An Ideology of IT Occupational Culture: The ASPIRE Values

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Abstract:

Many have conjectured that people in the IT occupation are different from non-IT business users and that such differences can lead to negative organizational outcomes. This study investigates how to measure these differences by developing a new, expanded theoretical framework of IT occupational culture (ITOC). This framework includes: Artifacts, Values, and Tacit Assumptions. Values form the core of any culture, and a cohesive set of cultural values is termed an "ideology." Using a mixed methodology, research was conducted in two parts to develop and measure an ideology of ITOC. A qualitative investigation based on interview data provided evidence of six core values in the ideology: Autonomy in Decision-Making, Structure in Environment, Precision in Communication, Innovation in Technology, Reverence for Technical Knowledge, and Enjoyment at the Workplace (ASPIRE). The quantitative investigation sought to validate the values and ultimately reduced the number of values to five based on factor analysis of survey data: Autonomy in Decision-Making, Structure/Precision, Innovation in Technology, Reverence for Technical Knowledge, and Enjoyment at the Workplace. IT respondents rated these values significantly higher than non-IT business personnel. Our findings have implications for practitioners and researchers and can provide a path to bridge the gap between IT and business users.

Keywords: Occupational Culture | Values | Ideology | IT Profession | Strategic Alignment

Article:

Introduction

The relationship between IT (Information Technology) departments and other business units in a firm has been described as a troubled marriage in need of counseling (Ward & Peppard, 1996). Terms like “cultural chasm,” “cultural gap,” and “culture clash” are frequently used to describe the frustrating lack of shared understanding between IT and non-IT employees (Guzman & Stanton, 2004; Nord et al., 2007B; Willcoxson & Chatham, 2006). In fact, the theme of friction between IT and business is almost as old as the occupation itself (Gregory, 1983). A common view is that the business sees IT as too focused on technology instead of the interests of the organization, while IT sees business users as “technologically inept and insufficiently aware of

the importance and complexity of IT" (van den Hooff & de Winter, 2011, p. 255). As a result, IT-business strategic (mis-)alignment has been an ongoing concern for senior managers (Kappelman et al., 2016). Strategic alignment (or simply alignment) is the business and IT working together to reach a common goal (Campbell, 2005), and is also referred to as linkage, harmony, integration, fit, and fusion (Tallon, 2007/2008; Chan & Reich, 2007). Culture can be an important antecedent of IT-business strategic alignment where cultural differences can lead to misalignment and negative organizational outcomes (Chan & Reich, 2007). This study seeks to explain such differences as a difference in occupational ideologies where an ideology is a cohesive set of cultural values (Trice, 1993).

Older studies have attempted to examine the differences between IT and business users with the lens of psychology. These studies asserted that the same personality types self-select into psychologically compatible occupations (Holland, 1966; Strong, 1943). But studies based on psychological constructs alone have seen mixed results in uncovering differences between IT and non-IT personnel. Couger and Zawacki (1980) developed a model of psychological motivational differences between IT personnel and management personnel using five core job dimensions of Skill Variety, Task Identity, Task Significance, Feedback, and Autonomy. They concluded that IT personnel have low social needs and high growth needs. However, later studies using the same model were unable to replicate their results. For example, Ferratt and Short (1986) as well as Veneri (1988) were unable to find significant differences in psychological motivators between IT and non-IT personnel. The Couger and Zawacki (1980) model was based on the classic 40-year old Job Diagnostic Survey from Hackman and Oldham (1974) and may not be appropriate for studying the new IT occupation. Even Myers-Briggs personality tests comparing IT personnel and business managers have not shown significant differences between the two groups (Willcoxson & Chatham, 2006). Cultural studies, on the other hand, offer more promise. They assert that occupation can have a stronger influence on personality than the other way around (Trice, 1993; Guzman et al., 2008). Thus, examining cultural differences may have more explanatory value than looking for personality differences between IT and business personnel.

Some studies on IT/business misalignment have examined this clash as an aspect of culture at the organizational level (Plisken et al., 1993; Iivari & Huisman, 2007). But the problem seems larger than that. How can it be a problem of organizational culture if the friction is common to all, or at least most, organizations? IT is frequently described as having its own culture which is different from and clashes with business management culture (Ward & Peppard, 1996; Nord et al., 2007B). Therefore, we must look outside individual firms and examine the IT occupation as a whole. Information Systems (IS) studies on culture have typically focused on the national and organizational level of cultural analysis (Gallivan & Srite, 2005). But Edgar Schein, the preeminent scholar of organizational culture, says that organizational culture is no longer the relevant topic and that "the most important driver of behavior derives neither from country nor organization, but from occupation" (Schein, 2015).

Thus, information technology occupational culture (ITOC) has become a topic of growing importance for both research and practice (Guzman & Stanton, 2009; Schein, 2010; Ramachandran & Rao, 2011). ITOC is defined as the basic assumptions, cultural forms, ideologies, and behaviors that grow uniquely in the context of the IT occupation (Guzman et al.,

2008). It has been argued that IT professionals have their own unique occupational culture that spans across organizations and industries (Guzman et al., 2008; Rao & Ramachandran, 2011).

There is some debate as to who should be included as members of the IT occupation. The lines between IT people and business users can sometimes become fluid as employees move between IT and non-IT roles in an organization (Guzman et al., 2008; Kaarst-Brown & Guzman, 2005). But a working definition of who is in the IT occupation is

> the workers who design, build, and manage application systems, who introduce them and other related IT into organizational environments, who operate, maintain, extend, and manage the IT, and who provide training, documentation, and support for the organizational context in which these systems are embedded. (Niederman et al., 2016)

Managing IT personnel requires a good understanding of their occupational culture (Dinger et al., 2016). Because we cannot manage what we cannot measure, the IS literature has repeatedly called for the development of measurable dimensions of IT worker values (Kaarst-Brown & Robey, 1999; Leidner & Kayworth, 2006; Niederman & Krasteva, 2012). In order to understand a specific culture, one must understand its particular values (Brief & Nord, 1990; Schein, 2010). Values are broad tendencies towards certain states of affairs that address what is evil versus good, forbidden versus permitted, and abnormal versus normal (Hofstede & Hofstede, 2005). Values form the core of a culture (Brief & Nord, 1990; Hofstede & Hofstede, 2005; Schein, 2010). Values have a strong influence on individual choices and behavior (Schein, 2010). Therefore, studying ITOC can aid in understanding how and why IT professionals in organizations work and interact with other organizational stakeholders the way that they do.

If we look to other fields, we find examples of where occupational values have been identified. For example, journalists seem to share five core values, namely: Public Service, Objectivity, Autonomy, Immediacy, and Ethics (Deuze, 2005). The occupational values of nurses include Managerialism, Credentialism (Chua & Clegg, 2007) and Decision-making (Rhodes, 1985). These value frameworks can be termed an "ideology" because they represent a cohesive set of values that depict what is fundamentally important to a cultural group (Trice, 1993). The following is a detailed example of the ideology of the Accounting occupation that highlights the values of order, rationality, and accurate reporting:

> 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 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)

The study of ITOC ideology is important for two reasons. First, when two or more groups interact who do not share a common set of values, cultural conflict can result (Leidner & Kayworth, 2006; Nord et al., 2007A). Thus, when the IT occupational group interacts with a different occupational group, it can lead to cultural conflict in the workplace (Nord et al., 2007A; Rao & Ramachandran, 2011). Second, cultural conflict at work can negatively impact business

outcomes (Jin & Rounds, 2011). IT professionals need to have positive interactions with business users for IS projects to succeed (Iivari & Huisman, 2007; Hirschheim & Newman, 1991). A congruence of values can lead to positive outcomes (Jin & Rounds, 2011).

This study is a major enhancement of the research begun in Jacks and Palvia (2014) that proposed six values for IT occupational culture based on a small sample. While their results were tentative, the present study extends their work in a substantial manner with a larger and more diverse sample. Specifically, our objectives are: 1) to develop an ITOC framework of value dimensions based on a qualitative study, and 2) to measure and validate those ITOC value dimensions with a quantitative study. We use a mixed methodology of qualitative interviews (Part I) and quantitative survey (Part II) in the pursuit of this goal. By doing so, this research aims to gain an increased ability to understand how IT professionals behave and interact with stakeholders outside of the IT department based on occupational cultural differences. In Part II, we also compare the survey results of IT professionals and non-IT business managers. The rationale for doing so is to provide evidence that we are identifying important value dimensions of IT occupational culture and address the potential argument that the values might be common to all professions. Our study addresses the call for more research on differences in occupational cultures in order to help bridge the gap between business and IT (Guzman & Stanton, 2009).

The paper is organized as follows. We first present the theoretical foundation for an expanded model of IT occupational culture in the broader context of culture studies. We then explain our mixed methods methodology as well as a narrative of how the results of the Part I qualitative study informed the development of the instrument used in Part II. The results of the Part II study show the measurable aspects of the ITOC ideology and how they were rated by IT and non-IT business users across various organizations. The next section discusses and interprets the findings of both studies. The remaining sections address the contributions, limitations, and future directions for research.

Theoretical Foundation

Culture studies in IS research have a rich history (Kappos & Rivard, 2008; Leidner & Kayworth, 2006; Srite & Karahanna, 2006). There are many definitions of culture ranging from mechanical views—culture is the collective programming of the mind (Hofstede & Hofstede, 2005) or culture is the operating system of the mind (English-Lueck, 2002)—to more metaphorical views where culture is a historically transmitted pattern of meanings embodied in symbols (Geertz, 1973). A common view of culture that guides business and IS literature is the following:

> culture is a pattern of shared basic assumptions learned by a group as it solved its problems of external adaptation and internal integration, which has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems. (Schein 2010, p. 18)

Culture can be observed at different levels of analysis (Karahanna et al., 2005) and has been modeled as a "virtual onion" with many layers (Straub et al., 2002). Building on the "virtual onion" model, a "spinning top" model has also been proposed (see Figure 1) that emphasizes the dynamic nature of the layers of culture spinning around the individual which affect their attitudes

and behaviors (Walsh & Kefi, 2008). The current study focuses on the occupational layer of the spinning top.

