

IT Culture: Its Impact on Communication and Work Relationships in Business

Jeretta Horn Nord

Management Information Systems, William S. Spears School of Business
Oklahoma State University, Stillwater, Oklahoma 74078 USA
E-mail: jeretta.nord@okstate.edu

G. Daryl Nord

Management Information Systems, William S. Spears School of Business
Oklahoma State University, Stillwater, Oklahoma 74078 USA
E-mail: daryl.nord@okstate.edu

Sandra Cormack

New England Strategic Alliance of Councils
Armidale, New South Wales, Australia
E-Mail: scormack@armidale.nsw.gov.au

Aileen Cater-Steel

Faculty of Business, University of Southern Queensland,
Toowoomba 4350 Queensland, Australia
E-mail: caterst@usq.edu.au

Abstract: Establishing an effective relationship between business and information technology (IT) professionals is essential for organizational success in today's competitive global economy. Despite many attempts to improve the IT-business relationships, tensions still exist. The cultural differences between business and IT have recently been blamed for these tensions. However, academic research on IT culture is lacking. This paper discusses and compares seven widely reported models for assessing organizational culture. From this, an appropriate model is selected and applied using a multiple case study approach to explore the culture of the IT group in five Australian organizations.

Keywords: Organizational culture, IT subculture, IT-business relationship

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Biographical Notes: Jeretta Horn Nord is Associate Dean for Undergraduate Programs and Professor of MIS at Oklahoma University. She recently served as Visiting Scholar at UCLA and as Visiting Professor at the University of Southern Queensland. Jeretta is currently editor-in-chief of the *Journal of Computer Information Systems* and Director of Publications for the International Association for Computer Information Systems. She has authored numerous articles, proceedings and conference papers.

G. Daryl Nord is Professor of MIS at Oklahoma State University. He is an active researcher and has published numerous articles and professional proceedings in areas including artificial intelligence/expert systems, systems analysis and design, the Internet, and electronic commerce. He served on national and international committees for professional organizations. Daryl is currently editor of the *Journal of Computer Information Systems* and Managing Director of the International Association for Computer Information Systems.

Sandra Cormack is a qualified IT professional with 19 years industry experience in private enterprise and Local, State, and Commonwealth government agencies. Her expertise is in information systems management, project management, and information systems strategic planning. Sandra is currently managing the implementation of new information systems and technologies, and associated organisational changes necessary for the successful partnering of five neighbouring local government authorities.

Aileen Cater-Steel is a lecturer in Information Systems at the University of Southern Queensland. Prior to this position, Aileen gained 21 years industry experience in the areas of programming, systems analysis, project management and IT management. She is interested in researching the challenges faced by software development managers, especially issues relating to software quality and software process improvement.

1 Introduction

This paper explores the culture of the IT group in five Australian organizations, providing a starting point for business and IT managers to foster a more productive relationship between the two disparate groups.

The first part of this article explores the growing awareness of the importance of the relationship between business professionals and their IT counterparts. A discussion follows about conflict that is an inevitable consequence when groups interact. Next, organizational culture and subcultures are introduced, and seven of the more widely recognized models for assessing the dominant culture in organizations are discussed and compared. A discussion of the IT culture in organizations follows, revealing data collected from interviews held with 22 business and 11 IT professionals in five Australian organizations. Finally, conclusions are drawn and guidelines suggested to help business and IT managers foster a more productive relationship.

Before proceeding, it is necessary to define what the authors mean by "IT group" and differentiate the IT professionals from business professionals. The term "IT" (information technology) has been preferred throughout this paper and refers to the field of study that relates to the development of computer-based data processing technologies and their application and management (Ward and Griffiths, 1996). "IT professionals" refers to the group of people in an organization whose responsibility is to deliver and support information technology solutions based on the requirements of the business (Markus and Bjorn-Andersen, 1987; Grindley, 1995; Nelson and Coopriider, 1996). This broad category includes CIOs, information systems managers, systems analysts, designers, programmers, and database administrators (Laudon and Laudon, 2000). Throughout this paper, IT professionals may also be referred to as the "IT group," "IT people," "IT staff," or simply "IT." Business professionals refers to those people "who use IT" (Grindley, 1995).

2 The IT-Business Relationship

Technological changes are placing increased emphasis on interaction among divisions. Increasingly, computer systems are being shared and linked, thus compelling organizational divisions to interact more with one another. Also, as computer systems become more complex, dependence on IT professionals becomes even greater (Kaiser and King, 1982). In an effective relationship, IT professionals and line managers work together to understand business opportunities; determine needed functionality; choose among technology options; and decide when urgent business needs demand sacrificing technical excellence for immediate, incomplete solutions (Rockart, Earl, and Ross, 1996).

The need to establish and sustain effective working relationships between business and IT professionals has long been recognized as one catalyst for solving many of the IT problems faced by organizations. In the 1980s, a healthy relationship was advocated as a critical success factor for IT (Martin, 1982), a means to speed business strategy execution (Gunner and Gulden, 1986), and necessary to achieve maximum value from IT investments (Henderson, 1989). Furthermore, successful relationships between IT and business were considered essential for the effective delivery of information systems products and services in organizations (Lucas, 1984).

As the 1990s approached, it was found that many of the top issues facing information systems management were managerial issues that related to the interface between the IS department and the rest of the organization (More, 1990; Niederman, Brancheau, and Wetherbe, 1991; Watson, 1989). IT practitioners were encouraged to create mutually

supportive and sustained partnerships with senior and line management to ensure the penetration of IS within the organization and for the successful transfer of the management of the use of technology from IT to line management (Dixon and Darwin, 1989; Earl, 1989; Keen, 1991; McFarlan, 1990). Top management was advised to recognize that a good plan can only be developed and executed through a partnership between the business unit managers (responsible for organizational culture) and the managers of the financial, the personnel, and the IT resource units (responsible for their own subcultures) (Selig, 1991).

