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A Theoretical Model of Nomadic Culture: Assumptions, Values, Artifacts, and the Impact on Employee Job Satisfaction

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A Theoretical Model of Nomadic Culture: Assumptions, Values, Artifacts, and the Impact on Employee Job Satisfaction

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Abstract:

The model of an anytime-anywhere workforce is changing the landscape of business today. Increasingly employees are being emancipated from their traditional offices by the widespread infiltration of technologies that facilitate this model. The question is, how can we characterize the culture developing in support of these new ways of working and how can they be cultivated? Understanding this " nomadic culture " is critical to both researchers and practitioners. Due to the newness of these technologies and the speed of their integration into today's work practices, prior research lends little direction in understanding this developing culture. This research contributes by proposing and validating a multidimensional model of nomadic culture. The model describes nomadic culture in terms of three levels: underlying assumptions, espoused values, and artifacts. Each level is then described more specifically by eight measurable nomadic culture sub-constructs. Using the Structural Equation Modeling technique, proposed relationships among the sub-constructs are tested along with the effect of organizational support for nomadic behaviors on employee job satisfaction. Significant support for the model was found in data collected from 203 working IT professionals from a wide variety of organizations. Suggestions for future research as well as implications for practice are provided.

Keywords: job satisfaction, nomadic computing, nomadic culture, nomadic workforce, organizational culture

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I. INTRODUCTION

The age of the ubiquitous mobile worker is upon us. Nearly 50 million or 40 percent of U.S. workers can be classified as mobile workers today [Business Communications Review 2005]. The number of full-time mobile workers in the U.S. has doubled between 2000 and 2003, as has the number of employees who spend more than 20 percent of their time working outside an office [Meta Group 2003]. An AT&T survey found that 80 percent of companies worldwide have employees working outside of the traditional office in 2005, up from 54 percent in 2003 [Macklin 2004]. This mobilization is expected to not only continue, but to rise to more than 61 million mobile workers by 2009 [RCR Wireless News, 2005]. It is being embraced by businesses at a time in which they find themselves competing in global business environments with distributed employees on short timeframes. However, today mobility extends beyond simple telecommuting and into the realm of working anytime anyplace in a nomadic computing environment. Organizations experimenting with this new model of work are reporting impressive results. Sun Microsystems claimed a savings of $300 million a year in real estate costs by allowing 50 percent of its employees to work anywhere. Best Buy, whose result-only work environment initiative was considered the most resolute among large companies, reported a record increase in job satisfaction and productivity among its nomadic workers [Conlin 2006].

Nomadic computing refers to the anytime-anywhere environment in which its users have access to computing resources, communication capabilities and services that are transparent, integrated, convenient, and adaptive (Kleinrock 2001). Such an environment offers users unprecedented capabilities to access and distribute information when they are on the move. Nomadic computing promises to enhance the level of mobility in computing and communication for employees both within and beyond organizational boundaries. Key benefits of this unfettered computing include improved productivity, removal of temporal and spatial constraints, improved access to key decision-makers, enhanced access to rich business data, and freedom [Davis 2002; Middleton and Cukier 2006].

In this paper, we use the term “nomadic worker” to describe mobile employees who perform anytime anywhere work in nomadic computing environments. The term “nomadic worker” has a broader scope than “mobile worker” or “telecommuter.” Nomads are employees who use computer and communication devices to access remote information from their home base, workplace, in transit, and at destinations [Kleinrock 1995]. They are characterized by a high level of mobility or greater distance from the traditional office, or both. By this definition, in addition to people who work away from their offices (e.g. from home, hotel, or field), a facility manager who spends most of the time away from the desk to resolve issues, attend meetings, and interact with co-workers is also a nomadic worker even though his or her movements are restricted to the vicinity of the workplace.

Of interest in this paper are the cultural developments related to the growing use of nomadic computing and nomadic workers in business today. Like any technologically-based change, in order for it to be sustainable and successful in the long term it must be supported by an underlying culture [DeGeorge 1999; Harper and Utley 2001]. What we have been seeing for the past several years is a widespread, growing implementation of technologies that enable nomadic workers and nomadic work practices without a clear underlying culture, that is, a common set of values and behaviors. According to DeGeorge, this is typical and is to be expected. The basis for this “cultural lag” is primarily inherent in the differing natures of culture and technology. Cost and complexity drive technology advances in a very single-minded manner, with promises of profits adding to the speed of development. In contrast, cultural development progresses more slowly [DeGeorge 1999]. However, the development of culture is critical, particularly for the success of nomadic work practices [Clear and Dickens 2005]. Lyytinen and Yoo [2002, p. 384] concur, and underscore that “the development of nomadic information environments at the organizational level also requires the development of social ontologies that define social roles, associated behaviors, and their linkages with various organizational contexts and capabilities.” Likewise, Jessup and Robey [2002] identify the importance of social consequences in ubiquitous computing environments such as those facilitated by nomadic work-enabling technologies. The study of this new nomadic culture is critical at this time in the context of the increasing infiltration of nomadic work-enabling technologies into business practices.

We expect that, nomadic culture, like other cultures, consists of a collection of artifacts, values, and basic assumptions that provide nomadic workers with the flexibility to work anywhere and anytime they need to. The culture facilitates the mobility of services, information, and employees across different devices, networks, and locations. In organizations with nomadic culture, same or comparable access to information, support mechanisms, and opportunities are available to nomadic workers regardless of their time and location of work. These organizations do not simply supply their employees with nomadic computing capabilities, they design their business

processes, operational procedures, organizational structure, and reward systems around the needs of nomads [Chen and Nath 2005].

It is likely that nomadic sub-cultures are already beginning to form within organizations. However, nomadic culture has not received much attention to date. From a business point of view this is problematic as technological innovation and early adoption of new technologies are well known to provide only limited competitive advantage over time [Porter 2001]. On the other hand, while culture takes longer and requires more effort to cultivate [DeGeorge 1999], it can provide long-term advantages. So cultivating and nurturing an effective nomadic culture within an organization could be a significant key to creating a sustainable competitive advantage based on nomadic work-enabling technologies. Nomadic culture research could also provide effective leaders with the ability to recognize this culture within their organization so that they can manage it and mesh it with the other cultures to create a successful organization [Schein 2006].