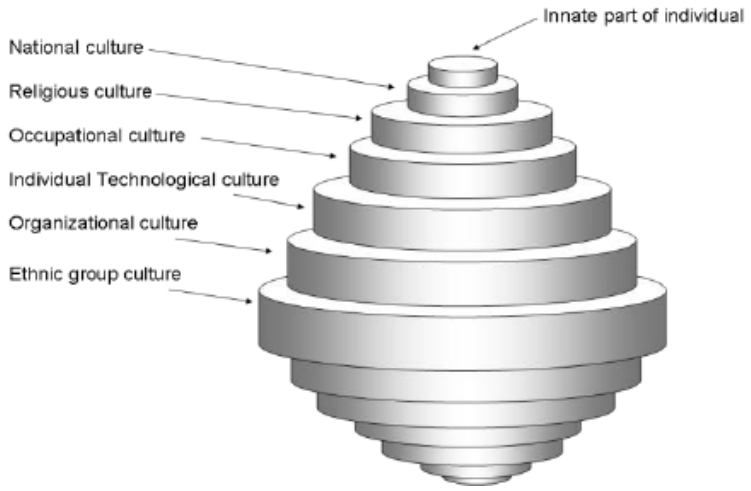

Figure 1. 'Spinning Top' model of culture (adapted from Walsh & Kefi, 2008)

Occupations can have their own cultures (Trice, 1993). Occupational culture differs from organizational culture in that it spans the boundaries of individual organizations (Guzman et al., 2008; Trice, 1993). While the term occupational "subculture" refers to manifestations of occupational culture within a firm, occupational culture is a broader term applying to all members of the occupation (Trice, 1993). According to Trice's Theory of Occupational Culture (Trice, 1993), occupational cultures develop from shared educational, personal, and work experiences of individuals who 1) pursue the same occupation, 2) share a similar ideology (i.e., a cohesive set of values), and 3) share in seven identifying cultural characteristics (Trice, 1993; Guzman et al., 2008). Regarding the third criteria, an occupation has its own distinct culture if and only if it has the following cultural characteristics: 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.

We now have a body of evidence in IS literature demonstrating that there is, indeed, such a thing as ITOC because of extensive qualitative and quantitative evidence for the presence of the seven characteristics (Guzman & Stanton, 2009; Guzman et al., 2008; Rao & Ramachandran, 2011). While past IS researchers have addressed various issues closely related to IT as an occupational group (Orlikowski & Baroudi, 1989; Duliba & Baroudi, 1991; Hirschheim & Newman, 1991), the explicit use of occupational culture as a theoretical framework was initiated by Guzman et al. (2008). Their proposition was that people who are part of IT occupations conform to an occupational culture that is characterized by a set of group dimensions that correspond with Trice's conception of occupational culture. Qualitative evidence based on interviews found that all seven characteristics were present in the IT occupation. A follow-up study by Guzman and Stanton (2009) confirmed the existence of ITOC using a mixed methodology and provided evidence that cultural fit with the seven ITOC characteristics is a good predictor of occupational commitment. They called for additional research on the differences between occupational cultures in order to find ways to bridge the gap between cultures and increase collaboration in organizations.

Rao and Ramachandran (2011) expanded on Guzman et al.'s (2008) foundation of ITOC in order to both validate the framework as well as to identify potential areas of conflict between the IT occupational group and the business manager occupational group. They identified four areas of potential conflict: 1) the role that IT should play in the organization (primary vs. support), 2) the jargon that IT uses that makes it difficult for nontechnical people to understand, 3) IT's desire for more user input but simultaneous distrust of the user's IT knowledge, and 4) IT's desire for a flatter organization even though it admits a hierarchy is necessary. Similar to Guzman et al. (2008), Rao and Ramachandran (2011) were able to validate the presence of the seven group dimensions indicating the presence of a distinct ITOC. They also indicated that occupational culture is a complex phenomenon and may require a series of studies in order to fully understand ITOC.

Guzman and Stanton (2009) successfully identified the seven characteristics in Trice's conception of occupational culture but did not focus on the other half of Trice's theory: a shared ideology of values. The substance of culture—an ideology—is a set of taken-for-granted, emotionally charged values and beliefs that are characteristic of a particular cultural group (Trice, 1993; Campbell, 2004; Deuze, 2005). These shared values form the core of a culture (Brief & Nord, 1990; Hofstede & Hofstede, 2005; Schein, 2010) and bind a group together. Cultural values represent strong and enduring preferences for ultimate ideals that are worth striving for (Rokeach, 1973; Plisken et al., 1993). Values are typically more stable than practices (Hofstede & Hofstede, 2005) and occupational values, in particular, are more stable than personality traits even across different age categories (Jin & Rounds, 2011).

A more comprehensive view of culture was developed by Edgar Schein (1985) and is frequently mentioned (Guzman et al., 2008; Rao & Ramachandran, 2011), but has not yet been fully incorporated into ITOC. In Schein's broader model of culture, culture can be divided into three components: 1) Artifacts (observable phenomena that provide cues for how things are done in the group), 2) Values (explicitly stated claims of ideals and desires for the group), and 3) Tacit Assumptions (taken-for-granted assumptions that are non-negotiable) (Schein, 1985; Schein, 2010). The third element of Tacit Assumptions represents the internalized values of the group and gets at the very heart of the culture. Furthermore, this model can be applied to any level of analysis (national, organizational, or occupational).

When we apply this model to ITOC, we see that Schein's Artifacts correspond closely with Trice's cultural characteristics because they are the initially observable artifacts of culture. They are easy to observe but difficult to decipher without understanding the deeper elements of culture. Both the Schein and the Trice models agree that the Artifact layer represents the outer manifestation of more deeply held values. But Trice's conception of Ideology blurs the distinction that Schein makes between Espoused Values and Tacit Assumptions. Espoused Values (henceforth simply "values") include shared beliefs and values which are frequently embodied in a guiding ideology (Schein, 2010). Ultimately, the shared values and beliefs become shared Tacit Assumptions if the actions based on them continue to be successful and continue to be reinforced by the group over time (Schein, 2010). Tacit Assumptions become common sense for the group, and violating them becomes inconceivable. Schein uses the example of Engineering's tacit assumption that it would be inconceivable to design something unsafe

because of a core value of Safety in its ideology. Of the three layers, Schein argues that values are the most appropriate layer to study because they are 1) easier to measure than tacit assumptions and 2) easier to decipher than artifacts (Schein, 2010).

We therefore propose that the Spinning Top of culture described above can be sliced through to reveal a cross section. Each layer of culture has its own Artifacts, Values, and Tacit Assumptions. This forms an expanded model of ITOC (see Figure 2 showing this cross section). It builds on the work of Guzman et al. (2008) and Rao and Ramachandran (2011) but incorporates their work into a broader framework of culture. The advantage of this expanded model is that it clearly highlights what we know about ITOC and what is still left to explore.

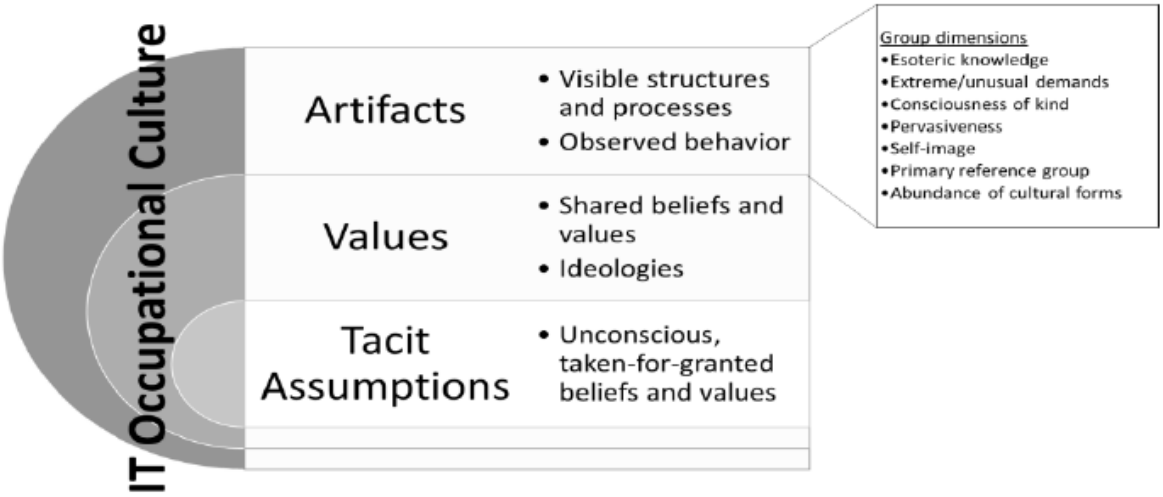

Figure 2. Expanded Model of IT Occupational Culture

Returning to Trice's framework, the seven group dimensions reside at the level of Artifacts. These dimensions focus on the outer structural layer of ITOC. For example, "Extreme and Unusual Demands" does not express a desire for an ideal; therefore, it is not a value, *per se*, but rather a manifestation of the outer structure. The same can be said for the other dimensions. These are the shared and observable group characteristics or tribal markers of ITOC. But without the values and explicit ideology, we do not have the entire picture. Using the expanded model, we now have a path to uncover the core of culture, and it is through examining values. Thus we also have a more general theory of culture that incorporates the spinning top model, Schein's culture model, and Trice's occupational culture model. It is likely that many important Tacit Assumptions have already been gathered in prior ITOC research as well. Table 1 provides a matrix of how the characteristics of ITOC map onto the expanded model including examples of potential Tacit Assumptions.

To fill in the missing gap of values, an initial exploration of defining measurable ITOC values was begun in Jacks and Palvia (2014) based on the constructs defined by Guzman et al. (2008). Six ITOC values were proposed based on literature and qualitative interviews. These were Structure of Power, Control, Open Communication, Risk, Reverence for Knowledge, and Enjoyment. Definitions of these values are shown in Table 2. This initial project provided quantitative evidence of the homogeneity of values between different groups of IT employees. However, it was only a pilot study providing tentative results based on a small sample size of

seven interviews and a survey of seventy-nine respondents. The pilot study served as the starting point for the current research which included a larger sample size, rigorous analysis methods and heterogeneity among IT and non-IT users.