In the last decade, the importance of an effective IT-business relationship received even more emphasis, with claims that the successful use of IT in organizations was largely dependent on an effective IT-business partnership (Byers and Blume, 1994; Grindley, 1992; Nelson and Coopriider, 1996). A closer working relationship between IT and other organizational groups could not only overcome some of the key IT-related concerns but, more importantly, provide opportunities to fully exploit information technology (Broadbent, 1996). Rather than only providing a support role, IT is now seen as having potential to add value to core business operations and therefore provide competitive advantage (Byers and Blume, 1994; Laudon and Laudon, 2000). Once again, top management was urged to get involved in information systems strategic planning by developing a direct two-way relationship between the CEO and the IS executive and to view this relationship as a key asset that required managing for effective IT capability (Feeny, Edwards, and Simpson, 1992; Rockart et al., 1996; Ross, Beath, and Goodhue, 1996).

From the above discussion, it is apparent that managing the IT-business relationship is important:

- to achieve maximum value from IT investments;
- for IT to successfully and effectively deliver information systems in an organization;
- to plan and execute business strategy;
- to transfer responsibility for the use of technology to line management;
- due to the penetration of IT and organizations' dependence upon it;
- for organizations to fully exploit IT and to add value to the business.

3 Organizational Conflict

Despite awareness of this need for IT and business to develop and sustain an effective partnership, the reality is often marred with conflict, from sniping and skirmishes to outright war! To help resolve this conflict, it is useful to employ the concept of culture, which provides a basis for understanding the differences between groups.

Conflict stems from many interacting individual, organizational, and systems factors, including organization size and structure, communication, personal behavior, reward systems, resource interdependence, and power (Ivancevich and Matteson, 1999; Smith and McKeen, 1992; Trice, 1993). Conflict can also occur between groups due to the functions they perform and their differing goals, values, and backgrounds (Vecchio, Hearn, and Southey, 1996). For example, the IT group may impose mandatory password changes to protect the system from unauthorized access. System users may resent being forced to change their passwords on a regular basis as it is time consuming and frustrating when passwords are forgotten. It is recognized that differing cultural systems can create different and opposing views on basic issues, which in turn, can result in conflict (Dubinskas, 1992). Conflict arises when interests collide or when one group is frustrated by the actions of the other group (Boulding, 1957; Hall, 1996). In a conflicting situation, two groups are blocked in their efforts to achieve agreement by a fundamental inability or unwillingness to interpret the other's position or perspective. Each group uses its own cultural beliefs to evaluate the actions of the other group, which in turn are not necessarily the same beliefs by which the

others guide themselves (Dubinskas, 1992). In intergroup conflict, perceptual distortions occur, with each group stereotyping the other on their perceived weaknesses while ignoring the contributions they make. While these differences may be small, each group will tend to exaggerate them and make generalizations. When differences between groups are emphasized, stereotypes are reinforced, relationships deteriorate, and conflict develops (Nelson and Coopriider, 1996).

Although potential sources of conflict may exist between groups, it may not necessarily result. Whether cooperation or conflict results depends on the reaction of one group to the behavior of the other (Boulding, 1957; Hall, 1996). Before conflict can take place, a decision must be made to engage in conflict. Based on their mindsets, different groups in organizations can view the same situation in many different ways; by shifting their viewpoints, their perspectives can change and conflict may not necessarily arise (Markus, 1984). If two parties agree, power and conflict become redundant (Warne, 1997). An example best illustrates this point. IT may have such an enormous backlog of work that it cannot attend to the technical request of a business group. This may cause the business group to react in a conflictual way by adopting a negative attitude towards IT services and communicating stories and myths about IT and their lack of service. Alternatively, the business group may react in a cooperative way by increasing their own technical skills and solving their own problem (Dubinskas, 1992). Also, the needs and constraints from one side can be perceived as unreasonable and lacking in cooperation from the other side (Nelson and Coopriider, 1996). What looks like a problem can be transformed into a solution with a simple change of perspective (Markus, 1984). When conflict does occur, it is reflected through hostility, frustration, communication difficulties, groups distancing themselves from one another, and lack of trust and cooperation (Smith and McKeen, 1992).

Two assumptions are worth noting when studying conflict. The first assumption is that conflict in organizations is an inevitable part of the normal state of an organization (Hall, 1996; Van Maanen and Barley, 1985). A degree of conflict is always guaranteed (Boulding, 1957; Irwin and More, 1994). When disparate groups encounter each other, a fundamental clash between the cultural systems of each group occurs (Dubinskas, 1992).

The second assumption is that conflict *per se* is neither good nor bad (Hall, 1996; Ivancevich and Matteson, 1999). Too much conflict can have negative consequences for the organization as conflict management requires time and resources and diverts energy that could be more usefully applied elsewhere. Also, achieving organizational goals and mutual productivity becomes almost impossible when intergroup conflict occurs (Nelson and Coopriider, 1996). Further, when subcultures are out of alignment and don't understand each other, they often work at cross-purposes, resulting in frustration and lower productivity (Schein, 1996). On the other hand, too little conflict can also be negative as it can lead to a stagnant organization that has no motivation for change. Conflict can also be positive if it facilitates positive change through increased awareness of problems and productive searches for solutions (Ivancevich and Mattson, 1999; Robey and Smith, 1993). Also, when groups with differing opinions try to agree, they gain a better understanding of the others' position (Buchanan and Huczynski, 1985; Dubinskas, 1992). Given these assumptions, organizations should focus on managing conflict, not preventing it, or alternatively, turning conflict into cooperation (Hall, 1996; Hirschheim and Newman, 1991).

In brief, it is clear that the differing cultures within organizations contribute to the presence of conflict between groups (Robbins, 1998). However, if properly managed, conflict can have a positive effect and can lead to a cooperative IT-business relationship. The conflict between business and IT is now explored from a cultural perspective.

4 The Troubled IT-Business Relationship

Since the first widespread application of computers to business problems in the late 1950s and 1960s, a dysfunctional relationship between business and IT professionals has existed (Doll and Ahmed, 1983; Ward and Griffiths, 1996). Provocative and sensational statements have been made about problems in the IT-business relationship. The views of IT people are contrasted with the views of business people with statements such as the following.