Due to the newness of this subject, the purpose of this study is to explore and establish a preliminary theory of nomadic culture. Scornavacca et al.'s [2006] assessment of existing research on mobile business recommended that future research in this area should focus on business and organizational applications, use empirical research methodologies, and develop theory. Following their recommendation, this study aims to develop a theoretical model for nomadic culture based on empirical data, and the resulting model will help us answer the following research questions: What are the assumptions underlying nomadic culture? What are the values and beliefs? What are the practices and artifacts related to the culture? What is the nature of the relationships between these? The study is also designed to study the research question of whether nomadic culture has any effect on employee job satisfaction. Addressing these questions about nomadic culture will serve to motivate a theory of nomadic culture that can then be used to direct future research. Since managing subcultures of organizations has been shown to be important in improving performance and success [Marcoulides and Heck 1993; Petty and Beadles 1995; Weber and Pliskin 1996; Schein 2006], such knowledge could also help organizations develop successful nomadic cultures or facilitate existing nomadic cultures.

The remainder of the paper develops a theory of nomadic culture, drawing from previous research conducted in the fields of psychology, management and MIS that have studied nomadic computing, organizational culture, job satisfaction, and the effect of technology on organizations. The development of measures of the nomadic culture model is presented, followed by a description of the data collection and a discussion of the data analysis. The paper concludes with a presentation of the findings and implications for future research and practice.

II. NOMADIC COMPUTING

The growth in nomadic computing is being driven by incessant advances in wireless and mobile technologies along with business needs for mobility and flexibility. Table 1 summarizes the devices and network services currently being used by organizations and employees to make anytime anywhere work possible. The miniaturization and convergence of devices and advancement in wireless technologies in the recent years have accelerated businesses' efforts to implement nomadic computing environments. A wide variety of computing devices (e.g. handset, PDA, Blackberry, and laptop) and communication technologies (e.g. high-speed Internet, Wi-Fi, and cellular networks) are helping workers to gain greater access to information and expedite field work.

Table 1. Devices and Network Services for Nomadic Computing

	Within Organizational Boundary	**Beyond Organizational Boundary**
Device	Desktop computers, portable computers, personal digital assistants, Blackberry, pagers, and handsets	Desktop computers, portable computers, personal digital assistants, Blackberry, pagers, and handsets
Network Services	Telephone systems, wired and wireless local area networks, Bluetooth, infrared, and voice over IP (VOIP)	Public telephone systems, high speed Internet services, cellular networks, third party Wi-Fi services (e.g. hotel, airport, coffee shop, and Wi-Fi hot spots), Wi-Max, and virtual private networks (VPN)

Nomadic computing has significant business value because it relaxes spatial and/or temporal constraints of activities [Balasubramanian et al. 2002]. For example, with mobile technologies, a worker in the field can check e-mail at any time. Without the technologies, this activity would be limited by both spatial and temporal constraints (i.e. One can only check e-mail when he or she is at a location where a computer and a network connection is present). Other research also suggests that the value of mobile and wireless applications is a function of the user's immediacy of information needs and user mobility [Chen and Nath 2003]. These time-and-space dimensions are not unique to nomadic computing. In fact, each information revolution in history represented an attempt to overcome temporal and spatial constraints [Lee and Sawyer 2002; Junglas and Watson 2006; Lofgren 2007]. Nomadic computing has simply made a leap in our ability to overcome these constraints on an unprecedented scale.

Lyytinen and Yoo's [2002, 2004] framework provides a broad view of a nomadic computing environment. The framework stipulates three key drivers that influence and enable both nomadic computing infrastructure and services: mobility, digital convergence, and mass scale. Mobility is important as users move away from a stationary computing environment to a nomadic computing environment. The resultant need for mobility has enormous impact on the design of devices, content, and networks. Digital convergence refers to open standards that allow heterogeneous devices and networks to share information seamlessly. Finally, mass scale is reflected by the wide availability of a nomadic computing environment at a global level and the high usage level demonstrated by users, and mass scale is essential to the attainment of true mobility and digital convergence. These three interweaving factors influence the design and deployment of nomadic computing environment infrastructures and services. Similarly, Junglas and Watson [2006] identified four fundamental drivers of human information needs called *u-constructs*: ubiquity, uniqueness, universality, and unison. Three of these drivers (ubiquity, universality, and unison) are analogous to the three drivers identified by Lyytinen and Yoo [2002]. The fourth, uniqueness, refers to an information systems ability to identify the user and localize the information for the user. As these studies suggest, nomadic and ubiquitous computing are natural extensions and parts of the evolutionary process of information systems to satisfy human's fundamental information needs. As these technologies become more and more sophisticated, the accompanying social and cultural impacts are inevitable and must be recognized and examined.

In recent years, some researchers have begun to study the social and cultural impacts of nomadic computing [e.g. Davis 2002; Jessup and Robey 2002; Cousins and Robey 2005; Jarvenpaa et al. 2005; Middleton and Cukier 2006; Prasopoulou et al. 2006]. Instead of emphasizing the efficiency effect of these new technologies, these studies have focused on potential negative impacts created by nomadic computing such as danger (competent-incompetence paradox), anti-social behaviors (engagement-disengagement paradox), distraction, and infringement on work-life boundaries (empowerment-enslavement paradox). Jessup and Robey [2002] underscored the importance of social issues when studying nomadic computing environments. They claimed that new technologies such as wireless that enable nomadic work practices will inevitably cause social consequences at the individual, team and organizational levels. Individuals must redefine what social norms, work and supervision are in this new computing-enhanced environment. Teams must find new ways to make themselves efficient with new work cultures and practices. This extends beyond simple consideration of the new technologies alone. Finally, organizations must adapt to new organizational forms and business models as well as redefine social boundaries in this technology-rich environment. The issue of "social boundaries" and nomadic work has also been examined by researchers. They have found that nomadic computing creates a potential infringement on users' work-life boundaries [Davis 2002; Jarvenpaa et al. 2005; Middleton and Cukier 2006; Prasopoulou et al. 2006]. Specifically, Jarvenpaa et al. [2005] describe how anytime-anywhere work has become "all the time, everywhere work" for some workers. The ease of access to information and people made possible by nomadic computing is also raising organizations' expectation to achieve immediate responses from its employees. Researchers predict that the spillover from work to personal life could have long-term negative effects on employees that would eventually lead to a drop in productivity [Davis 2002; Chesley 2005]. Such research has led to recommendations that organizational culture can be an effective tool for reinforcing the functional aspects of nomadic work while suppressing dysfunctional aspects [Jarvenpaa et al. 2005; Middleton and Cukier 2006].