Table 1. ITOC Elements in the Expanded Model

	Guzman et al 2008	Guzman & Stanton 2009	Rao & Ramachandran 2011
Artifacts			
Esoteric knowledge	×	×	×
Extreme or unusual demands	×	×	×
Consciousness of kind	×	×	×
Primary reference group	×		×
Social image of occupation	×		×
Cultural forms	×	×	×
Pervasiveness		×	×
Values			
Tacit Assumptions (examples)			
Technical knowledge is valuable.	×		
Need to have constant self re-education	×		
Miscommunication can result from not using precise jargon			×
Users do not have sufficient technical knowledge.		×	
IS managers do not have sufficient technical knowledge			×
Non-IS managers have unrealistic expectations of IT personnel			×
Flatter hierarchies are better.			×

Table 2. Initial ITOC Values from the Pilot from Jacks & Palvia (2014)

Occupational value	Definition
Structure of power	The level to which members of the IT occupation believe that power should be distributed versus being centralized.
Control	The level to which members of the IT occupation believe that they should have more formal, structured control processes.
Open Communication	The level to which members of the IT occupation believe that they should communicate openly with other groups outside of IT.
Risk	The level to which members of the IT occupation believe that they should be comfortable with taking risks in order to innovate.
Reverence for Knowledge	The level to which members of the IT occupation believe that they should accept distinctions between members on the basis of IT technical knowledge.
Enjoyment	The level to which members of the IT occupation believe that work should have certain play-like aspects like fun, creativity, and challenge.

Mixed Methodology

Our mixed methodology approach mimics that used by Guzman and Stanton (2009) and van den Hooff and de Winter (2011) where a qualitative strand of investigation leads to theory development that can be further tested in a quantitative approach. A mixed methodology combines qualitative and quantitative data collection methods and analysis techniques in a single study to increase the robustness of the results. Calls for increased use of mixed methodologies in

IS have been made in order to gain benefits of both depth and breadth in the understanding of a phenomenon (Venkatesh et al., 2013).

The pilot study (Jacks & Palvia, 2014) provided the value codes as the starting point for the interview protocol in the full study. After the initial pilot interviews, it was necessary to do additional interviews to ensure that the value constructs were conceptualized well. Construct conceptualization is the most critical element of scale creation and validation (MacKenzie et al., 2011). Part I of the full study included qualitative interviews with IT professionals. Part I results are presented here together with a discussion of how they informed Part II. Part II included a quantitative survey for the creation and validation of an ITOC instrument. It also compared IT professionals with non-IT business personnel.

Part I: Qualitative Interviews

Twenty-five qualitative semi-structured interviews were conducted with IT professionals to explore the values that are important in their occupation. Where Guzman and Stanton (2009) examined perceptions of IT occupational culture by interviewing IT *students*, this study extends their work by interviewing people who were employed in IT for at least seven years. Additional interviews beyond the 25 were not necessary as a level of saturation was reached where new information no longer added to understanding (Creswell, 2007). As we progressed through the interviews and examined the transcripts, recurring themes began to emerge.

Subjects for the interviews were selected using purposeful sampling in order to obtain a broad range of demographics (Creswell, 2007). These demographics included variations in age, gender, years of experience, industry, and type of IT role (see Appendix B). The two selection criteria for interviewing IT professionals were 1) they had worked in the field for at least seven years, and 2) they had worked in IT departments of multiple organizations and not just one company. Appropriate participants were obtained through 1) professional contacts, 2) asking interviewees if they knew other professional associates willing to be interviewed (a technique known as "snowballing"), and 3) a large IT services recruiting firm that provided additional contacts that met the selection criteria. In this way, we sought to reduce the effects of selection bias. The interview protocol is presented in Appendix A.

Table 3. 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

Each interview lasted from one to two hours. All interviews were conducted face-to-face, recorded, and then immediately transcribed. All the transcriptions were provided to the interviewees for validation and they were allowed to make amendments in order to increase data reliability (Yin, 2003). All interviewees were allowed as much time as they needed to describe and illustrate their occupational values. They were repeatedly prompted with "what else is important to IT workers?" in order to reduce the chance of important issues being overlooked.

The analysis of the interviews involved two stages: 1) coding and 2) content analysis. The overall approach for the qualitative analysis is shown in Table 3.

All transcriptions were imported into the online qualitative analysis software Dedoose for coding. Coding followed standard protocols of descriptive coding for demographics, topic coding by subject, and pattern coding into larger categories (Richards, 2005). While the initial codes were based on the six ITOC value themes from Jacks and Palvia (2014) as a starting point, many new codes emerged from the interviews. The goal was to avoid straitjacketing data into an anticipated form and allow the data to speak for itself, seeking as much conceptual clarity as possible. Verification of consistency of coding over time was accomplished by revisiting the coding of initial interviews and in some cases recoding from scratch for comparison.

Qualitative content analysis includes 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 (Saldana, 2009; Weber, 1990); all of these techniques were used. Themes are the outcomes of coding and categorization based on rigorous and thoughtful content analysis (Saldana, 2009).

Analytic/thematic coding is what leads to theory emergence and theory confirmation (Richards, 2005). Analytic coding required deeper thinking about the core values that might be represented by different statements from the interviewees. The set of categories was distilled into a more concise set of major themes based not only on category frequency but also careful reflection over the course of a year. 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 true to the context of *what* was said, *how* it was said, and also what was *not* said. While the themes reflected some similarities with the pilot study, the major ideological themes were not the same. How these themes changed are part of our journey of discovery.

Reliability in qualitative research refers to repeatability and consistency of processes, i.e., interviewing, handling of qualitative data, and coding (Richards, 2005; Venkatesh et al., 2013; Weber, 1990). Because the interviews were conducted using a protocol template, 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 can be considered reliable (Saldana, 2009).

Validity in qualitative research refers to credibility, plausibility, and confirmability (Richards, 2005; Venkatesh et al., 2013). Because all interviewees were allowed to make corrections and clarifications of their transcribed conversations and none of them gave any indication of being disingenuous in their answers, the data can be considered to have high validity. Respondent validation is a popular method of checking validity (Richards, 2005) so the stronger test of validity was sending the value definitions back to the interview participants to get their feedback. The consensus of the feedback was extremely positive and there was agreement that this formed the core of ITOC values.

Mixed Methodology: Part I Results

There were six core value themes that emerged from the shared value categories and thus capture an ideology of IT occupational values. Some remained the same from the pilot while others changed. The six value themes identified from the qualitative data are: 1) Autonomy in Decision-Making, 2) Structure in the Environment, 3) Precision in Communication, 4) Innovation in Technology, 5) Reverence for Technical Knowledge, and 6) Enjoyment at the Workplace. These will henceforth be abbreviated with the appropriate acronym ASPIRE. It is easily remembered and provides helpful guidance to business and IT managers alike in their daily interactions with IT professionals.

These six values represent the areas that were highly valued by IT professionals in our sample. Table 4 shows the code frequency for these six values and their definitions. Additional evidence and explanation of the six values are presented in the next sections.

Table 4. Coding Frequency and Definitions of the ASPIRE Values

Value	Coding Frequency	Definition
Autonomy in Decision-Making	39	Level to which members of an occupation believe that they should be empowered with decision-making for the organization, access to tools, and access to data.
Structure in the Environment	123	Level to which members of an occupation believe that orderliness, process, and role definition are needed in the work environment.
Precision in Communication	60	Level to which members of an occupation believe that communication about work tasks must be detailed, accurate, and exact.
Innovation in Technology	47	Level to which members of an occupation believe that technological improvement, novelty, and creativity are valued.
Reverence for Technical Knowledge	175	Level to which members of an occupation believe that intelligence and increasing technical knowledge are what determines respect and admiration.
Enjoyment at the Workplace	52	Level to which members of an occupation believe that their work should include play, fun, and socializing.

Autonomy in Decision-Making

Initially described in the pilot as a preference for flatter hierarchies at work, the full study put this idea in its proper context. IT professionals care less about the actual structure of power in an organization (centralization vs. decentralization or flat vs. hierarchical) and care much more about their own empowerment at work. (Note that in the quotes that follow, the interviewee number is shown inside the parentheses).

> 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)

This empowerment can manifest as decision-making authority, greater access to data, access to the right tools, and a limited need for managerial approval.

> 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)

> 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. (20)

Autonomy's opposite value was bureaucracy and needing multiple levels of approval in order to get work accomplished. Bureaucracy had a profoundly strong negative connotation in the interviews and is a potential source of conflict in the workplace.

> 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. (9)

> I don't necessarily like working with three layers of management. (1)

> Fewer chiefs, more Indians. (6)

> There were just all of these layers of management fat who really did little other than to impede progress. (17)

Autonomy is important to IT personnel 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 supervision. Ironically, they want to be simultaneously in control of business users and technology but not be controlled by management, which results in a fierce sense of autonomy.

Structure in the Work Environment

The initial term "control" in the pilot contained some ambiguity about what and who was being controlled. 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. The interviewees referred to this as "structure." Thus, "structure" became the *in vivo* code for what they were describing as an orderly environment. This included clear job titles, job responsibilities, and a strong division of labor between teams and between departments.

> I really liked the structure of that IT department because everybody had their job. It was very defined, and I knew what I had to do. (20)

> I like the fact that there's a lot more structure here. You won't have major projects to come in and all of the sudden just "drop everything and do this!" It's a different environment, much more structured, much more "Let's do it in this order." (21)

> Engineers don't need to be rolling code out [into production]. It needs to be structured. (6)

Some also called this "having a process focus" or simply "wanting things to run smoothly." IT workers want the structure of their work environment to be tightly defined.

> Having rules in place and enforced. That's ideal! (17)

> It's important to have a well-documented process for doing something (23).
>
> I think IT people do like standardization. (2)

The opposite of structure is disorganization, lack of control, and, ultimately, chaos. Disorganization and ad hoc processes were consistently identified as things to be shunned and avoided and hence potential sources of conflict between the business and IT.

> You knew exactly what your job role was. At this company it's very hazy. Things like that are what drive me crazy in my current job! (11)
>
> 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. (17)

Precision in Communication

As the interviews proceeded, there was no evidence of IT people being poor at general communication skills. They were articulate, verbose, and insightful in their comments. All the interviewees were eager to get into extreme amounts of detail, either about their background, their work, or technology, sometimes insisting that their job title be recorded exactly right. They 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 code co-location analysis which linked the code "communication" with the code "precision." This finding differed from the previously identified value of "Open Communication" in the pilot study. This need for precision in communication may be what business managers identify as "poor communication skills."

> 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. (1)

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.

> IT people absolutely crave a lot of detail that they're not getting from other people! (20)
>
> 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 non-IT manager. There's definitely two different ways of communicating. (3)

The opposite of Precision in Communication is being too vague, too imprecise, or communicating irrational expectations, which is a source of conflict between business and IT.

> The biggest problem that we have is getting the information, the correct information at a level of detail to do what we need to do. (21)

> 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. (6)

Innovation in Technology

The theme of "Risk" appeared in the pilot, but it was eliminated in favor of "Innovation" because most interviewees felt strongly that risk propensity or risk aversion is purely a matter of where in the organization the IT person is and what is his/her job function. What is common for IT people is a love of technology, progress, and a rapid pace of technological change.