- “Conflict is structured into their relationships ... Resentment of the innovation is aggravated by resentment of the innovator: resentment of his rewards, his values, his manner, his vocabulary, his prestige as a change-maker, his apparent freedom from ‘normal company discipline,’ his promotability, his dress, his fickle loyalty to the firm, and not least, his youth” (Hirschheim and Newman, 1991).
- “Management and users have a poor relationship with technologists” (Black, 1997).
- “There is no love lost between users and IT professionals” (Kennedy, 1994).
- “The two tribes mentality is all too common” (Black, 1997)
- “There is an uneasy alliance between senior executives responsible for managing organizations and IT people they hired to operate organizations’ computers” (Wang, 1994)
- “Stop referring to us and them – we’re all part of the one business” (Grindley, 1995; Robey and Smith, 1993).

There are numerous reasons for this disconnect between business and IT professionals. Five of the more common reasons, which are discussed next, are: the birth and growth of IT, business management inexperience with IT, changing role of IT, failure of IT to understand business implications of technology, and lack of management appreciation of the potential for IT to improve business performance (Grindley, 1992; Keen, 1991).

4.1 Birth and Growth of IT

The history surrounding the birth of IT suggests that IT brought with it a culture of its own that clashed with the dominant organizational culture. Indeed, the arrival of the computer and the IT industry has challenged traditional forms of management, administration, and authority (Grindley, 1995). Management techniques developed over the past years have not been successful when applied to the management of IT, and an overwhelming number of companies have been unable to absorb IT professionals into their organizational culture (Grindley, 1992). The community of IT professionals grew out of a population that had its own set of values, assumptions, and jargon, all of which was unfamiliar to those from other areas of the business. Because of these differences, IT and business have gradually diverged and the gap has widened (Wang, 1994).

4.2 Business Management Inexperience with IT

Business management inexperience with IT is another reason given for the cultural gap between business and IT. “With IT being a relatively recent arrival on the managerial landscape, business managers have not developed the kind of experience and expertise that they have developed in other business disciplines such as Finance and HR” (Keen, 1991). “The application of management techniques developed in business over the last 200 years do not seem to work properly when applied to computers” (Grindley, 1995). Many managers are not technically versed and feel incapable of managing or understanding IT, and this is by choice. Managers run the business while the IT group provides technical solutions (Ward and Peppard, 1996). IT professionals have a belief that business people don’t understand

what IT does to help the business; if they did understand, then the business would value their IT people (Bashein and Markus, 1997). Many IT professionals believe they cannot achieve success with IT unless business management becomes more involved (Gunner and Gulden, 1986).

4.3 The Changing Role of IT

The changing role of IT over the years is also flagged as a reason for the cultural chasm between business and IT. The IT function has evolved from a process-oriented, backroom function to a strategic, information-oriented function (Ward and Griffiths, 1996). As a backroom function, IT was considered overhead (Keen, 1991); those responsible for the management of these systems were left alone to practice their “dark art” (Spanos, Prastacos, and Poulymenakou, 2002, p. xiii). Hence, business managers could ignore IT. The 1970s saw the emergence of hierarchical databases, rudimentary networks, a more structured approach to systems development, the token involvement of users in the design of systems, and the adoption of project management techniques from the construction and manufacturing industries (Thomsett, 1993). This decade was notorious for repeated project failures. Business perceived a lack of service from computing people, which impacted on the IT’s credibility of IT (Doll and Ahmed, 1983; Thomsett, 1993). During the 1980s, with the explosion of personal computing technology, responsibility for IT development moved away from the IT organization, creating IT management issues of control of resources, compatibility of hardware and software, and data integrity (Ward and Peppard, 1996). This growth of IT was not accompanied with commensurate improvements in the understanding of IT (Avison and Fitzgerald, 1991).

IT has now matured to a stage where it has become an important aspect of every-day business and an integral part of everyday life (Keen, 1991). IT is no longer a back room function but an icon of everyday living, and business managers can now no longer afford to ignore this IT function in their organizations if they are to achieve organizational success.

4.4 Failure of IT to Understand Business Implications

A further reason for tensions in the IT-business relationship is the technical focus of IT professionals and their perceived lack of understanding of business issues. IT people are often criticized for showing more loyalty to IT than to the business and also failing to appreciate the business implications of their own technology (Grindley, 1992). Business people feel that IT professionals need to liaise more with users about what they want, as opposed to telling them what IT has decided (Smith and McKeen, 1992). This is illustrated by two examples: “The very best thing to do is take your head out of the sand and go and ‘walk the job’ because you’ll see exactly what problems you create”; “It’s frustrating when a technical person doesn’t appreciate the business trading process and the marketing aspects involved. They tend to think of IT in isolation, and because they have a new toy they want to get into the organization, they don’t think ‘well, what’s it going to do.’ Despite involving IT people in the business, there still tends to be a technology emphasis come through” (Jackson, 1998).

4.5 Lack of Management Appreciation of IT

The final reason given for tensions in the IT-business relationship is the lack of management appreciation for IT. Many IT professionals believe that the IT potential for improving business performance is not appreciated by top management (Griffiths, 1994; Grindley,

1992). Indeed, many in management have a poor understanding of the potential of IT and have still not recognized its importance (Hirschheim et al., 1988). IT groups are often viewed by business as an overhead expense, and there is little appreciation of their contribution to the business (Brancheau and Wetherbe, 1987). It has been said that management no longer believes in the potential of IT systems as previous systems have failed to live up to expectations. Repeated project failures, delays, and cost overruns have destroyed the credibility of the IT group and reduced its influence and status in many organizations (Broadbent et al., 1993; Doll and Almed, 1983; Griffiths, 1994; Keen, 1991; Lederer and Mendelow, 1988; Schein, 1992). These problems have largely contributed to management discomfort in dealing with and managing IT, thus leading to an uncomfortable relationship (Doll and Ahmed, 1982; Keen, 1991). It cannot be said with confidence that the IT group always produces quality services and makes a significant contribution to the business (Broadbent et al., 1993). “A significant number of financial controllers believe IT has failed to deliver a competitive advantage, increase the bottom line, or improve business processes. Only a minority believe IT is contributing to their business” Bryan, 1997).