III. ORGANIZATIONAL CULTURE

Culture is a complex concept. While most organizational culture researchers would agree that culture is generally a set of shared beliefs and values that individuals in the culture subscribe to, there are a variety of definitions that vary on the specifics. Hofstede [1994, p.1] defines culture as "the collective programming of the mind which distinguishes the members of one group or category of people from another." Uttal [1983] adds a behavioral aspect in his definition of organizational culture as a "system of shared values (what is important) and beliefs (how things work) that interact with a company's people, organizational structures, and control systems to produce behavioral norms." A behavioral outcome of culture is also noted by other researchers [eg. Karahanna et. al. 2005]. Schein [1984] proposes that the behaviors rooted in a particular culture originally arise as learned, shared assumptions of possible solutions to perceived problems. These shared assumptions are the basis of a culture. In their study involving consumers, Homer and Kahle [1988] found empirical evidence that values affect attitudes, which in turn affect behavior. Likewise, Steinwachs [1999] found that within groups the shared values of the group typically lead people in the group to think and act similarly.

Culture can be manifested at many different levels, such as at a family, corporation, gender, religion, race or national level. Within a given culture, subcultures can exist that are different from the parent culture or other peer subcultures [Ouchi 1980; Ashforth and Mael 1989; Schein 1984; Karahanna et. al. 2005]. Schein [2006] proposes that these subcultures can be differentiated in many ways that include functionally, geographically, technologically, by product or market, and by parent organization. An example would be a particular firm in a given national culture in which different subcultures have developed in their accounting and sales divisions. While both subcultures would hold with the general national level and organizational level cultural values and attitudes, the subculture in the accounting

division might strongly value precision and accuracy while the sales division subculture might value aggression and competition.

While some cultural characteristics (e.g. individualism, power distance, masculinity, and uncertainty avoidance) at the national level [Hofstede 1994] may be relevant to nomadic culture, this study chooses to focus on nomadic culture at the organizational level for the following reasons. First, since this is the first known study on nomadic culture, a narrow focus allows the study to delve more deeply into the core research questions. Consequently, this study will employ samples from only one country — the United States so that the factor of national culture is constant. Second, the use of organizational culture has been shown as a way to reinforce positive attitudes and activities, which could be effective in addressing the negative social consequences of nomadic computing [Morgan 1997]. Therefore, we believe that nomadic culture at the organizational level will have the most immediate impact on organizations trying to take full advantage of nomadic computing.

While there are numerous organizational culture models in the literature, we base our theory of nomadic culture on Scheins' [1984, 1992] widely accepted theory of organizational culture. Scheins' theory has been used by many others to direct investigations related to organizational culture [eg. Nahm et al. 2004; Giberson, Resick, and Dickson 2005]. A basic tenet of Schein's [1984, 1992] theory is that culture goes deeper than simple behaviors. He posits a process in which values drive overt behaviors, and as these behaviors successfully solve the problem(s) that motivated them, the values transform into unconscious assumptions about how things are in the world. Consequently, he identifies three levels on which an organizational culture can be examined: overt behaviors and artifacts, espoused values, and basic assumptions.

Overt behaviors, or artifacts, refer to the constructed environment of the organization (i.e. office layout) as well as observable behaviors patterns. Artifacts are things that can be easily seen, heard, or felt. Cultural artifacts refer to the surface aspects of the organization (and its members) that are easy to discern, highly visible, yet hard to understand without knowledge of the underlying values and the assumptions that drive them. They are the visible signs of the organizations' values. Organizational structures and processes, overt behaviors, products, creations, language, technologies, even simply the dress of members, are all artifacts of a culture. However, while artifacts are easy to observe, they are difficult to interpret. This " why " behind artifacts is the next level, which Schein names *espoused values or justification*. These values, beliefs, and philosophies are the reasons members of the culture will give for their observed behaviors. They may also be what the members want the reasons to be for their behaviors. Espoused values, then, are the basically shared views of what is right and wrong, and what are accepted ethics and best practices openly professed by members of the culture. They can be described as conscious strategies, goals, or philosophies that are often given as justification for actions taken. These values (and ultimately the assumptions upon which they are based) drive the behaviors of organizational members. If they are reinforced, over time they may become underlying assumptions of the organization. Often these values are reflected in mission statements and other written materials of the organization. An example would be a value that individual needs must be taken into account when assigning geographical moves. However, espoused values can conflict with the underlying assumptions of the organization. Here, conflict would be present if the organization held the underlying assumption that anyone who refuses an organizational move is taken off the fast-track for promotion.

Finally, Schein argues that to truly understand the logic behind overt behaviors and supporting espoused values, one must examine the third level of culture: the underlying assumptions of the group and its members. The underlying assumptions of a culture, that is the basic assumptions that are unconsciously shared as " obvious " truths by members of the culture within an organization, are the essence of the culture. These underlying assumptions originally develop as shared values and beliefs, becoming repeatedly instantiated over time. As a value serves to direct successful responses to problems, this value becomes an unconscious assumption about the problem and its context. Eventually they become unconscious beliefs, perceptions, thoughts and feelings originally related to the problem. Once they become unconscious, they are not easily reachable by the conscious mind. They become, at this level, taken for granted truths shared and passed on by organizational members. The strength of such assumptions increases if the members of the culture are successful [Schein 1997]. As they have become unconscious, they are difficult to elicit and even more difficult to change. However, they are keys to understanding why things happen the way they do in the organization. They are undebatable understandings of how the world works, and since they are unconscious, they are taken for granted and so are essentially invisible. Some examples would include an underlying belief that people are basically hard-working if given the chance, that research is a fundamental emphasis for the organization, that teamwork is valuable, or that an organization operates primarily in order to make a profit. However, these shared assumptions can be changed. For example, an organization can change the composition of a group by bringing in outsiders who hold different assumptions and solutions, i.e. culture. Shared assumptions, then, are the basis or foundation for the espoused, or announced, values of an organization [Schein 1992]. In total, all three levels together form a particular culture.