> One of the things that really attracted me to IT is that technology doesn't stand still. I like that a whole lot. (1)

> I enjoy the really cutting-edge technology. (24)

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

The narrative examples of trying new things, playing with new technology, and creating a novel approach to improve a process were consistent in the interviews, and these ideas can be succinctly termed as "Innovation." This is an obvious—but non-trivial—point to make about IT occupational culture: Innovation in Technology is what gives meaning to the work. Innovation encapsulates the desire for novelty, variety, creativity, and technical challenge that all interviewees shared.

> I like innovating to the point where everything starts breaking down I go back and fix. (3)

> 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)

> There was a lot of creativity…That's important to me…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)

IT people like the fact that technology is always changing and do not understand why people or organizations do not embrace it like they do. The opposite of innovation is stagnancy and

boredom. Several interviewees talked about leaving work environments that became technologically stagnant and did not keep up with the latest hardware and software.

> 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. I understand that. Been there, done that. And I've been negative as well. (13)

While business managers might value technological innovation as a means to an end, IT people value Innovation in Technology for its own sake.

> 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. (13)

Reverence for Technical Knowledge

Reverence for Knowledge was a theme that emerged during the pilot and continued to grow and expand in the full study. Reverence for Technical Knowledge may be the most important of the six ASPIRE values. Quantitatively, the code count was the highest for this theme. Qualitatively, interviewees became very serious in their tone when they talked about knowledge, learning, problem-solving ability, and being able to think critically.

> 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! (16)

> 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 nuts. (23)

> 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. (18)

> 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. (3)

Reverence for Technical Knowledge means respecting intelligence in general and technical know-how in particular. It includes the constant drive to learn more. Technical knowledge is based on actual experience and not book-learning or certification. Intelligence is to be respected and admired in others and what IT people want to be known for.

> I think part of that is just reverence for people that know how to do things, but also people that know how to approach knowledge acquisition, if that makes sense. They know how to know things, they know how to problem solve for themselves, not just knowing to, "Oh, I'll just go ask Bobby because he knows the answer." Yeah. Right. (24)

> The learning defines them, not the job they have. 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…I want to be the person that other people come to for information. You know, you want to be your oracle in your area…you've got to have that drive to want to know, want to learn. (18)

This is perhaps in contrast to the business manager who wants to be known as a good leader and not necessarily as the smartest person in the room. There can be a painful disconnect when IT workers report to a manager who is not technically proficient. They defer to technical knowledge, not managerial authority. For them, technical knowledge is the ultimate authority.

> I will respect a guy who knows what he's doing over a guy who tells me what to do… I can't be strong enough about that! (9)

> 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)

> 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 two 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 say no that's not how we're going to do it. (2)

The opposite of Reverence for Knowledge included the most egregious of negative occupational values: pretense at real understanding and corruption or abuse of knowledge. This represents another potential area of conflict.

> 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. (18)

> I never worked on any Y2K work and I never really wanted to, but it just seemed wrong. There was also a lot of money being taken for nothing, you know. A lot of charlatan stuff going on. It was the dark side coming through there where people were scaring other people. (10)

Enjoyment at the Workplace

Enjoyment was also a theme identified during the pilot. The word "enjoy" was used in conjunction with other values frequently, but enjoyment, particularly in interaction with colleagues, was important for its own sake.

> I enjoyed my co-workers. I enjoyed that type of environment. It was more of a tight-knit community, a tight-knit family. (3)
>
> I like working with peers. (1)

Enjoyment for IT people includes fun, play, and above all having a sense of humor and laughing about work with colleagues, even to the point of playing good-natured pranks on each other (which might be frowned on in other occupations).

> 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 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)
>
> 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. 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…. That's really what brings me back every day. (7)

Most interviewees discussed how much they enjoyed going out to eat with others in order to socialize with their colleagues.

> 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 us 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. (5)
>
> It's just been my experience that, I think a lot of times with IT you can find out that it's more like a…outside of being friends…it's more like a brotherhood. (21)

The opposite of Enjoyment is dullness, stress, and lack of interest, or even job burnout. The Theory of Occupational Culture explains that people in dangerous or stressful occupations will use kidding, joking, and humor as a way of managing emotions at work (Trice, 1993). Burnout due to stress can lead to the type of conflict which ultimately results in turnover, which is a problem for management (Moore, 2000).

> I worked for a place, not long, where I still wake up in a cold sweat at night. It was a very small shop. 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)

The interviewees also provided many examples of perceived differences between IT workers and business managers. Because of these differences, it was important to gather survey responses from non-IT business managers as well as IT employees in Part II of our research in order to see if these differences are significant. Some exemplar interview quotes include:

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

> I definitely think that the brain process is different in an IT person than in others. 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)

> 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. (23)

In summary, the six ASPIRE values emerged out of the intensive interviewing, analysis, and reflection process to form a portrait of ITOC ideology. Some values remained the same from the pilot and some were refined to reflect the new qualitative data. Each value shows strong support based on empirical evidence in the transcripts. This is not to say that all IT employees are the same. But there are commonalities due to a shared occupation. There are likely important differences based on specific roles within IT but this is out of the scope of the current study and should be pursued in future studies. This particular constellation of six values addresses broad and shared tendencies within the IT occupation, as shown in Figure 3.

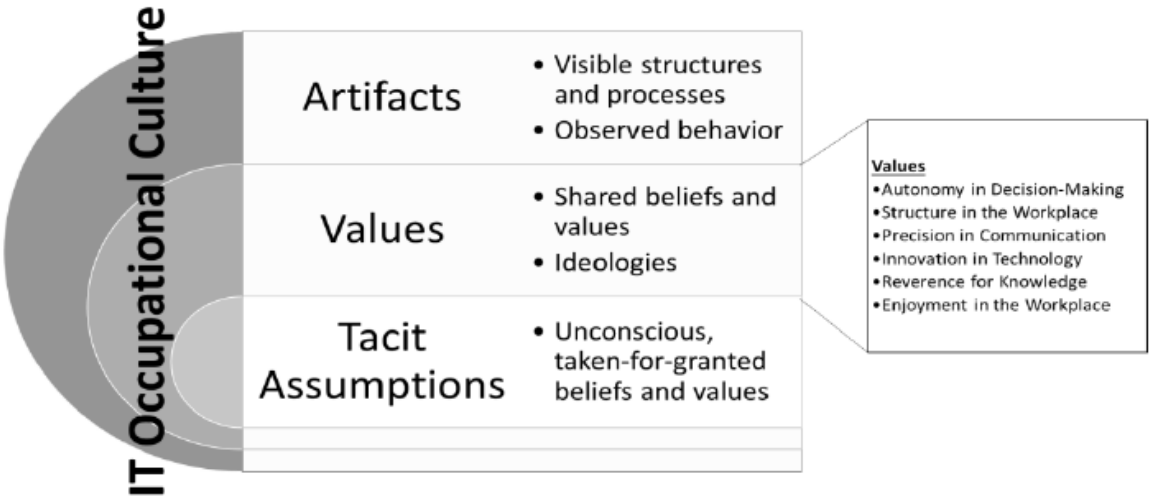

Figure 3. Updated Model of ITOC based on Qualitative Data

Mixed Methodology: Part II Results

The objectives of Part II are to measure and validate the ASPIRE value dimensions. A survey instrument was developed using items based on the qualitative results of Part I. Similar to Guzman and Stanton (2009), the value dimensions were operationalized into measurable constructs using items that were identified in the analysis of Part I.

An initial item pool was created as the first step (DeVellis, 1991) using items from the Part I results. Content validity of the item pool was addressed by using a Q-Sort method with five Ph.D. students. They assigned each potential item to a theme and then ranked the items under each theme. Items that consistently ranked low were eliminated from the pool. A pre-test was performed by sending the electronic survey to three Ph.D. students to ensure that items were well worded and unambiguous and that the mechanics of the online survey worked without technical difficulty. The full instrument (shown in Appendix C) was hosted in Qualtrics in order to gather responses electronically. The instrument used a 7-point Likert scale for each item.

The instrument was administered to both IT personnel and non-IT business users in order to see if there were significant differences in responses and to make sure that we were not simply measuring values common to all white-collar professions. The goal was to obtain five to ten IT professionals and five to ten non-IT business users from at least 30 organizations. These organizations included variation in industries and sizes. CIOs and CEOs were approached to request their organization's participation in the study. Contacts were obtained through 1) personal contacts and Linked-In connections, 2) three different advisory boards at our university, and 3) the Lexis-Nexis database. The executive at each firm was asked to share the survey link with their IT department as well as non-IT business users. The first five participating firms were treated as a new pilot test group; they were asked about any problems with the survey. There were no negative comments, so no further changes were made to the survey.

A total of 52 different organizations agreed to participate and were sent the survey link. Of the 52 organizations, 43 returned surveys for a response rate of 83 percent. Surveys with missing

responses were eliminated resulting in a total of 524 useable surveys. The data was divided into two groups. Group 1 included IT employees with job titles such as Systems Administrators, Software Developers, IT Analysts, etc. Group 2 included business users who were in non-IT roles such as Sales Managers, Marketing Directors, Accountants, etc. The participant breakdown was 320 IT employees in Group 1 and 204 non-IT business users in Group 2. The sample characteristics for gender, education, age, and years of experience are shown in Table 5.

Table 5. Sample Characteristics

Gender		**Age**		**Years of IT experience**	
Male	315	18-20	6	1-4	44
Female	205	21-29	88	5-9	70
Education		30-39	165	10-14	99
High School	58	40-49	164	15-19	88
Associate Degree	72	50-59	89	20-24	74
Bachelor's Degree	271	60+	7	25-29	87
Master's Degree	116			30+	59
Ph.D.	2				

Responses from the two groups were combined for the purpose of testing the measurement model and conducting factor analysis. The initial correlation matrix in SPSS gave an early indication that two latent variables, Structure in the Workplace and Precision in Communication, were cross-loading highly on each other. Factor analysis confirmed the same issue with the Structure in the Workplace and Precision in Communication items. A decision was made to allow Structure and Precision to combine into a single factor and reduce the number of factors from six to five in order to accurately represent the data. This will be interpreted further in the discussion section but will be labeled as Structure/Precision in the results tables below.

Part II Results: Measurement Model

To purify the instrument further (Churchill, 1979), items that did not load highly on any construct (<.4) were eliminated one at a time. The final refined instrument reduced the number of items from 32 to 25 and is shown in Appendix C where the dropped items are identified.