Whatever the reasons for the culture gap between business and IT, there is sufficient evidence to suggest that this gap is a deep-rooted problem that can result in a poor IT-business relationship (Wang, 1994). This poor relationship may be a risk to information systems project success (Hirschheim et al., 1988; Warne, 1997). Additionally, enormous amounts of time and energy are wasted every day because of incompatibilities between the IT and organizational cultures (More, 1990). So, who is to blame – the IT professionals or the business professionals? Each group thinks the other is from a different planet. However, “we are all from the same planet” (Moriarty, 1997). The answer to the culture gap lies in developing an effective relationship between business and IT professionals (Gunner and Gulden, 1986). If IS researchers are to be able to influence or change management’s behavior, they will need to have a firm understanding of why such resistance exists (Wu, 2003).

Applying the concepts of culture to occupational subgroups in organizations to manage conflict between them has tremendous value (Dubinskas, 1992; Schein, 1996). Looking at group conflict through the lens of culture allows a deeper understanding of this conflict (Dubinskas, 1992). In continued attempts to improve the IT-business relationship, the focus of recent research has moved towards the “human” element of IT (Wang, 1994). It is now widely accepted that globalization, deregulation, and innovation propelled by information and communication technologies (ICT) are the key forces shaping the economic landscape (Spanos et al., 2002). Therefore, an investigation of the IT culture may help business professionals better understand the behavior of IT professionals, providing a starting point for reconciliation between business and IT professionals.

5 Organizational Culture and Subcultures

Culture is comprised of a number of underlying assumptions, values, and beliefs that are reflected through stories and myths, symbols, rituals and routines, control systems, organizational structure, and power structures (Johnson and Scholes, 1993).

Organizational culture is defined as a shared set of beliefs, values, and norms present in an organization expressed through things such as symbols, ceremonies, myths, rituals, special languages, and stories, which in turn influence the behavior of people (Baker, 1980; Robbins, 1998; Schein, 1992; Trice, 1993). These beliefs, values, and norms are passed on to incoming employees (Van Maanen and Barley, 1985), communicating the correct way to think and act and how things should be done (Sankar, 1988).

There are four major reasons for understanding and managing organizational culture. First, organizational culture defines the behavior in organizations by providing a framework so employees know how they will be expected to behave (Martin and Siehl, 1983). That is, culture prescribes rules or standards for the way that people relate to each other and the way things are done (Vecchio et al., 1996). Second, cultures can create commitment to corporate values so employees believe they are working towards something in which they believe (Martin and Siehl, 1983). A shared meaning by all employees in an organization promotes a culture whereby everyone is guided in the same direction (Robbins, 1998). Third, culture can be a control mechanism, encouraging or prohibiting patterns of behavior (Martin and Siehl, 1983). Last, organizational culture can also make a significant contribution to an organization's performance and success (Baker, 1980; Marcoulides and Heck, 1993; Martin and Siehl, 1983).

In addition to the dominant culture discussed above, various subcultures develop within organizations. These subcultures reflect common problems, situations, or experiences (Robbins, 1998). An organizational subculture is "a subset of an organization's members who interact regularly with each other, identify themselves as a distinct group in an organization, share a set of common problems, and behave according to the understandings unique to that group" (Van Maanen and Barley, 1985).

Subcultures are likely to be found within organizational groups (Trice, 1993). A subculture may be a professional group within an organization whose members have their own norms, customs, values, and traditions that are peculiar to their profession rather than to the organization (Burns, 1997). One example of a group having its own distinctive and powerful subculture is an occupational group. An occupational group, or occupational community, is a group of practitioners, researchers, and teachers who have a common base of knowledge, a common jargon, similar background and training, and a sense of identification with each other (Schein, 1992). Just as it is important to understand and manage organizational culture, there are three sound arguments as to why it is necessary to understand and manage subcultures. First, to fully understand the culture of an organization, it is necessary to understand the dominant culture of the organization, the subcultures within the organization, and the interaction between these subcultures (Schein, 1992; Thomsett, 1993). A second major reason for studying subcultures is to help resolve organizational conflict (Robey and Zmud, 1992). Because organizational subcultures have their own set of beliefs, assumptions, and underlying values represented through symbols, it is recognized that they may clash with the dominant organizational culture or other subcultures (Burns, 1997; Choi and Kelemen, 1995; Robbins, 1998; Schein, 1996; Trice, 1993). When cultures clash, the efficient operation of the business and organizational success can be seriously affected (Baker, 1980; Burnes, 1992). Third, studying subcultures is a way of understanding both the constitution of a group with a distinctive identity and the fundamental grounds upon which groups differentiate or distinguish themselves from each other (Van Maanen and Barley, 1985).

IT people are often described as having their own culture different from that of the business (Ward and Griffiths, 1996). IT professors, IT consultants, and IT practitioners have similar assumptions (Schein, 1992). In Australia, the acceptance of the Australian Computer Society (ACS) into the Australian Council of Professions in February 2000 is evidence that IT is considered an occupational group. In sharing a common base of knowledge and jargon, IT workers form an occupational group with a distinct subculture. This subculture of the IT group of professionals is such that it may lead to behavior that is dysfunctional to the rest of the organization (Keen, 1991). This "disconnect" between business and IT, also referred to as a "culture gap" (Grindley, 1992) or a "cultural chasm" (Keen, 1991), is defined as a "conflict, pervasive yet unnatural, that has misaligned the objectives of executive managers

and technologists and that impairs or prevents organizations from obtaining a cost-effective return from their investment in information technology” (Wang, 1994).