IV. TOWARD A THEORY OF NOMADIC CULTURE

We propose that nomadic culture, like any culture, is developing in organizations in response to problems. Here, the problems are inherent in the rapid infiltration of nomadic work-enabling technologies, workforces and practices happening in business today. While such technologies are becoming widespread, the culture supporting them is just beginning to develop. We expect that nomadic culture develops most often as a subculture within an organization, likely distinguished by differentiators such as technology, functionality, and geography, as described by Schein [1992]. This reflects the general nature of nomadic culture, which is not specific to one type of group (e.g. salesmen, IT professionals) or industry. We posit that nomadic culture, as a culture, is not dissimilar from other types of cultures and subcultures found in business on most dimensions. However, one must note that there is a twofold difference: its technological drivers and its generality. The speed with which nomadic work-enabling technologies have infiltrated business is likely making it possible for the ensuing [nomadic] culture to develop more quickly and earlier than if a nontechnical driver was involved. Second is the generality of the nomadic work-enabling technologies and their underlying nomadic culture. They are not confined to use in specific business functional areas or industries. However, we maintain that these differences do not make nature of nomadic culture essentially different from other organizational cultures, but rather likely make it more important to understand in a timely manner.

We use Schein's model of organizational culture to guide our development of a model of nomadic culture. Our overall theoretical model (see Fig. 1) posits that nomadic culture can be examined in terms of a collection of basic underlying assumptions, related espoused values, and resultant artifacts that support employees in working anytime anywhere with efficiency and effectiveness. In the context of nomadic culture, we posit that two underlying assumptions (views that employees are trustworthy, responsible and self-directed and that technology is important and has a positive impact on the organization) influence a set of espoused values (anytime-anywhere work, virtual workgroups, and IT are valuable, supervision of mobile workers can be done effectively, and technology response must be proactive). Specifically, we reason that an assumption that employees are internally driven and self-motivated would influence values of anytime anywhere work being beneficial, supervision of nomadic workers being effective, and virtual teams being useful. These three values are employee-oriented, and so likely are based on an assumption that is about employees. They all reflect basic activities that are central to nomadic work [Jessup and Robey 2002]. Likewise, we consider an influence of a technology assumption on two espoused values/beliefs related to IT: technology is valuable, and technology must be sensed and responded to in a proactive manner. Finally, as Schein predicts, values in turn affect artifacts. Therefore, these values are hypothesized to affect the artifact (organizational support for nomadic behaviors) of nomadic culture. All five of the values are thought to influence the artifact or support that an organization provides for nomadic employee behaviors as this support can range from support of specific employee behaviors to provision of enabling technologies

The Underlying Assumptions of Nomadic Culture

We begin with the underlying basic assumptions. Within a culture, these underlying assumptions drive the values professed by the members of the culture. While there are many shared assumptions that could be held by nomadic culture members, we posit that they can be divided into two types: those related to technology and those related to people. This is congruent with the literature, which indicates that underlying assumptions of a culture form around beliefs related to human existence such as the nature of humans and human relationships and around the organization itself and its environment. In the context of nomadic culture, there is both a human aspect and a technology aspect (environment). Other studies of technology have also noted this typology, and some fields of work have even made this duality their central focus (e.g. human-computer interaction). Our human aspect is congruent with recommendations by Schein [1997], who notes that the underlying assumptions of a culture often include ones about the nature of humans. Likewise, nomadic culture is deeply embedded in an array of fast changing nomadic computing technologies; therefore, it seems reasonable that assumptions related to technology would be a significant part of a nomadic culture. An effect of culture on technology has been identified by other researchers, such as Alavi et al. [2005-6], who found an effect of culture on the use of knowledge-management technologies.

The technologies underlying nomadic work make possible flexible, dynamic, distributed work environments with little inherent structure [Balasubramanian et al. 2002]. In such an environment, we posit that an underlying assumption that employees are highly motivated and self-directed would be essential. Organizations with such assumptions have been identified by researchers. For example, McGregor, in his widely accepted organizational theory identifies two types of organizations: Theory X and Theory Y organizations. Theory Y organizations focus on the promotion of employee self-direction, autonomy, and realization of individual potential [Meeker 1982], whereas employees in Theory X organizations are thought to be controlled by hierarchical or scalar methods (i.e. the exercise of authority) as these organizations believe employees must be directed, motivated, and controlled by managers in order to prevent passivity. The desired characteristics of nomadic workers would correspond with the tenets of McGregor's

Theory Y organizations. Likewise, Reigle [2001] postulated that Theory X was the underlying assumption of a mechanistic culture while Theory Y was the assumption of an organic culture. Mechanistic culture, characterized by close adherence to the chain of command, functional division of work, specialized task, vertical communication, and top-down decision making, is designed for stable business environments. Organic culture, on the other hand, is more suitable for changing and innovative business environments as the ones often seen today [Burns and Stalker 1961]. Organic culture, with its underlying Theory Y assumptions, closely fits the type of environment facilitated by nomadic work-enabling technologies. Thus, we maintain that the underlying assumptions held by members of a nomadic culture would parallel those of an organic culture and a Theory Y organization: believing that employees are responsible, trustworthy, and self-directed. The nomadic culture model includes these beliefs under the general construct of " assumptions about employees. "