Scale Reliability and Validity

The dataset was tested for normality in SPSS. The Kaiser-Mayer-Olkin (KMO) test of sample adequacy was .81 (where >.9 is marvelous, >.8 is meritorious, >.7 is middling, and >.6 is mediocre (Kaiser & Rice, 1974). Bartlett's Test of Sphericity had an Approximate Chi-Square of 3031.66 at a significance of 0.000. A significance value < .05 shows that the data is approximately multivariate normal and suitable for factor analysis. Further testing of the measurement model was done in WarpPLS. Even though there was no path model with relationships to test, PLS can be used for confirmatory factor analysis (Hulland, 1999).

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). Reliability scores were measured using Cronbach's alpha and Internal Composite Reliability (ICR) and are shown in Table 6. Cronbach alphas above 0.70 are treated as acceptable for reliability in social science research. ICR is interpreted like Cronbach's alpha.

Table 6. Reliability - Latent Variable Coefficients

	Autonomy	Structure/Precision	Innovation	Reverence for Knowledge	Enjoyment
Composite reliability	0.784	0.818	0.818	0.899	0.855
Cronbach's alpha	0.634	0.749	0.722	0.775	0.771

Convergent validity, the degree to which multiple measures of a construct agree with each other (Campbell & Fiske, 1959), was demonstrated by examining the factor loadings. Loadings were greater than 0.50 on their respective constructs and the p values were all lower than 0.05. The factor loadings are shown in Table 7. Discriminant validity, the degree to which measures of different constructs are distinct and orthogonal from each other (Campbell & Fiske, 1959) was also evaluated. The square root of a variable's AVE should be greater than its correlation with any other variable in order to demonstrate discriminant validity (Chin, 1998). These values are shown in Table 8.

Table 7. Indicator Loadings and Cross Loadings

	Autonomy	Structure/ Precision	Innovation	Reverence for Knowledge	Enjoyment	SE	p value
AUT1	**0.711**	0.023	0.052	0.0.32	0.112	0.040	<0.001
AUT2	**0.679**	0.065	0.230	0.005	0.059	0.040	<0.001
AUT3	**0.655**	0.124	0.170	0.036	0.068	0.040	<0.001
AUT4	**0.715**	0.074	0.011	0.004	0.118	0.040	<0.001
STR1	0.115	**0.595**	0.048	0.022	0.070	0.041	<0.001
STR2	0.013	**0.510**	0.239	0.034	0.157	0.041	<0.001
STR4	0.122	**0.597**	0.060	0.055	0.132	0.041	<0.001
STR6	0.184	**0.554**	0.053	0.022	0.083	0.041	<0.001
PRE1	0.019	**0.540**	0.044	0.191	0.007	0.042	<0.001
PRE2	0.088	**0.593**	0.033	0.052	0.062	0.041	<0.001
PRE3	0.026	**0.641**	0.156	0.163	0.059	0.040	<0.001
PRE4	0.126	**0.620**	0.038	0.003	0.033	0.041	<0.001
PRE5	0.003	**0.668**	0.045	0.022	0.034	0.040	<0.001
INN1	0.104	0.093	**0.658**	0.092	0.049	0.040	<0.001
INN2	0.006	0.013	**0.725**	0.040	0.031	0.040	<0.001
INN3	0.132	0.009	**0.751**	0.036	0.000	0.004	<0.001
INN4	0.055	0.020	**0.671**	0.014	0.055	0.040	<0.001
INN5	0.213	0.049	**0.633**	0.107	0.073	0.041	<0.001
REV3	0.017	0.008	0.011	**0.904**	0.007	0.039	<0.001
REV4	0.017	0.008	0.011	**0.904**	0.007	0.039	<0.001
ENJ1	0.119	0.009	0.042	0.035	**0.825**	0.040	<0.001
ENJ2	0.009	0.015	0.082	0.026	**0.839**	0.040	<0.001
ENJ3	-0.008	0.004	0.027	0.036	**0.785**	0.040	<0.001
ENJ4	0.159	0.002	0.021	0.057	**0.626**	0.041	<0.001

Table 8. Correlations of Latent Variables with Square Roots of AVE

	Autonomy	Structure/ Precision	Innovation	Reverence for Knowledge	Enjoyment
Autonomy	0.690	0.202	0.367	0.123	0.350
Structure/Precision	0.202	0.580	0.389	0.195	0.195
Innovation	0.367	0.389	0.689	0.258	0.321
Reverence for Knowledge	0.123	0.195	0.258	0.904	0.095
Enjoyment	0.350	0.195	0.321	0.095	0.774

*Note: Square roots of AVE are shown on the diagonal.

The correlation matrix (shown in Appendix D) also demonstrates both convergent and discriminant validity of the five variables. Items loaded higher on their specified variable than on any other variable. High factor loadings are evidence of convergent validity while low cross loadings provide evidence of discriminant validity.

Three measurement issues presented themselves during the analysis: 1) Autonomy Reliability was borderline; 2) Structure and Precision were highly correlated and were treated as a single factor; 3) only two Reverence for Knowledge items were loading well enough to be kept, but both items referred to "intelligence" alone ("earning respect based on intelligence" and "being known for my intelligence"). These issues present some challenges that will be addressed in the Discussion section.

The last step of the analysis was testing for differences between IT people and non-IT business managers. To do this, an index for each variable was created by calculating the mean response of the items that belonged to each variable. The two groups were compared using ANOVA in SPSS to test for differences in means for each index. The ANOVA analysis in Table 9 shows that all but one of the values are significantly different between the IT and non-IT groups. Only Autonomy showed no significant difference. Descriptive statistics with means and standard deviations for each variable are shown in Table 10. The group of IT personnel rated four of the five ITOC values significantly higher than the non-IT group.

Table 9. ANOVA Results Between Groups

	Sum of Squares	Mean Square	F	Sig.
Autonomy	0.060	0.060	0.159	0.690
Structure/Precision	11.933	11.933	43.873	0.000
Innovation	3.670	3.670	10.910	0.001
Reverence for Knowledge	6.110	6.110	7.240	0.007
Enjoyment	5.980	5.980	10.960	0.001

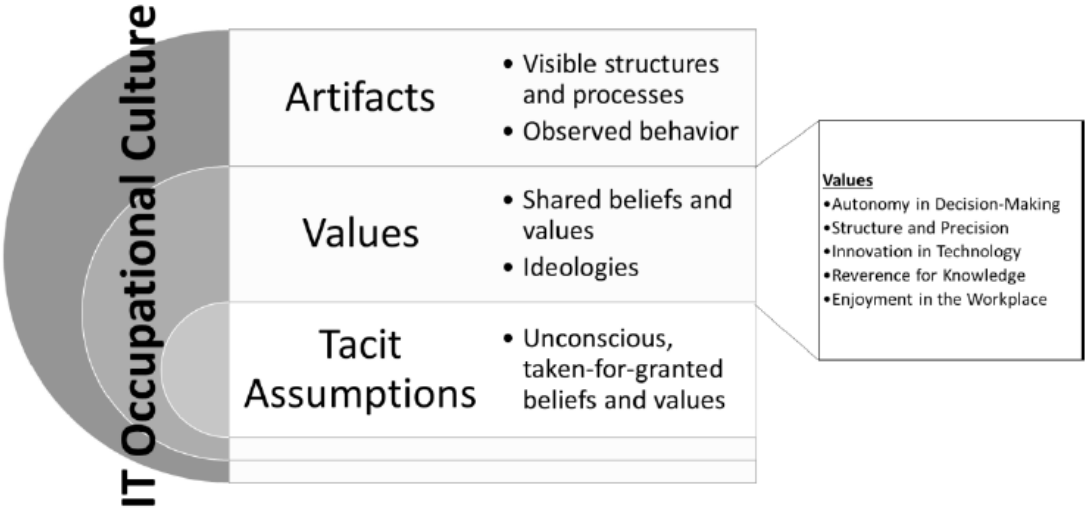

Figure 4. Updated Model of ITOC based on Quantitative Data

Based on the quantitative results, an updated model of ITOC is shown in Figure 4 that summarizes our findings. Because Structure and Precision were combined into one factor, the number of value dimensions was reduced to five.

Table 10. ANOVA Descriptive Statistics Between Groups

						95% Confidence Interval for Mean			
Group		**N**	**Mean**	**Std. Dev**	**Std. Error**	**Lower Bound**	**Upper Bound**	**Minimum**	**Maximum**
Autonomy	**1**	320	5.91	.59	.03	5.54	5.67	3.8	7.0
	2	204	5.59	.66	.05	5.49	5.68	2.5	7.0
	Total	524	5.60	.62	.03	5.55	5.65	2.5	7.0
Structure/ Precision	**1**	320	5.66	.46	.03	5.61	5.71	4.2	7.0
	2	204	5.35	.61	.04	5.27	5.43	2.3	6.6
	Total	524	5.54	.54	.02	5.49	5.58	2.3	7.0
Innovation	**1**	318	5.67	.54	.03	5.61	5.73	3.0	7.0
	2	204	5.50	.63	.04	5.42	5.59	2.0	7.0
	Total	522	5.61	.59	.03	5.56	5.66	2.0	7.0
Reverence for Knowledge	**1**	317	5.46	.82	.05	5.37	5.55	3.0	7.0
	2	204	5.24	1.05	.07	5.10	5.39	1.0	7.0
	Total	521	5.38	.92	.04	5.30	5.45	1.0	7.0
Enjoyment	**1**	317	5.32	.73	.04	5.24	5.40	2.0	7.0
	2	204	5.10	.75	.05	4.99	5.20	1.0	6.8
	Total	521	5.23	.75	.03	5.17	5.29	1.0	7.0

Discussion

This study found evidence of six important occupational values for IT professionals based on qualitative interviews: Autonomy in Decision-Making, Structure in Environment, Precision in Communication, Innovation in Technology, Reverence for Technical Knowledge, and Enjoyment at the Workplace (ASPIRE). These six were then narrowed down to five dimensions based on survey data: Autonomy in Decision-Making, Structure/Precision, Innovation in Technology, Reverence for Technical Knowledge, and Enjoyment at the Workplace. In addition, all five values were ranked higher by IT personnel than non-IT personnel demonstrating heterogeneity between IT and non-IT occupations. The findings provide refinement and conceptual clarity to the constructs that were first proposed in Jacks and Palvia (2014). But what does it all mean?