From an understanding of their own culture, IT professionals can be made aware of their own identities, values, beliefs, and assumptions and the resultant consequences of their behavior (Krefting and Frost, 1985). This is important as culture is sometimes hidden from its own members (Dubinskas, 1992). Through making IT professionals aware of their own values, beliefs, and assumptions and how these are reflected in their behavior, IT professionals are in a better position to behave in a manner promoting a healthy relationship with their business counterparts. In addition, business professionals can benefit from an understanding of the IT culture. Members of one subculture are often ignorant of the subcultures of others (Van Maanen and Barley, 1985).

Although culture is difficult both to explain and to study (Schein, 1992), several models have been developed and successfully tested, providing a helpful framework for assessing organizational culture or specific subcultures.

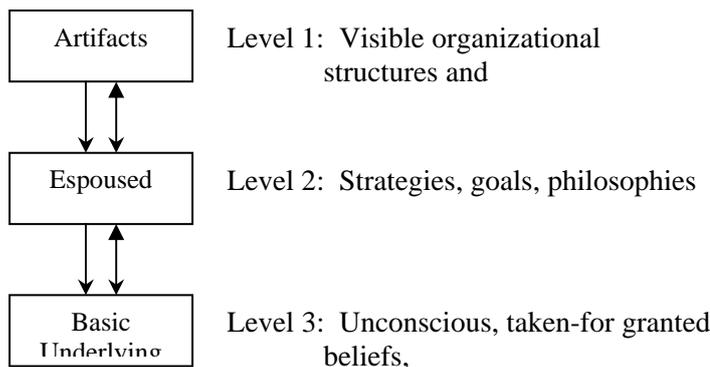
6 Models for Assessing Organizational Culture

The following section discusses and compares seven of the more widely reported models for assessing organizational culture. Many of these are variations of the first model discussed, Schein’s three-level model for assessing organizational culture, the model most prolific in the literature.

6.1 Model 1: Three Levels of Culture

This first model proposes that there are three levels of culture, with each level relating to the degree of visibility to the observer (Schein, 1992). These three levels, illustrated in Figure 1 are artifacts, espoused values and basic underlying assumptions.

Figure 1 Levels of culture (Source: Schein, 1992, p. 17)



The first level, artifacts, refers to the visible, or tangible, organizational structures and processes (Brown, 1995; Schein, 1992). Artifacts are categorized by Krefling and Frost (1985) as verbal, behavioral, and physical. Language, stories, and myths are examples of verbal artifacts. IT professionals have a reputation for using technical jargon and TLAs – three-letter abbreviations such as RAM, ROM, CPU, GUI, FTP, XML, URL, SQL, TPS, EIS, and SSL. Rituals, routines, and ceremonies fall into the category of behavioral artifacts. For example, many organizations have adopted procedures requiring business staff to submit Customer Service Requests to the IT department for support, new systems, and modifications to existing systems. These requests are then prioritized for action by IT management. Technology and art, the organization's physical environment, dress code, corporate logos, and published mission statements are examples of physical artifacts. In Australia, the traditional IT male dress code of jeans and t-shirt has been updated to include a computer-theme tie and leather jacket. As a consequence of the long hours often involved in IT jobs, IT staff have a reputation for drinking lots of coffee. The mug typically sports a Dilbert cartoon and sits on a CD coaster! To understand and interpret the meaning of such artifacts and how they influence the behavior of organizational members, it is necessary to examine the next level of culture, espoused values (Schein, 1992).

The second level of culture, espoused values, refers to the beliefs, values, attitudes, and norms of the behavior of people within an organization (Brown, 1995). Espoused values can also relate to what an organization does and how it does it. For example, the mission statement of Avis, the car rental company, is "Avis – We Try Harder." This mission statement is an artifact. However, implied in this mission statement is the attitude or belief that people who work for Avis do try harder, and this may be reflected in the behavior of Avis employees (Vecchio et al., 1996). Since espoused values are not as directly observable as are artifacts, they are not easy to identify and measure (Schein, 1992).

The third level of culture, basic underlying assumptions, develops when beliefs, perceptions, and values become so entrenched that they are taken for granted and become unconscious assumptions (Johnson and Scholes, 1993; Schein, 1992). For example, based on their underlying assumptions, observers may have different interpretations of the situation of someone sitting idle at their desk. One observer may interpret this situation as someone being lazy, whereas another observer may interpret this situation as someone thinking deeply about a complex problem. Such unconscious assumptions are typically reflected in espoused values, which in turn are reflected through artifacts (Johnson and Scholes, 1993).

This three-level model of culture was applied to help understand those elements of culture that bear on the observed difficulty of implementing IT solutions. Data were collected over a period of 25 years through general inquiry, personal efforts to learn how to use technology, consulting work with computer companies, observations of the interactions between IT professionals and the rest of the organization, interviews with IT professionals, and interviews with CEOs. The focus of Schein's research was on the most tacit and intangible level of culture, basic underlying assumptions; and findings were organized around three categories of assumptions – IT staff assumptions about information, IT staff assumptions about human nature and learning, and IT staff assumptions about organizations and management. Assumptions of senior management were also observed, and it was found that in cases where IT implementations were unsuccessful, the assumptions of IT staff differed greatly from the assumptions of senior managers (Schein, 1992). The next two models discussed represent variations of this three-level model for studying culture.

6.2 *Model 2: The Krefting and Frost Four Levels of Organizational Culture*

One variation proposes that there are indeed four levels of culture – artifacts, perspectives, values, and assumptions (Krefting and Frost, 1985). This variation splits the second level of the three-level model, espoused values, into perspectives and values. The term “perspectives” refers to the rules and norms shared by members. Values are seen as being more abstract than perspectives and are the basis on which organizational members judge situations. This four-level model is purely descriptive, and the researchers have been unable to locate publications that report on any tests of this model.