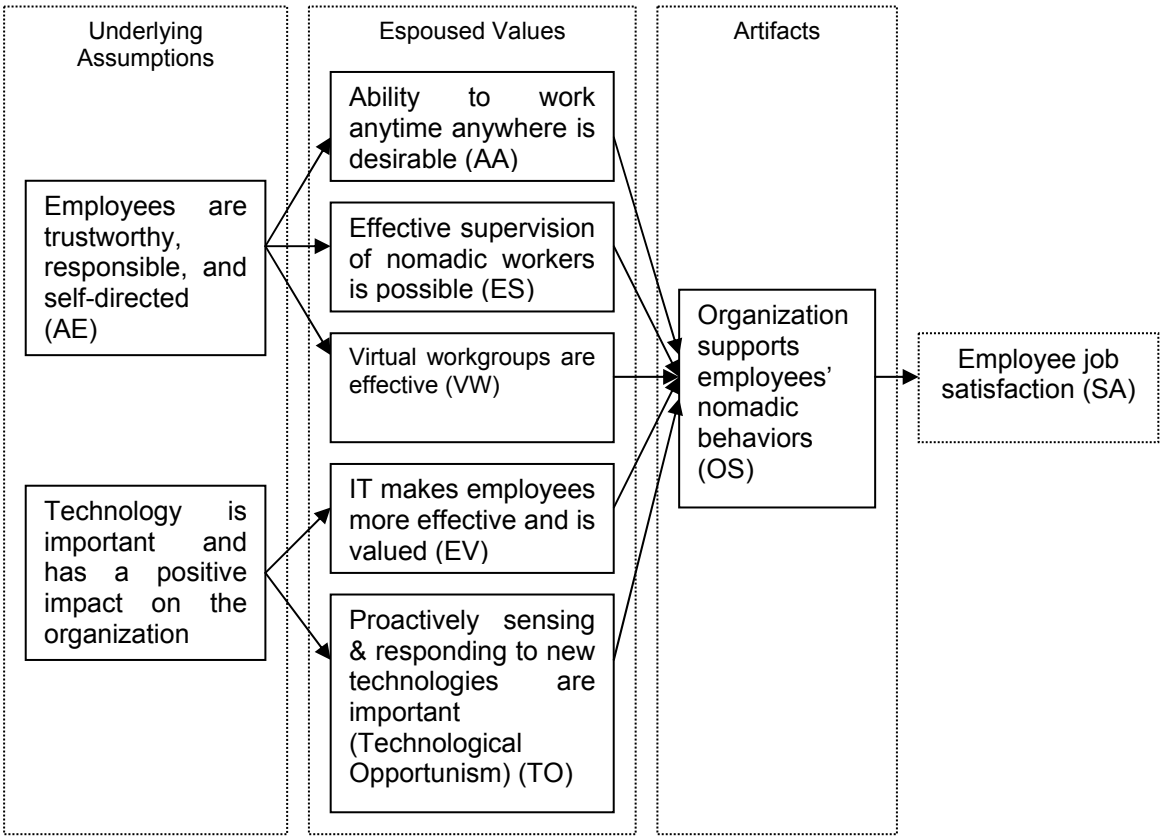

Figure 1: Research Model: Levels of Nomadic Culture and Job Satisfaction

The other posited underlying assumption of the nomadic culture model is that members of the culture hold a positive view of the value of technology. That is, technology is seen as important and it is seen to have value for the organization. It is reasonable to expect that members of a culture based on technology (such as a nomadic culture) would have to see technology as important at a fundamental level. Keep in mind that members of this culture are likely nomadic workers or people who support nomadic work within the organization. If they are nomadic workers, they are already using technology to work in a nomadic manner successfully and have embraced it. They are likely to be, at this point in time, early adopters of nomadic work practices. The people who support them in these practices would also have to believe that the technologies underlying their nomadic work practices are important since without them, they could not work nomadically with success. We maintain that nomadic cultures are beginning to develop as nomadic work and technologies become mainstream. Therefore, we posit that a positive view of technology is an essential underlying assumption of a theory of nomadic culture.

The Espoused Values of Nomadic Culture

The Employee Underlying Assumption and Related Espoused Values

Following Scheins' model, the underlying assumptions of nomadic culture about employees is hypothesized to influence some set of human-oriented espoused values. Recall that these values are the conscious reflection of the underlying unconscious assumptions. We posit that the assumption that employees are responsible and self-directed will be reflected in values held by members of the culture about nomadic work. These values are grounded not only in the underlying assumption about employees but also in the unique work environment facilitated by

nomadic work-enabling technologies. A key effect of these technologies is their ability to relax spatial and/or temporal constraints of activities [Balasubramanian et al. 2002]. Hence, we posit that two work practices made possible by nomadic work-enabling technologies, anytime-anywhere work and virtual workgroups, would be valued. In addition, we posit that members of a nomadic culture would explicitly believe that nomadic workers can be supervised effectively.

The ability to work anytime, anywhere refers to the extent to which the nomadic culture members believe that anytime-anywhere work adds value to the organization and therefore should be facilitated. The ability to work anywhere, anytime is a key outcome of nomadic work practices. Hence, it must be valued by members of a nomadic culture as it is a central activity. Research on the effectiveness of this type of work is inconclusive to date. Early researchers noted the importance of anytime-anywhere work practices in the form of telecommuting. Jarvenpaa and Ives [1994] stated that valuing it was an important precursor to organizational success. Likewise, Ford and Butts [1991] found that individual performance increased with implementation of telecommuting programs. Problems identified with early telecommuting tended to revolve around a lack of richness of the mobile environment [Daft, et al. 1987]. However, the enrichment of information spaces today makes this problem less significant for modern nomadic workers. A more recent study found that mobile work practices enhanced employee efficiency, creativity, and morale [McIntosh and Baron 2005]. In fact, the rapid infiltration of nomadic work-enabling technologies into today's work practices reflects their ability to provide employees with the capability to work anytime anywhere with efficiency and effectiveness. Therefore, we posit that a strong nomadic culture would value anytime anywhere work. Being comfortable with granting employees the freedom of working anytime anywhere is a reflection of a Theory Y organization, which operates under the assumption that employees are responsible, trustworthy, and self-directed. Since the espoused value is a manifestation of the underlying assumption, we propose:

H1a: An underlying assumption that employees are trustworthy, responsible, and self-directed will be positively related to valuing anytime-anywhere work (AE → AA).