If an ideology is a cohesive set of shared values, then we are now prepared to offer an interpretation of the ideology of ITOC, similar to the Accountant ideology shared previously:

> *IT is an occupation that expects a high level of personal autonomy, is intolerant of any ambiguity in both communication and work structure, craves the opportunity to create and innovate, respects intelligence over authority, and strongly desires enjoyable elements of play in the work environment.*

This interpretation may be an example of the type of meta-inference described by Venkatesh et al. (2013) as a theoretical statement, narrative, or story inferred from the integration of findings from quantitative and qualitative strands of mixed methods research. Such an interpretation has not been previously attempted in the IS literature.

This is not to say that all IT personnel will completely agree with this statement of ideology, yet there is evidence that it is an overall representation of ITOC writ large.

That said, we do not want to overstate the homogeneity of ITOC. Certainly there are differences between members based on their IT role such as programmers, systems administrators, and business analysts. To address this in the future, the three-way view of culture is an important tool in cultural analysis and has been advocated for IS research in particular (Kappos & Rivard, 2008). It indicates that culture may be analyzed as 1) Integrated, 2) Differentiated, or 3) Fragmented. Integration sees consensus and consistency in a group and was the primary focus of this research. The differentiation perspective examines inconsistent interpretations and differing subcultures within a group. The differences between programmers, system administrators, and IT/business analysts, for example, need to be investigated further.

There are some interesting parallels between our qualitative results and those of Guzman et al. (2008). Both found a clear emphasis on the value of technical knowledge. Both found evidence of feelings of superiority and control over other groups, although while Guzman et al. (2008) labeled this as "ethnocentrism," this attitude fell under our construct of Autonomy. And while Guzman's study found a strong sense of satisfaction in helping others, this idea did not bubble up as one of the main values, possibly because it may depend on the IT person's role and whether he or she works directly with end users or not.

In our voyage of discovery, we found (as others have before) that culture can prove difficult to measure, and this study had its measurement challenges. The first challenge was in the Autonomy value. The reliability of the Autonomy items based on the quantitative data was borderline (Cronbach alpha of 0.634 and Composite Reliability of 0.784). And while the IT responses rated Autonomy higher, it was not statistically significantly higher than the non-IT responses. It would be tempting to simply drop Autonomy from further consideration and even assert that Autonomy is simply a core value for *all* professional occupations. But we would argue for its inclusion based on the fact that 1) other studies have promoted Autonomy as a central aspect of IT professionalism (e.g., Dinger et al., 2016) and 2) the construct of Autonomy is important enough, based on the qualitative data, to be included in future studies on ITOC.

The second challenge involved the cross-loading of Structure in the Workplace and Precision in Communication. Even though these were conceptually different in the interviews, quantitative data showed that respondents viewed them the same way, giving evidence that there might be a larger construct at work. We choose to interpret this combination of Structure and Precision as "Intolerance for Ambiguity." Perhaps this is one of the sources of conflict between business and IT where business managers have a high tolerance for ambiguity and IT personnel do not. That said, Precision in Communication is too important a variable to eliminate, especially as it addresses the fundamental problem of *how* IT people communicate and, moreover, provides empirical support for the "different normative communication strategies" of IT personnel identified in Guzman et al. (2008). As a suggestion, Structure in the Environment may be better measured using "Role Ambiguity" for which there are validated items (Ply et al., 2012). This might serve to differentiate Structure from Precision in Communication better.

The third challenge was with the construct of Reverence for Knowledge. This played an important role in both the pilot as well as the Part I qualitative study. Yet the measurement items for problem-solving, critical thinking, continual learning, and respect for intelligence over authority did not load together in the factor analysis. Only two items for respect for intelligence were usable. While the idea of respect for intelligence was prevalent throughout the interviews, it does not capture the broader domain of Reverence for Knowledge emphasized by the interviewees. Because this is a recent construct in the literature, further refinement of the measurement instrument is needed.

The constructs that did not have any measurement issues were Innovation and Enjoyment. Proposing Innovation as a core value of ITOC is not asserting anything revolutionary due to the nature of the IT occupation itself. But it does provide more conceptual clarity of what is common to the entire ITOC than the previous value in the pilot that was labeled "Risk." Enjoyment in the Workplace, on the other hand, was the only value that remained relatively unchanged throughout the original pilot, the qualitative analysis, and the quantitative analysis. This is an untapped area for research, and we propose that the IT occupation may be an example of what Eklund (2009) refers to as a "play" occupation. Play occupations are experienced as joyful and intrinsically satisfying, demand great attention, and absorb the person totally (Eklund, 2009). Highlighting the play aspect of the ITOC ideology may be central to discerning what is special about the IT occupation.

So this particular constellation of values that coalesce together as a cohesive ideology provides a contribution to the theory of occupational culture. The use of the Spinning Top model of culture and the new combined model of occupational culture in Figure 4 are also contributions to theory. We have also endeavored to squarely address our shortcomings in order to assist future researchers in avoiding their own pitfalls.

Research into ITOC is more than just a theoretical exercise. There are important practical implications that arise from our increased understanding of ITOC. Measuring occupational value differences may be a first step in reducing cultural conflict and negative outcomes in organizations. Business managers who understand and appreciate the ITOC ideology will go far in reducing the cultural gap and commensurate cultural conflict. But when values differ in an organization, conflict is only one of three possible outcomes (Trice, 1993). The other two involve "accommodation" and "assimilation." Accommodation refers to a situation of mutual tolerance where both occupational groups keep their ideologies intact, but there is awareness of and respect for those differences. Accommodation may also refer to what Po Bronson (2000) calls a "cultural mash-up" between IT and Business, which consists of respecting the best values of both worlds. For example, managers can learn to respect the need to provide more precise communication, while IT personnel can respect the importance of technical knowledge and innovation not just for their intrinsic value but also for the value provided towards organizational efficiency and profitability. Assimilation, on the other hand, refers to one group gradually adopting the values of the more dominant group. We recommend a strategy of accommodation that will gradually lead to assimilation over time in order to improve organizational outcomes.

It is critical for business leaders to understand the deeper levels of culture in order to be prepared for the anxiety caused when values and assumptions are challenged (Schein, 2010). Assuming

that business management is the dominant ideology in the workplace, we now how a much clearer view of which values need to be assimilated if we want to culturally integrate IT personnel and business management rather than using oft-repeated vague phrases, such as "IT needs to understand the business more." We also have a credible explanation for the ongoing problem of IT/Business strategic alignment – a problem that has been documented repeatedly in annual surveys conducted by the Society for Information Management (e.g., Kappelman, 2016). If the problem of poor alignment is due to cultural differences in core values, then the problem is more deeply rooted than previously thought. However, we also need to be aware that value differences may exist for a reason and may be important ingredients in what makes IT professionals successful. We also need to acknowledge that these value differences are, by their very nature, dynamic. For instance, prior research has begun to note a trend of moving away from the traditional "geek" stereotype of IT to one that is more professional (Akbulut-Baily, 2009) because the IT skill mix is slowly shifting from technical to more business and project-oriented skills (Zwieg et al., 2006). Thus, we may eventually see a partial natural assimilation of ITOC values over time and an increase in positive outcomes for the organization.

Contributions

There are several outcomes and implications of this study. The proposed ideology of the ITOC values (ASPIRE) builds on previous research and extends Trice's Theory of Occupational Culture. The expanded model of ITOC including Artifacts, Values, and Tacit Assumptions can serve as a useful framework to guide future research. Researchers may also use the ASPIRE values as a starting point to examine other aspects of IT occupational culture; in this regard, the ITOC ideology provides specific guidance in terms of what is valued by IT professionals. Another theoretical contribution is the overall cultural approach: more progress can be made by using a cultural lens instead of a psychological one in addressing how and why IT professionals are different from non-IT workers. While there is a need for further refinement of the instrument measuring ITOC values, we believe we have made substantial progress in mapping out this relatively unexplored territory from a theoretical standpoint.

For practice, business leaders now have a short list of values on which to focus their attention. Research on culture is more critical than ever because cultural understanding is essential if leaders are going to lead (Schein, 2010). They cannot successfully manage occupational cultures with differing values if they do not know exactly what these values are. This research sets the stage for a useful dialogue between business leaders and IT employees about what is truly important in the workplace. Guidance for practitioners would include shifting the language from the antagonistic ("I know you're a geek so all you care about is technology!") to the accommodating ("I know precise communication is very important to technology professionals, so can you help me get as specific as possible about my business requirements so we can be successful together?"). A better understanding of ASPIRE values in terms of the ideological values would facilitate smoother interactions between IT and business and perhaps ultimately lead to the holy grail of true IT/Business alignment.

Limitations

The Theory of Occupational Culture emphasizes that ideologies never provide a completely static set of ranked values and that there can always be ambiguities and contradictions in any ideology (Trice, 1993). The main limitation of this study is the critique by some that culture can only be examined via ethnography and case studies over extended periods of time (Schein, 2010). This methodological challenge may be mitigated by past research that has demonstrated the viability of the survey method in studying both national culture (Hofstede & Hofstede, 2005; House et al., 2004) and organizational culture (Iivari & Huisman, 2007). Both positivist and interpretive approaches are necessary in order to advance research in this area. Each approach helps offset the limitations of the other, which is a key strength of using a mixed methodology (Venkatesh et al., 2013).

There were challenges in instrument development that were described earlier. In addition to the typical concerns of generalizability and sample size with any instrument, there were measurement issues in Part II with several constructs. We have attempted to make our case for why these constructs should be given further consideration as part of the framework; however, measurements can and should be refined in the future. MacKenzie et al. (2011) emphasize that researchers never have enough resources to go through every single step of instrument creation and validation. That said, additional work needs to be done to address the steps they recommend for cross-validation and developing norms for the scale.

Directions for Future Research

We offer our instrument as a positive step toward the end goal and make it available for future refinement and advancement. An area for further research is to examine the impact of the IT/business cultural gap on organizational level outcomes: what are the social and operational outcomes of such value differences, and what is the ultimate effect on firm performance? Other useful research questions might include the following: To what extent can management influence the ITOC values and how? Do ITOCs differ across different countries and national cultures, and if yes, how? What managerial interventions are most effective? While this study has shown benefits in leveraging the integrated view of culture that sees ITOC as relatively homogeneous, researchers can and should extend ITOC to examine differentiated and fragmented views of culture as well by examining specific roles within IT.