6.3 *Model 3: Martin and Siehl’s Four Levels of Organizational Culture*

The second variation of Schein’s three-level model proposes an additional fourth level of culture, management practices (Martin and Siehl, 1983). Management practices such as training, performance appraisal, allocation of rewards, and hiring were found to influence the behavior of people in organizations. These practices are particularly relevant to IT staff as training is both desirable and necessary to maintain skill currency in the fast-changing IT world. Also, the demand for and shortage of IT professionals has resulted in organizations offering higher remuneration and incentives to attract and retain them. A number of present and former General Motors employees were interviewed to assess the culture within this organization to test this model.

6.4 *Model 4: Theoretical Predictive Model for Organizational Productivity*

Model 4 is described as an exploratory theoretical model for defining an organizational culture, which in turn can be used to explain organizational performance (Marcoulides and Heck, 1993). This model proposes that the culture of an organization and subsequently the behavior of its people can be determined through seven observable variables of culture, which in turn influence organizational performance. These seven variables are organizational structure, organizational purpose, organizational values, organizational climate, task organization, worker attitudes, and worker goals.

To test this model, Marcoulides and Heck (1993) used structured interviews and follow-up questionnaires to study 392 participants from 26 organizations. The results of this research showed that each of the above seven variables of culture had some effect on organizational performance.

6.5 *Model 5: Seven Dimensions of Culture*

The fifth model for assessing organizational culture proposes seven dimensions of culture relating to beliefs and values (Pliskin et al., 1993):

- innovation and action orientation, including rapid response to changes in the environment;
- risk taking such as investment in new ventures and systems;
- integration and lateral interdependence taking into account the importance of cooperation and communication among organizational sub-units to achieve organizational goals;
- top management contact and the nature of the manager-subordinate relationship;
- autonomy in decision making, especially the importance of delegating responsibility for decisions;
- performance orientation, staff accountability, and performance appraisal; and

- reward orientation in terms of equitable, competitive, and performance-based pay structures.

Each of these seven dimensions of culture was studied in relation to a failed MIS implementation within a chemical company where an external firm had been contracted to implement a system to support the personnel management function. The failed system implementation was found to be due to a number of discrepancies between presumed and actual organizational culture for each of the seven dimensions of culture. For example, members of the organization believed risk taking was encouraged, but Pliskin et al. (1993) found that management acted conservatively. Similarly, members of the organization had the perception that innovation was important, yet no evidence was found of any innovation. The results of this study advise practitioners that it is necessary to first be aware of culture, and second, to regard culture needs as a constraint with MIS implementations.

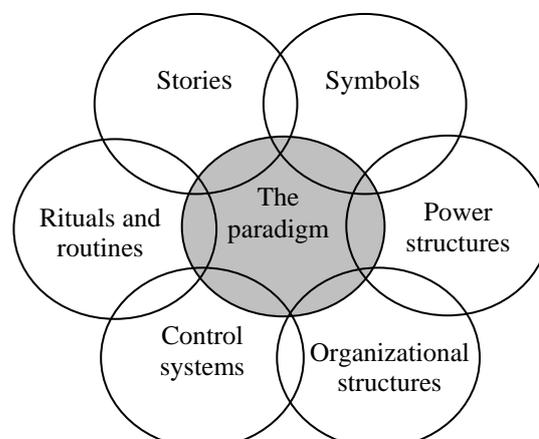
6.6 Model 6: Four Manifestations of Culture

In-depth interviews were used as the primary means of data collection to study the cultural differences of ten organizations (Hofstede et al., 1990). Four categories of manifestations of culture were identified: symbols, heroes, rituals, and values. Symbols, heroes, and rituals reflected “what is,” and values reflected “what should be.” Organizational culture was found to be different in each organization with respect to the three categories of manifestations of culture: symbols, heroes, and rituals. In relation to the fourth category, values, a determination was made that values did not differ between organizations but differed according to demographics such as age, seniority, and education.

6.7 Model 7: The Cultural Web

Rather than studying levels of culture in organizations, Johnson and Scholes (1993) view the different aspects of culture as a web, as illustrated in Figure 2. The center circle, the paradigm, represents a core set of values, beliefs, and assumptions common to the organization. These values, beliefs, and assumptions are reflected through the outer circles, which represent the cultural elements of stories, symbols, power structures, organizational structures, control systems, and rituals and routines.

Figure 2 The cultural web of an organization (Source: Johnson and Scholes, 1993)



Stories are tales told by members of an organization; rituals and routines define the way work is done; symbols refer to the type of language used, logos, and office layouts. Control systems emphasize what is important in the organization; power structures reflect the powerful managerial groupings in an organization; and the organizational structure refers to the way in which an organization works.

Ward and Peppard (1996) used this cultural web to obtain the view that a business had of its IT personnel. A user survey was administered, and the results of the survey were correlated to the elements of the cultural web. It was found that the business did not hold its IT department in high regard, suggesting that IT professionals and business people subscribe to two different paradigms.

6.8 Summary of Organizational Culture Models

The above review and comparison (as summarized in Table 1) reveals a high degree of similarity among the seven models for studying organizational culture. Each model refers to a tacit level of assumptions and beliefs that are reflected through more tangible organizational symbols.

Table 1. Summary and Comparison of the Seven Models of Culture

Research	Elements of Culture			
	Tacit			Explicit
Model 1: Schein (1992)	Underlying assumptions	Espoused values		Artifacts
Model 2: Krefting & Frost (1985)	Underlying assumptions	Values	Perceptions	Artifacts
Model 3: Martin & Siehl (1983)	Underlying assumptions	Espoused values	Artifacts	Management practices
Model 4: Marcoulides & Heck (1993)		Organizational values Worker attitudes Worker goals		Task organization Organizational structure Organizational purpose Organizational climate
Model 5: Pliskin et al. (1993)		Innovation and action orientation Risk taking Integration and lateral interdependence Autonomy in decision making Performance orientation		Top management contact Reward orientation
Model 6: Hofstede et al. (1990)		Values		Symbols Heroes Rituals
Model 7: Johnson & Scholes (1993)	Paradigm	Symbols Stories and myths Rituals and routines		Control systems Organizational structure Power

7 Case Study: IT Culture in Five Australian Organizations

In the previous section, seven popular models for assessing organizational culture were reviewed. Of these, the Johnson and Scholes (1993) model (illustrated in Figure 2) was selected to assess the IT culture in five organizations. This model was chosen because it offers a holistic view of culture, encompassing all of the elements of culture identified by

other researchers. In addition, this model highlights some of the more visible aspects of culture and links these back to values, beliefs, and assumptions, making the concept of culture easier to study and analyse. Also, this model is recommended as a useful tool for assessing IT culture in organizations (Avison, Cuthbertson, and Powell, 2000; Ward and Griffiths, 1996).