The underlying assumption that employees are trustworthy, responsible and self-directed is also posited to influence the espoused value that supervision of nomadic employees can be done effectively. As previously discussed, members of a nomadic culture would be those practicing nomadic work practices and others who support them in these practices. However, the beliefs about the effectiveness of nomadic employee supervision of the people supporting the nomadic workers are less clear. Research on the topic draws no clear-cut recommendations. Early research examining the effectiveness of supervision of remote employees showed that managers felt it could not be done effectively. In fact, researchers of the time pointed to a fear of lost managerial control as a significant factor that prevented the widespread use of telecommuting [DeSanctis 1984; Roderick and Jelley 1991]. Likewise, during interviews of managers of a firm that was experimenting with alternate-work-site programs, Olson [1982] discovered that managers found remote supervision time consuming, difficult to administer, and less ideal than non-remote supervision. Managers stated that they would prefer to have the employees "where they could see them." Even in a more recent survey of human resource managers, the researchers found that the biggest HR obstacle to mobile work practices was supervision of employees [McIntosh and Baron 2005]. It is likely that this negative attitude was partially justified early on, as the underlying communication and information technologies did not support remote supervision well. However, the fact that nomadic work practices are becoming more common today provides anecdotal evidence that the negative view of remote employee supervision seen in the early days of telecommuting has perhaps changed [Conlin 2006]. Today's information and communications technologies probably offer better methods for managers to monitor and keep in touch with their subordinates, although no empirical work exists to support this supposition. But it seems reasonable that since a nomadic workforce would require remote supervision, a strong belief by members of the culture that such supervision can be done effectively would be important for a successful nomadic culture. The management's trust in employees plays a vital role in forming this belief; therefore, we propose:

H1b: An underlying assumption that employees are trustworthy, responsible, and self-directed will be positively related to believing in effective supervision of nomadic employees (AE → ES).

The espoused value of virtual workgroups refers to the extent to which members of the nomadic culture believe that virtual workgroups or teams perform effectively. Powell et al. [2004, p.7] defined virtual teams as "groups of geographically, organizationally and/or time dispersed workers brought together by information and telecommunication technologies to accomplish one or more organizational tasks." This definition clearly identifies the nomadic aspect of virtual teams. In fact, we consider virtual teams to be an extension of the concept of anytime anywhere work in the context of teams. Organizations have been increasing their use of teams for over a decade. With nomadic technologies, the nature of these teams is changing. Today such teams are often virtual, where members need not be physically adjacent to participate in the work of the team. Researchers have also identified virtual teams as a topic of interest although the findings on their effectiveness have been mixed [Sharda et al. 1988;

Burke and Aytes 1998; McDonough et al. 2001; Warkentin et al. 1997; Crampton 2001; Sarker and Sahay 2002]. Some researchers have focused on studying ways in which their effectiveness could be improved [Kaiser et al. 2000; DeMeyer 1991; Suchan and Hayzak 2001; Kayworth and Leidner 2001-2]. In spite of the lack on consensus about the effectiveness of virtual teams in the literature, it appears that virtual teams are a method of working that is likely here to stay. Therefore, we posit that a strong nomadic culture would value virtual teamwork and believe it to be effective. Virtual groups are most likely to be found in Theory Y organizations due to their organic cultural environments and employee-centric assumptions. Therefore, as one of the human-focused values, valuing virtual group work is believed to be a manifestation of the assumption that employees are trustworthy, responsible, and self-directed. Consequently, we hypothesize:

H1c: An underlying assumption that employees are trustworthy, responsible, and self-directed will be positively related to valuing virtual workgroups (AE → VW).

The Technology Underlying Assumption and Related Espoused Values

The second underlying assumption of the nomadic culture model focuses on technology. We posit that two values are driven by the underlying assumption that technology is important and has a positive impact on the organization. They are that: 1) information technology makes employees more effective, and is valued and utilized; and 2) it is considered important to proactively sense and respond to new technologies. We propose that these values would be explicitly expressed by members of a nomadic culture. Both are believed to be driven by an unconscious belief in the value of technology in general and to an organization specifically. To believe otherwise would be inconsistent with the values. Therefore, we propose that assuming technology is important and valuable will lead to members of the culture espousing the beliefs that information technology is valuable and useful and that technological opportunism and proactivity are important.

The espoused value of articulating that " information technology is valued and effective " would be very visible as nomadic workers would be significant consumers of the technologies that make their nomadic work possible. Hence, nomadic workers would exhibit behaviors of using information technologies and would value these as, without them, they could not work nomadically. This value has also been studied in the context of organizations in general. For example, the Technology-to-Performance Chain (TPC) proposed and validated by Goodhue and Thompson [1995] asserted that information technology leads to improvements in individual performance when it is utilized and fits the task at hand. As nomadic culture is a culture strongly based on technology, valuing technology would be particularly relevant. Valuing and using technology is believed to be a reflection of an organization's technology-related assumption; therefore, we propose:

H1d: An underlying assumption that technology is important and has a positive impact on the organization will be positively related to valuing and using information technology (AT → EV).

The second value that we propose members of a nomadic culture would espouse is *technological opportunism*. That is, that it is important to keep abreast of new and relevant technologies and how they could be used. Technological opportunism is important for a culture based on information technologies that are not static, but that are changing very quickly. Relying on old technologies could mean a quick demise of the effectiveness of a nomadic work paradigm. Research has supported the effectiveness of technological proactivity and opportunism in environments even less technologically-based than nomadic environments. Jarvenpaa and Ives (1994) predicted that organizations that use IT as a primary enabler and react rapidly to the ever-changing business environment would be successful in the future. More recently, Srinivasan et. al. [2002] identified the characteristic of technologically opportunistic organizations as a positive attribute of modern organizations. They found that "a technologically opportunistic firm senses and responds proactively to capitalize on (or counter) technology opportunities (or threats)." For organizations that want to become more technologically opportunistic, Srinivasan et al. [2002] recommended developing an adhocracy culture within the firm, characterized by an emphasis on flexibility, creativity, entrepreneurship, and adaptability [Deshpande, et al. 1993]. These characteristics are highly consistent with the attributes we predict are necessary for a strong, Theory Y-based, Organic-type nomadic culture. Additionally, companies with adhocracy cultures have been found to thrive on experimenting with new technologies and willing to take necessary risks [Moorman, 1995]. Therefore, we expect that an organization with a successful nomadic culture will espouse a belief in the importance of technological opportunism. As the other technology-related espoused value, technology opportunism is believed to be influenced by an organization's technology-related assumption. Therefore, we hypothesize:

H1e: An underlying assumption that technology is important and has a positive impact on the organization will be positively related to valuing the importance of proactively sensing and responding to new technologies (AT → TO).

