterprise.
- Opportunities are formally available across the enterprise and with business partners/alliances.
- N/A or don't know

The following statements pertain to the interpersonal interaction (e.g., trust, confidence, cultural, social, and political environment) that exists across IT and business units in our organization.

- There is minimum interaction between IT and business units.
- The association is primarily an "arm's length" transactional style of relationship.
- Trust and confidence among IT and business is emerging.
- Trust and confidence among IT and business is achieved.
- Trust and confidence is extended to external customers and partners.

- N/A or don't know

The following statements pertain to the IT organization's ability to attract and retain the best business and technical professionals.
- There is no formal program to retain IT professionals. Recruiting demands are filled ineffectively.
- IT hiring is focused on technical expertise.
- IT hiring is focused equally on technical and business expertise. Retention programs are in place.
- Formal programs are in place to attract and retain the best IT professionals with both technical and business skills.
- Effective programs are in place to attract and retain the best IT professionals with both technical and business skills.
- N/A or don't know

Instructions:
The following is a list of typical business management values. How important are the following items to you in your day-to-day work?
- Organizational effectiveness
- High morale
- Organizational reputation
- Organizational efficiency
- High productivity
- Organizational stability
- Organizational growth
- Organizational value to community
- Profit maximization
- Service to the public

Instructions:
The following items reflect your perception of IT's contribution to business value and firm performance within your organization. Please rate your level of agreement with each one.

IT has enabled our company to expand its market share.
- Strongly Disagree
- Disagree Somewhat
- Disagree
- Neither Agree nor Disagree
- Somewhat Agree
- Agree
- Strongly Agree

IT has enabled our company to increase its market dominance.

Our company has strengthened its core business due to IT.

IT has enabled our company to improve administrative efficiency.

IT has enabled our company to improve productivity.

If you had any problems or concerns with this survey or if any wording was unclear, please provide your feedback here. [optional]

If you would like to enter the drawing for a $50 gift card to Amazon.com, please enter your email address here.
[optional]

If you would like a copy of the aggregated results when published, please provide your email address here [optional].

*** Thank you for your help in this important research effort! ***

APPENDIX F

IRB APPROVALS

From: **IRB** <irbcorre@uncg.edu>
Date: Wed, Jul 6, 2011 at 10:22 AM
Subject: IRB Notice
To: pcpalvia@uncg.edu
Cc: tfjacks@uncg.edu, cifarrio@uncg.edu, irbcorre@uncg.edu

To: Prashant Palvia
Information Systems and Oper Mgt
441-B Bryan Building

From: UNCG IRB

Date: 7/06/2011

RE: Notice of IRB Exemption
Exemption Category: 2.Survey, interview, public observation
Study #: 11-0250 **Study Title**: Interpreting IT Occupational Culture

This submission has been reviewed by the above IRB and was determined to be exempt from further review according to the regulatory category cited above under 45 CFR 46.101(b).

Study Description:
The purpose of this project is to get a better understanding of the occupational culture of Information Technology professionals.

Investigator's Responsibilities
Please be aware that any changes to your protocol must be reviewed by the IRB prior to being implemented. The IRB will maintain records for this study for three years from the date of the original determination of exempt status.

CC:Tim Jacks, Deans Office Bryan Schl Of Bande, Chris Farrior, (ORED), Non-IRB Review Contact, (ORC), Non-IRB Review Contact

From: **IRB** <irbcorre@uncg.edu>
Date: Tue, Jan 24, 2012 at 10:40 AM
Subject: IRB Notice
To: pcpalvia@uncg.edu
Cc: tfjacks@uncg.edu, irbcorre@uncg.edu

To: Prashant Palvia
Information Systems and Oper Mgt
441-B Bryan Building

From: UNCG IRB
Date: 1/24/2012

RE: Notice of IRB Exemption
Exemption Category: 2.Survey, interview, public observation
Study #: 12-0012
Study Title: Measuring IT Occupational Culture

This submission has been reviewed by the above IRB and was determined to be exempt
from further review according to the regulatory category cited above under 45 CFR
46.101(b).

Study Description:
This study will examine different aspects of IT occupational culture and their impact on
IT/business alignment as well as firm performance.

Investigator's Responsibilities
Please be aware that any changes to your protocol must be reviewed by the IRB prior to
being implemented. The IRB will maintain records for this study for three years from the
date of the original determination of exempt status.

CC: Tim Jacks