The IT literature was reviewed, and important themes were identified relating to each of the six elements of culture. To focus the review of the literature, the themes of culture identified provided a useful starting point. Only themes for the outer elements (artifacts) of IT culture were reviewed since the overall IT culture, or paradigm, is reflected through these artifacts. Also, assumptions, values, and beliefs are difficult to study except through long-term observation and in-depth, clinical interviewing techniques (Schein, 1992).

To provide an understanding of the culture of the IT group in organizations, interviews were held with 21 senior business managers and 11 IT managers from five large Australian organizations. Table 2 provides basic information about these organizations, including the type of organization, number of employees, number of IT staff, and the position titles of the business and IT professionals interviewed in each organization.

Table 2. Participating Organizations

<i>Case</i>	<i>Description</i>	<i>Business Professionals Interviewed</i>	<i>IT Professionals Interviewed</i>
A	Financial organization 400 employees 20 IT staff	Customer Services Manager Call Center Manager Credit Manager Audit Manager	Systems Manager Operations Manager
B	State government agency 6,500 employees 80 IT staff	CEO Deputy CEO Director, Communication Centre Audit Manager	IT Director Project Manager
C	Travel company 30,000 employees 800 staff	General Manager Projects Office General Manager – Commercial Systems General Manager— Passenger Revenue Accounting General Manager – Engineering and Maintenance General Manager – Australian Sales	Group General Manager - Systems Delivery General Manager – Infrastructure and Operations
D	National government agency 4,000 employees 100 IT staff	National Manager National Manager – Policy and Products Manager – Financial Operations and Accounting Network Editor	Applications Manager Client Liaison Manager
E	Retail company 80,000 employees 250 staff	National Administration Manager Electronic Trading Manager National Systems Accountant National Project Manager of Traineeships	Project Manager Manager of Communications and Infrastructure Planning Manager

Interviewees displayed candour in their responses to the semi-structured interview questions and provided rich descriptions and examples of the implicit and explicit cultural themes of the IT group in their organizations. The data were analyzed by reviewing interview transcripts for themes and patterns related to six elements of culture. A distinct IT culture comprised of a number of themes was identified in each of the five organizations that participated in this research. The themes of culture that emerged are summarized in Table 3. Most of these themes reoccurred in two or more cases, thereby demonstrating literal replication logic (Wu, 2003).

In most organizations, business and IT did not share the same view about the role of the IT group. A few success stories and many horror stories were told in all cases, particularly about the failure of the IT group to meet time and cost targets. A lack of communication between business and IT groups was identified, and IT people were often perceived to be highly technical and lacking in business knowledge. Additionally, a high rate of IT staff turnover was reported in four of the organizations. Procedures imposed by the IT group were unpopular in all organizations. In most cases, all IT projects were managed by IT professionals and the IT group was seen as not meeting business needs.

In addition to identifying many themes of IT culture common to most of the five organizations studied, this research also highlights themes that were scarcely mentioned in the literature. The following six themes of IT culture surfaced in more than one organization that participated in this research, providing greater support that these themes may be common to IT groups:

- business and IT have opposing views on the role of IT;
- IT groups are comprised of poorly skilled IT professionals;
- IT groups have a Help Desk or Customer Service Request procedure;
- IT groups have poor funding;
- business people are gaining strategic control of IT;
- business groups control IT expenditure.

Through the identification of these new themes of IT culture, this research advances previous academic research on IT culture by providing insights into new artifacts that may be typical of the IT culture.

Based on the literature and findings from this research, themes contributing to an ideal culture were derived. Therefore the following recommendations are suggested (and summarized in Figure 3) to improve the IT culture within organizations.

- The role of IT must be clearly defined and communicated throughout the organization.
- IT managers and business executives must be involved in regular and frequent information exchange sessions.
- Organizations should promote IT success stories and discourage dissemination of horror stories about IT's performance.
- Effective communication must be established between the IT and business professionals.
- Strategies to reward and retain staff need to exist to achieve low staff turnover.
- Skilled IT professionals with an appreciation of business issues should be hired or trained.
- IT should be decentralized throughout the organization but ensure reporting channels are clear.
- Systems delivery method must be simplified and promoted to business people.
- Help Desk must have a customer service focus and adequate resources to provide a good service.

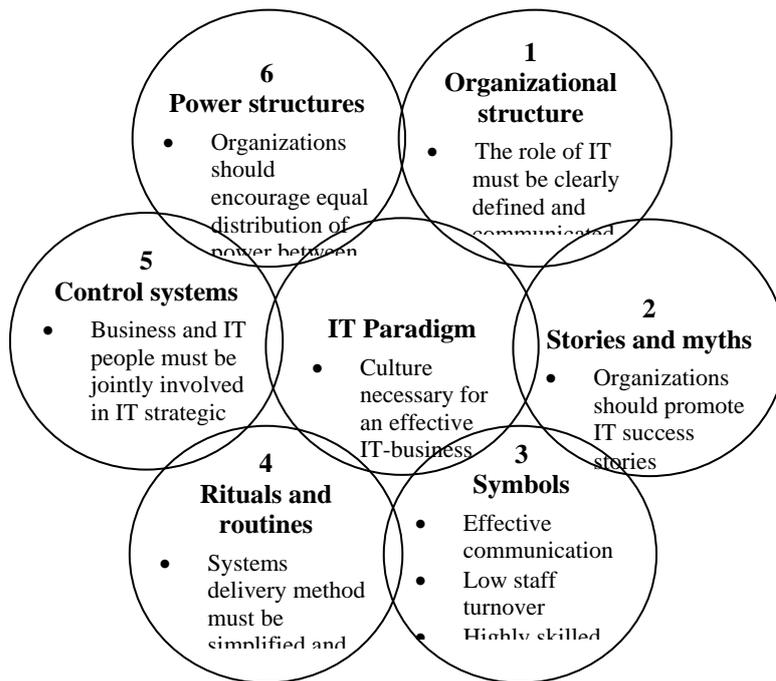
- Business and IT people must be jointly involved in IT strategic planning and project control.
- Business people should control and monitor IT expenditure.
- Organizations should encourage equal distribution of power between business and IT groups.
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Table 3. Themes of IT Culture from the Literature and from the Five Cases in this Study Highlighting Themes Demonstrating Literal Replication Logic