The Artifacts of Nomadic Culture

The espoused values of a culture underlie and to a large extent determine the visible behavioral patterns and outward manifestations of the culture [Schein 1992]. Schein refers to these manifestations as *artifacts*. While the level of artifacts is the most easily observed and the most intuitive of the three levels of a culture, it is the most difficult to interpret as it does not offer any explanation of the observed behaviors and items. In the context of nomadic culture, we offer that the level of artifacts can be summarized as "the organizational support provided for employee's nomadic behaviors." We hypothesize that all five espoused values of nomadic culture would influence this support (see Figure 1).

Consider an organization that possesses a nomadic culture. Of course, the fact that this example organization has a nomadic culture means that the culture has arisen over time as a successful response to some problem(s) posed to the organization, as maintained by Schein [1992]. What nomadic culture artifacts would we expect to see in this organization? As the culture arose as a successful solution to a problem(s), it would be reasonable to expect that the organization would formally recognize nomadic work and work practices in its documentation: policies, procedures, and processes. For example, a nomadic culture artifact could be employee evaluation criteria that focus on performance outcomes rather than time spent at the office. Such a focus does not address the where and when of working, nor the 'with whom' of working, but only the outcomes of the work. Thus, employees could work outside of formal work environments or hours with non-local people and not be penalized. Traditionally, due to the limited visibility of nomadic employees in an organization, their promotability became limited. In fact, nomadic workers have been found to feel that their career path was limited because of their remote work practices even though their performance had improved [Olson 1982]. Therefore, a reward policy adjusted to emphasize on results would be an important artifact of nomadic culture. Consequently, an important artifact of organizational support for employees' nomadic behaviors is how employees are evaluated.

Artifacts related to assisting employees to be more effective at nomadic work are also important signs that an organization is committed to fostering nomadic culture. As the literature in nomadic computing suggested, while nomadic computing offers unprecedented freedom and potential for efficiency, it has produced numerous side effects such as potential danger, anti-social behaviors, distraction, and infringement on work-life boundaries [Davis 2002; Jarvenpaa et al. 2005; Middleton and Cukier 2006]. In Best Buy's case, it is pointed out that educating managers and employees about the new location-agnostic work is imperative for success [Conlin 2006]. Training on how to cope with the social paradox presented by nomadic computing technologies and nomadic work arrangements will enable employees to work effectively and, at the same time, minimize the negative effects. Therefore, another important artifact indicating organizational support for nomadic behaviors is training on nomadic computing technologies and nomadic work practices.

Another example of nomadic culture artifacts can be found in Best Buy's "results-only work environment" program that "seeks to demolish decades-old business dogma that equates physical presence with productivity" [Conlin 2006]. At Best Buy, employees can work wherever they want, whenever they want, as long as they get their work done. There is neither a fixed work schedule nor mandatory meetings to attend. Employees are given the freedom to design work routines that would best fit their work habits and life situations. Therefore, organizational support for employees' nomadic behaviors is demonstrated in the type of work arrangements that are considered acceptable or even encouraged in the organization. The artifacts can be measured by the number of employees who work regularly from home or other locations, the number of employees who have flexible work schedules, whether employees are allowed to work at their own pace, and whether working anytime anywhere is an option for employees. More obvious would be explicit statements of the acceptability or desirability of nomadic work practices such as virtual teams or working outside of traditional work hours or settings appearing in employee policies, handbooks, or contracts.

Here, the values behind the artifacts discussed above would be the beliefs that anytime anywhere work is valuable and that virtual teams are useful. Therefore, we propose:

H2a: An espoused value of believing that anytime anywhere work is valuable will be positively related to the presence of nomadic culture artifacts supporting employee nomadic behaviors (AA → OS).

H2b: An espoused value of believing that virtual workgroups are effective will be positively related to the presence of nomadic culture artifacts supporting employee nomadic behaviors (VW → OS).

As Best Buy's case shows, the acceptance of this "post-face-time, location-agnostic" way of working would require the fundamental changes in the values held by the organization and its leaders. When it was first implemented, it met its share of strong opposition from people who felt that work relationships were better face-to-face, who could not trust their employees to make their own work-life decisions, and who feared that nomadic employees would be

hard to supervise. When increased productivity and employee satisfaction, drastically reduced turnover rate, and improved employee-supervisor relationships were demonstrated in divisions that implemented the program, the values of the management and employees started to shift in the direction, which led to wider acceptance and support for nomadic work at Best Buy. Therefore, it is crucial for an organization and its management to believe that supervision of nomadic employees can be done effectively in order to be fully committed to supporting nomadic employees. Hence, we hypothesize:

H2c: An espoused value of believing in effective supervision of nomadic employees will be positively related to the presence of nomadic culture artifacts supporting employee nomadic behaviors (ES → OS).