Conclusion

Our study provided new findings and insights into the relatively new area of research of ITOC (Information Technology Occupational Culture). A theoretical model of occupational culture was proposed that merged Trice's conception of culture with that of Schein and includes: 1) Artifacts, 2) Values, and 3) Tacit Assumptions. Values form the core of any culture and an ideology represents a cohesive set of shared values. Using a mixed methodology, research was conducted in two parts to develop an ideology of ITOC. Part I was a qualitative investigation that provided evidence of six core values: Autonomy in Decision-Making, Structure in Environment, Precision in Communication, Innovation in Technology, Reverence for Technical Knowledge, and Enjoyment at the Workplace (ASPIRE). The results of Part I informed Part II which was a quantitative effort in scale creation, measurement, and validation. Part II narrowed down the set of values to Autonomy in the Workplace, Structure/Precision, Innovation in Technology,

Reverence for Technical Knowledge, and Enjoyment at the Workplace based on factor analysis. The findings also revealed significant differences between IT and non-IT business users such that IT personnel rated all the ITOC values higher than non-IT personnel. These findings not only confirm previous work that there is definitely such a thing as a distinct IT occupational culture but also extend our knowledge by identifying the most important values of ITOC. These findings point a potential path to overcoming the conflict and misalignment between IT and business through a better understanding of ITOC. Ultimately, measuring occupational culture is extremely difficult, but not impossible. To this end, we believe we have made a positive move forward toward the goal of developing an instrument that measures important aspects of IT occupational culture.

References

Akbulut-Baily, A. (2009). A measurement instrument for understanding student perspectives on stereotypes of IS professionals. *Communications of the AIS, 25*(1), 29.

Bronson, P. (2000). *The nudist on the late shift: And other true tales of silicon valley.* New York, NY: Broadway Books.

Brief, A., & Nord, W. (1990). *Meanings of occupational work*. Lexington, MA: Lexington Books.

Campbell, C. (2004). A longitudinal study of one organization's culture: Do values endure? *Mid-American Journal of Business, 19*(2), 41-51.

Campbell, D., & Fiske, D. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin, 56*, 81-105.

Chan, Y., & Reich, B. (2007). IT alignment: What have we learned? *Journal of Information Technology, 22*, 297-315.

Chin, W. (1998). The partial least squares approach to structural equation modeling. In G. Marcoulides (Ed.), *Modern methods for business research*. Mahwah, New Jersey: Lawrence Erlbaum Associates.

Chua, W., & Clegg, S. (1989). Contradictory couplings: Professional ideology in the organizational locales of nurse training. *Journal of Management Studies, 26*(2), 103-127.

Churchill, G. (1979). A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research,* 64-73.

Creswell, J. (2007). *Qualitative inquiry & research design*. Thousand Oaks, CA: Sage Publications.

Couger J., & Zawacki, R. (1980). *Motivating and managing computer personnel*. New York, NY: John Wiley & Sons.

Deuze, M. (2005). What is journalism? Professional identity and ideology of journalists reconsidered. *Journalism, 6*(4), 442-464.

DeVellis, R. (1991). *Scale development: Theory and applications*. Thousand Oaks, CA: Sage.

Dinger, M., Thatcher, J., Treadway, D., Stepina, L., & Breland, J. (2015). Does professionalism matter in the IT workforce? An empirical examination of IT professionals. *Journal of the Association for Information Systems*, *16*(4), 281-313.

Duliba, K., & Baroudi, J. (1991). IS personnel: Do they form an occupational community? *ACM SIGCPR Computer Personnel, 13*(2), 24-35.

English-Lueck, J. (2002). *Cultures @ Silicon Valley*. Stanford, CA: Stanford University Press.

Ferratt, T., & Short, L. (1986). Are information systems people different: An investigation of motivational differences. *MIS Quarterly, 10*(4), 377-387.

Gallivan, M., & Srite, M. (2005). Information technology and culture: Identifying fragmentary and holistic perspectives of culture. *Information and Organization, 15*(4), 295-338.

Geertz, C. (1973). *The interpretation of culture*. New York, NY: Basic Books.

Gregory, K. (1983). Native-view paradigms: Multiple cultures and culture conflicts in organizations. *Administrative Science Quarterly, 28*, 359-376.

Guzman, I., & Stanton, J. (2004). Culture clash! The adverse effects of IT occupational subculture on formative work experiences of IT students. *AMCIS 2004 Proceedings*, 457.

Guzman, I., & Stanton, J. (2009). IT occupational culture: The cultural fit and commitment of new information technologists. *Information Technology & People, 22*(2), 157-187.

Guzman, I., Stam, K., & Stanton, J. (2008). The occupational culture of IS/IT personnel within organizations. *The DATA BASE for Advances in Information Systems, 39*(1), 33-50.

Hackman, J., & Oldham, G. (1974). The job diagnostic survey: An instrument for the diagnosis of jobs and the evaluation of job redesign projects. *Technical Report No. 4,* Department of Administrative Sciences, Yale University (May, 1974).

Hirschheim, R., & Newman, M. (1991). Symbolism and information systems development: Myth, metaphor and magic. *Information Systems Research,* 2(1), 29-62.

Hofstede, G., & Hofstede, J. (2005). *Cultures and organizations: Software of the mind*. New York: McGraw-Hill.

Holland, J. (1966). *The psychology of vocational choice.* Waltham, MA: Blaisdell Publishing.

House, R., Hanges, P., Javidan, M., Dorfman, P., & Gupta, V. (2004). *Culture, leadership, and organizations*. Thousand Oaks, CA: Sage.

Hulland, J. (1999). Use of partial least squares (PLS) in strategic management research: A review of four recent studies. *Strategic Management Journal, 20*(2), 195-204.

Iivari, J., & Huisman, M. (2007). The relationship between organizational culture and the deployment of systems development methodologies. *MIS Quarterly, 31*(1), 35-58.

Jacks, T., & Palvia, P. (2014). Measuring value dimensions of IT occupational culture: An exploratory analysis. *Information Technology and Management, 15*(1), 19-35.

Jin, J., & Rounds, J. (2012). Stability and change in work values: A meta-analysis of longitudinal studies. *Journal of Vocational Behavior, 80*(2), 326-339.

Kaarst-Brown, M., & Guzman, I. (2005). Who is 'the IT workforce'?: Challenges facing policy makers, educators, management, and research. *Proceedings of 2005 SIGMIS-CPR conference on Computer Personnel Research*, 1-8.

Kaarst-Brown, M.L., & 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) 192-217.

Kaiser, H.F., & Rice, J. (1974). Little jiffy, mark IV. *Educational and Psychological Measurement*, *34*(1), 111-117.

Kappelman, L., McLean, E., Johnson, V., & Torres, R. (2016). The 2015 SIM IT issues and trends study. *MIS Quarterly Executive*, *15*(1), 55-83.

Kappos, A., & Rivard, S. (2008). A three-perspective model of culture, information systems, and their development and use. *MIS Quarterly, 32*(3), 601-634.

Karahanna, E., Evaristo, J., & Srite, M. (2005). Levels of culture and individual behavior: An integrative perspective. *Journal of Global Information Management, 13*(2), 1-20.

Kline, R. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York, NY: The Guilford Press.

Leidner, D., & Kayworth, T. (2006). A review of culture in information systems research: Toward a theory of information technology culture conflict. *MIS Quarterly, 30*(2), 357-399.

Moore, K. (2011). MIT's Ed Schein on why corporate culture is no longer the relevant topic and what is. *Forbes*. 11/29/2011. Accessed at http://www.forbes.com/sites/karlmoore/2011/11/29/mits-ed-schein-on-why-corporate-culture-in-no-longer-the-relevant-topic-and-what-is/ on 7/22/2014.

Niederman, F., & Krasteva, S. (2012). Observations regarding the history of the study of computer personnel. *Proceedings of SIGMIS-CPR 2012 in Milwaukee, Wisconsin, USA,* 189-197.

Niederman, F., & Mandviwalla, M. (2004). Introduction to special issue on the evolution of IT (computer) personnel research: More theory, more understanding, more questions. *The DATA BASE for Advances in Information Systems, 35*(3), 6-8.

Niederman, F., Ferratt, T., & Trauth, E. (2016). On the co-evolution of information technology and information systems personnel. *The DATA BASE for Advances in Information Systems*, *47*(1), 29-50.

Nord, J., Nord, G., Cormack, S., & Cater-Steel, A. (2007A). IT culture: Its impact on communication and work relationships in business. *International Journal of Intercultural Information Management, 1*(1), 85-107.

Nord, J., Nord, G., Cormack, S., & Cater-Steel, A. (2007B). An investigation of the effect of information technology (IT) culture on the relationship between IT and business professionals. *International Journal of Management and Enterprise Development, 4*(3), 265-292.

Orlikowski, W., & Baroudi, J. (1989). The information systems profession: Myth or reality? *Office Technology & People, 4*(1), 13-30.

Pliskin, N., Romm, T., Lee, A., & Weber, Y. (1993). Presumed versus actual organizational culture: Managerial implications for implementation of information systems. *The Computer Journal, 36*(2), 143-152.

Ply, J., Moore, J., Williams, C., & Thatcher, J. (2012). IS employee attitudes and perceptions at varying levels of software process maturity. *MIS Quarterly, 36*(2), 601-624.

Ramachandran, S., Rao, S., & Goles, T. (2008). Information security cultures of four professions: A comparative study. *Hawaii International Conference on System Sciences, Proceedings of the 41st Annual Conference*. IEEE.

Rao, V., & Ramachandran, S. (2011). Occupational cultures of information systems personnel and managerial personnel: Potential conflicts. *Communications of the Association for Information Systems*, *29*(31), 581-604.

Rhodes, B. (1985). Occupational ideology and clinical decision-making in British nursing. *International Journal of Nursing Studies,* 22(3), 241-257.

Richards, L. (2005). *Handling qualitative data: A practical guide*. Thousand Oaks, CA: Sage.

Romm, T., Pliskin, N., Weber, Y., & Lee, A. (1991). Identifying organizational culture clash in MIS implementation. *Information & Management*, *21*, 99-109.

Saldana, J. (2009). *The coding manual for qualitative researchers*. Thousand Oaks, CA: Sage.

Schein, E. (1985). *Organizational culture and leadership*. San Francisco, CA: Jossey-Bass.

Schein, E. (2010). *Organizational culture and leadership* (4th ed.). San Francisco, CA: Jossey-Bass.

Schein, E. (2015). Some thoughts about the uses and misuses of the concept of culture. *Journal of Business Anthropology*, *4*(1), 106-113.

Srite, M., & Karahanna, E. (2006). The role of espoused national cultural values in technology acceptance. *MIS Quarterly*, *30*(3), 679-704.

Straub, D., Loch, K., Evaristo, R., Karahanna, E., & Srite, M. (2002). Toward a theory-based measurement of culture. *Journal of Global Information Management*, *10*(1), 61-65.