Elements of Culture	Themes of IT Culture	Identified in Literature	Cases				
			A	B	C	D	E
Organization Structure	IT group plays a strategic role	Yes					
	IT group plays a support role	Yes	✓				
	Business and IT have opposing views re role of IT			✓	✓	✓	✓
	IT director is a senior executive	Yes	✓		✓		
	IT director is not a senior executive	Yes		✓		✓	✓
	Small IT group			✓			
Stories and Myths	Horror stories told about IT performance	Yes	✓	✓	✓	✓	✓
	Success stories spread about IT	Yes	✓		✓	✓	✓
Symbols	IT group takes caution not to use jargon						✓
	Lack of communication between IT and business	Yes		✓	✓	✓	✓
	Low staff turnover of IT group		✓				
	High staff turnover of IT group	Yes		✓	✓	✓	✓
	IT are highly analytical, technical, and boring	Yes	✓	✓	✓	✓	✓
	IT people are arrogant					✓	
	IT group is poorly skilled					✓	✓
	IT group has good business knowledge		✓				
	IT people lack business knowledge	Yes		✓	✓	✓	✓
	IT function centralized in organization	Yes	✓			✓	✓
	IT function decentralized throughout organization	Yes		✓	✓		
	All software developed in-house		✓				
Uniform worn by Help Desk staff						✓	
Rituals and Routines	Help Desk/Customer service request procedure		✓	✓	✓	✓	✓
	Systems development process implemented	Yes	✓	✓	✓	✓	✓
	Government policies/ User pays systems			✓		✓	
Control Systems	Business gaining strategic control of IT				✓		✓
	IT controls strategic direction	Yes	✓			✓	
	Loosely defined strategic control of IT			✓			
	IT people manage projects	Yes	✓	✓		✓	✓
	Reluctance by anyone to control projects				✓		
	Business controls IT expenditure			✓	✓		
Power Structures	Business highly dependent on IT	Yes	✓			✓	✓
	IT group not meeting business needs	Yes		✓	✓	✓	✓
	IT group lacks position power	Yes		✓			
	IT group holds high level of expert power	Yes			✓	✓	
	Diminishing levels of expert power held by IT			✓			

Notes: ✓ indicates the theme of culture was identified in the study as important

Shaded rows highlight themes that were identified in more than one of the five organizations studied

Figure 3. Recommended culture for IT group

8 Implications and Conclusion

Through investigating the subculture of the IT group within five Australian organizations, this research adds to the body of knowledge relating to IT culture through the application of a model to understand the IT culture. This research confirms the view in the IT academic and professional literature that IT groups have their own subcultures identifiable by analysing six elements: organizational structure, stories and myths, symbols, rituals and routines, control systems, and power structures. In addition, this research highlights new themes of IT culture, providing insights into new themes that may be common to IT groups. Revealing new themes implies that the IT culture has not previously been adequately addressed in the literature, or alternatively, that the IT culture is evolving and can be recognised by a growing number of artifacts. It is apparent that understanding and managing culture is important for sustained survival in today's competitive global economy. A desirable work environment and maximum profit margins will not be achieved until IT and management are able to communicate effectively and work together as a team.

The following recommendations to management are based on Hofstede's (1994) key steps and tailored by applying the findings of this study.

- Secure a commitment by top management to change the IT culture and exercise its power and expertise.

- Undertake an assessment of the organization culture and the IT subculture.
- Determine which characteristics of organizational subcultures contribute to conflict.
- Create a network of change agents to communicate the issues and work out how these elements can be diffused.
- Design and implement structural, procedural, control, and personnel policy changes.

However, all practitioners desiring to use the results of this research to introduce cultural change to improve the IT-business relationship should note that there may be factors other than cultural differences that result in intergroup conflict, such as political behavior and external influences. Also, a company that copies the culture of a successful organization may not recognize the same success: the Japanese business culture, although successful in Japan, failed when introduced in the United States (Choi and Kelemen, 1995). People carry several layers of mental programming within themselves corresponding to different levels of culture related to their nationality, region, religion, gender, generation, social class, and profession (Hofstede, 1994). As each country has its own distinctive culture (Choi and Kelemen, 1995; Hofstede et al., 1990) and the national culture influences the organizational culture, further research is required if the findings of this research are to be generalized to organizations and IT groups in other countries. Therefore, the findings of this research should not be applied in isolation of consideration of other factors. In addition, it should be noted that the findings of this research should not be considered as “action items” for practitioners on how to implement and manage cultural change to improve the IT-business relationship. The organizational behavior theory on culture makes suggestions on how to manage cultural change. Practitioners should also be aware that “cultural change takes a long time to achieve” (Noble, 1997).

Through an assessment and awareness of the IT subculture and its impact on the IT-business relationship, IT and business professionals will have the necessary knowledge to adjust their behavior and culture accordingly, promoting cooperation rather than conflict between the two groups. Instead of paying lip service to cultural issues, applying new technology to business problems, or manipulating a few priorities and calling this cultural change, organizations must take the concept of culture more seriously (Schein, 1996). As a starting point for cultural change, this research suggests an ideal IT culture that organizations may wish to consider to minimise tensions in the IT-business relationship.

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