Strong, E.K. (1943). *Vocational interests of men and women.* Stanford, CA: Stanford University Press.

Tallon, P. (2007/2008). A process-oriented perspective on the alignment of information technology and business strategy. *Journal of Management Information Systems,* 24(3), 227-268.

Trice, H. (1993). *Occupational subcultures in the workplace*. Ithaca, NY: ILR Press.

van den Hooff, B., & de Winter, M. (2011). Us and them: A social capital perspective on the relationship between the business and IT departments. *European Journal of Information Systems,* 20(3), 255-266.

Veneri, J. (1988). An investigation of the differences in motivators of information systems and non-information systems personnel and in the motivating potential of jobs in the information systems and non-information systems fields (Unpublished thesis). Monterey, CA: Naval Postgraduate School.

Venkatesh, V., Brown, S., & Bala, H. (2013). Bridging qualitative-quantitative divide: Guidelines for conducting mixed methods research in information systems. *MIS Quarterly, 37*(1), 21-54.

Walsh, I., & Kefi, H. (2008). The spinning top model, a new path to conceptualize culture and values: Applications to IS research. *International Conference on Information Systems 2008 Proceedings,* Paper 192.

Ward, J., & Peppard, J. (1996). Reconciling the IT/business relationship: A troubled marriage in need of guidance. *Strategic Information Systems, 5*(2), 37-65.

Weber, R. (1990). *Basic content analysis* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Willcoxson, L., & Chatham, R. (2006). Testing the accuracy of the IT stereotype: Profiling IT managers' personality and behavioural characteristics. *Information & Management, 43*(6), 697-705.

Yin, R. (2003). *Case study research: Designs and methods.* Thousand Oaks, CA: Sage.

Zwieg, P., Kaiser, K., Beath, C., Bullen, C., Gallagher, K., Goles, T., Howland, J., & Simon, J. (2006). The information technology workforce: Trends and implications 2005-2008. *MIS Quarterly Executive, 5*(2), 101-108.

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Appendix A

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.

Table A.1. Interview Protocol

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) Is your work meaningful or not? Please elaborate.

Appendix B

Table B.1. Interview 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

Appendix C

Instructions: Please indicate your level of agreement with the following statements. Your responses should be based on your own beliefs and values.

Response categories are:

1 - Not at all,
2 - Important Very Unimportant
3 - Somewhat Unimportant
4 - Neither Important nor Unimportant
5 - Somewhat Important
6 - Very Important
7 - Extremely Important

Table C.1. Full Instrument

Variable	Item	Item Description
Autonomy	AUT1	Having less bureaucracy for getting approval to take action is...
	AUT2	Having a high level of freedom in order to do my job well is...
	AUT3	Having a "flatter" organizational structure (i.e., fewer layers of management) is...
	AUT4	Empowerment for employees to make decisions independently of management is...
	AUT5*	Having a high level of access to raw data is...
Structure in the workplace	STR1	Having everyone consistently adhere to hardware and software standards is...
	STR2	Sticking to the original project plan (instead of making last minute change requests) is...
	STR3*	Clearly defined job roles and responsibilities are...
	STR4	Enforcing rules is...
	STR5*	Orderliness is...
	STR6	Ensuring that timelines and deadlines are reasonable, not rushed, is...
Precision in communication	PRE1	A high level of technical detail when communicating with others in the organization is...
	PRE2	Using exactly the right words when speaking is...
	PRE3	Precision in communication is...
	PRE4	Communicating specific expectations, instead of general expectations, is...
	PRE5	Communication of precise project timelines is...
Innovation	INN1	Playing with the latest "bleeding edge" technology is...
	INN2	Embracing new technology is...
	INN3	Building clever new solutions is...
	INN4	Showing creativity is...
	INN5	Figuring out a better way to do things is...
Reverence for knowledge	REV1*	Technical problem solving skills are...
	REV2*	Critical thinking skills are...
	REV3	Earning respect based on intelligence is...
	REV4	Being known for my intelligence is...
	REV5*	Learning new skills every day is...
	REV6*	Being motivated to learn new skills on your own is...
Enjoyment in the workplace	ENJ1	Having fun at work is...
	ENJ2	Laughing and joking with others at work is...
	ENJ3	Having a sense of humor is...
	ENJ4	Going out to lunch with my co-workers is...
	ENJ5*	Variety in my daily tasks is...

* = Item was dropped from the refined instrument

Appendix D

Table D.1. Correlation Table of Items

	AUT1	AUT2	AUT3	AUT4	STR1	STR2	STR4	STR6	PRE1	PRE2	PRE3	PRE4	PRE5	INN1	INN2	INN3	INN4	INN5	REV3	REV4	ENJ1	ENJ2	ENJ3	ENJ4
AUT1	1	0.299	0.332	0.314	-0.021	0.045	0.028	0.181	0.022	0.081	0.105	0.132	0.093	0.06	0.186	0.111	0.143	0.228	0.039	0.062	0.21	0.152	0.121	0.023
AUT2	0.299	1	0.229	0.354	0.027	0.037	0.033	0.206	0.127	0.057	0.12	0.143	0.101	0.186	0.239	0.262	0.31	0.336	0.109	0.1	0.305	0.243	0.278	0.09
AUT3	0.332	0.229	1	0.282	0.078	0.073	0.031	0.152	0.109	0.112	0.093	0.182	0.087	0.155	0.087	0.063	0.133	0.134	0.106	0.042	0.184	0.129	0.097	0.116
AUT4	0.314	0.354	0.282	1	-0.051	0.109	-0.038	0.163	0.025	0.004	0.096	0.129	0.074	0.136	0.203	0.088	0.215	0.249	0.104	0.054	0.336	0.25	0.237	0.132
STR1	-0.021	0.027	0.078	-0.051	1	0.269	0.426	0.297	0.161	0.207	0.175	0.247	0.297	0.191	0.143	0.117	0.055	0.038	0.066	0.071	0.018	0.014	0.055	-0.024
STR2	0.045	0.037	0.073	0.109	0.269	1	0.213	0.264	0.189	0.168	0.176	0.216	0.267	0.118	0.059	0.064	0.046	0.014	0.032	0.046	0.128	0.107	0.145	0.121
STR4	0.028	0.033	0.031	-0.038	0.426	0.213	1	0.222	0.113	0.31	0.27	0.191	0.307	0.108	0.151	0.192	0.146	0.154	0.138	0.141	0.045	-0.021	0.023	-0.039
STR6	0.181	0.206	0.152	0.163	0.297	0.264	0.222	1	0.14	0.24	0.265	0.251	0.236	0.206	0.168	0.194	0.152	0.151	0.133	0.111	0.246	0.134	0.164	0.097
PRE1	0.022	0.127	0.109	0.025	0.161	0.189	0.113	0.14	1	0.193	0.154	0.181	0.224	0.274	0.112	0.187	0.127	0.012	0.178	0.178	0.074	0.081	0.035	0.065
PRE2	0.081	0.057	0.112	0.004	0.207	0.168	0.31	0.24	0.193	1	0.457	0.249	0.227	0.198	0.137	0.183	0.208	0.124	0.107	0.171	0.104	0.101	0.107	0.171
PRE3	0.105	0.12	0.093	0.096	0.175	0.176	0.27	0.265	0.154	0.457	1	0.362	0.361	0.147	0.216	0.228	0.234	0.233	0.041	0.026	0.131	0.058	0.108	0.033
PRE4	0.132	0.143	0.182	0.129	0.247	0.216	0.191	0.251	0.181	0.249	0.362	1	0.441	0.234	0.181	0.151	0.141	0.174	0.139	0.094	0.162	0.126	0.138	0.109
PRE5	0.093	0.101	0.087	0.074	0.297	0.267	0.307	0.236	0.224	0.227	0.361	0.441	1	0.214	0.185	0.173	0.214	0.171	0.111	0.108	0.094	0.091	0.062	0.102
INN1	0.06	0.186	0.155	0.136	0.191	0.118	0.108	0.206	0.274	0.198	0.147	0.234	0.214	1	0.492	0.364	0.254	0.164	0.228	0.175	0.225	0.184	0.103	0.18
INN2	0.186	0.239	0.087	0.203	0.143	0.059	0.151	0.168	0.112	0.137	0.216	0.181	0.185	0.492	1	0.4	0.29	0.282	0.158	0.125	0.19	0.154	0.181	0.111
INN3	0.111	0.262	0.063	0.088	0.117	0.064	0.192	0.194	0.187	0.183	0.228	0.151	0.173	0.364	0.4	1	0.386	0.384	0.189	0.202	0.221	0.112	0.186	0.149
INN4	0.143	0.31	0.133	0.215	0.055	0.046	0.146	0.152	0.127	0.208	0.234	0.141	0.214	0.254	0.29	0.386	1	0.403	0.195	0.141	0.246	0.165	0.249	0.154
INN5	0.228	0.336	0.134	0.249	0.038	0.014	0.154	0.151	0.012	0.124	0.233	0.174	0.171	0.164	0.282	0.384	0.403	1	0.081	0.104	0.216	0.106	0.185	0.093
REV3	0.039	0.109	0.106	0.104	0.066	0.032	0.138	0.133	0.178	0.107	0.041	0.139	0.111	0.228	0.158	0.189	0.195	0.081	1	0.633	0.08	0.08	0.063	0.085
REV4	0.062	0.1	0.042	0.054	0.071	0.046	0.141	0.111	0.178	0.171	0.026	0.094	0.108	0.175	0.125	0.202	0.141	0.104	0.633	1	0.048	0.063	0.045	0.074
ENJ1	0.21	0.305	0.184	0.336	0.018	0.128	0.045	0.246	0.074	0.104	0.131	0.162	0.094	0.225	0.19	0.221	0.246	0.216	0.08	0.048	1	0.57	0.54	0.395
ENJ2	0.152	0.243	0.129	0.25	0.014	0.107	-0.021	0.134	0.081	0.101	0.058	0.126	0.091	0.184	0.154	0.112	0.165	0.106	0.08	0.063	0.57	1	0.572	0.399
ENJ3	0.121	0.278	0.097	0.237	0.055	0.145	0.023	0.164	0.035	0.107	0.108	0.138	0.062	0.103	0.181	0.186	0.249	0.185	0.063	0.045	0.54	0.572	1	0.269
ENJ4	0.023	0.09	0.116	0.132	-0.024	0.121	-0.039	0.097	0.065	0.171	0.033	0.109	0.102	0.18	0.111	0.149	0.154	0.093	0.085	0.074	0.395	0.399	0.269	1