The organization could also have artifacts based on the two espoused values dealing with technology. For example, their nomadic workers would possess modern technologies such as laptops, wireless access devices, access to organizational information offsite, and the knowledge to use the technologies effectively. The organization would also possess an effective network infrastructure. This infrastructure would be essential to providing access to information required for successful nomadic work [Watson-Manheim et al. 2000]. In Larsen and McInerney's [2002] research, they found that access to and ease of communication tools played a role in user perception of a simulated virtual organization. A less obvious artifact could relate to the training on effective use of the technologies available to employees. A survey of HR professionals found that nomadic workers were not receiving the same level of training and mentoring opportunities as other employees [Nelson 2003]. Deficiency in employees' skills in the enabling technologies is likely to affect the outcomes of nomadic work. An organization with a nomadic culture might offer training that could be taken both in person and remotely (for nomadic workers). Such artifacts would all be based on the espoused value of believing that technology is valuable and is being used; therefore, we propose:

H2d: An espoused value of believing that technology makes employees more effective and is valued will be positively related to the presence of nomadic culture artifacts supporting employee nomadic behaviors (EV → OS).

Finally, in an organization with a nomadic culture, one might see a variety of relevant, new technologies that are being used or tested for usefulness. Not only would there be significant use of information technology by the members of the culture, but the technologies would be relatively new and with some variety indicating experimentation. The value behind these artifact examples would be a belief that technological proactivity and opportunism are important; therefore, we hypothesize:

H2e: An espoused value of believing in the importance of proactively sensing and responding to new technologies will be positively related to the presence of nomadic culture artifacts supporting employee nomadic behaviors (TO → OS).

Employee Job Satisfaction

Previous research has shown that organizational culture impacts many different factors related to organizational success. For example, individual-level factors, such as job satisfaction, job motivation, and commitment to the organization, have been found to consistently affect the performance of the organization [Sangmook 2005; Rayton 2006]. In this study, we focus on examining whether there is a relationship between job satisfaction and the support an organization provides for nomadic work for two reasons. First, research has shown that organizational cultures in general appear to impact job satisfaction [Lund 2003; Lok and Crawford 2004]. Here, job satisfaction refers to "the affective reaction of individuals to various features of the job" [Igbaria et al. 1994, p. 179]. Lund [2003] specifically examined the relationship between culture and job satisfaction and found that employees at organizations with clan and adhocracy cultures demonstrated higher job satisfaction than those employed at organizations with market and hierarchy cultures. As we maintain that nomadic culture is likely more associated with adhocracy-type values, we posit a positive relationship of organizational nomadic work support and job satisfaction. Second, employee job satisfaction was chosen as it appears to have important implications for organizational success. Job satisfaction has been shown to impact variables important to the performance of organizations. For example, Cotton and Tuttle [1987] found job satisfaction to be a good predictor of employee turnover. Likewise, McFarlane et al. [1998] found that employees with higher job satisfaction were more likely to intend to perform well on the job. Cougher and Zawacki [1981] found that job satisfaction was significantly correlated with their five core job characteristics of skill variety, task identity, task significance, autonomy, and feedback. These studies and others suggest that employee job satisfaction is important to organizations.

Thus, we hypothesize that nomadic culture, reflected by the support that an organization provides for nomadic work practices, is directly linked to job satisfaction:

H3: The presence of nomadic culture artifacts supporting employee nomadic behaviors will be positively related to high employee job satisfaction (OS → SA).

V. RESEARCH METHODOLOGY

Measurement Scales

Survey was the research methodology used in this study. The research model constructs were measured using multi-item scales. The items were developed using a multi-stage approach. In the first stage, 58 initial questionnaire items were generated based on an extensive literature review of how previous researchers had measured the same concepts. The items were modified to fit the context of nomadic culture when necessary. In some cases, new items had to be developed as none could be found in the literature. However, these new items were based on existing literature conceptualizations and theories. Table 2 summarizes the sources for the items for each of the model constructs.

In the next stage, content validity of the items was established by five nomadic computing and organizational culture researchers along with three top-level managers of organizations that actively support nomadic work. They were asked to comment on the validity of the items and suggest additions, deletions and modifications. Feedback from these experts resulted in significant revisions to the initial items. Finally, two IS researchers reviewed the items independently to further refine the questionnaire. As the result of this process, 43 items were retained for the final questionnaire. The items were written in the form of statements with which the respondent was to agree or disagree on a 5-point Likert scale or choose a particular range (items 32-34) (see Appendix 1). The questionnaire was administered via a web-based survey. The online survey was designed following the guidelines from Smith [1997] to improve the response rate and accuracy. The online survey was pretested to ensure that it functioned correctly.

Table 2. Model Constructs and Their Sources

CONSTRUCT	SOURCES
Assumptions about Employees: Employees are trustworthy, responsible, and self-directed (AE).	Adapted from McGregor, 1960; Meeker 1982; Reigle 2001
Assumptions about Technology: Technology is important and has a positive impact on the organization (AT).	New items
Beliefs about Anytime Anywhere Work: Ability to work anytime anywhere is desirable (AA).	Adapted from Watson-Manheim et al. 2000; Ford and Butts 1991; and Daft, et al. 1987
Beliefs about the Supervision of Nomadic Employees: Effective supervision of nomadic workers is possible (ES).	Adapted from Olson 1982; DeSanctis 1984; and Roderick and Jelley 1991
Beliefs about Virtual Workgroups: Virtual workgroups are effective (VW).	Adapted from Sharda et al. 1988; Warkentin et al. 1997; Burke and Aytes 1998; Crampton 2001; McDonough et al. 2001; Sarker and Sahay 2002; and Powell et al. 2004
Beliefs about the Value of IT: IT makes employees more effective and is valued (EV).	Adapted from Goodhue and Thompson 1995
Beliefs about Technological Opportunism: Proactively sensing and responding to new technologies is important (TO).	Adapted from Srinivasan et al. 2002
Organizational Support for Employees' Nomadic Behaviors (OS)	New items
Employee Job Satisfaction (SA)	Adapted from Goldstein and Rockart 1984

Data Sample

Our focus was on nomadic incubators within organizations and how organizational cultures and beliefs regarding nomadic work are perceived by those who are already nomadic workers or are most likely to become nomadic workers. We identified two possible relevant sampling units within organizations in which nomadic practices might be most likely and consistently present: IT and sales. Sales because of their need for mobility in working with clients outside of the physical organization, and IT because of their extensive use of technology and their increasing mobility due to the pervasiveness of IT in organizations today that requires IT workers to spend a great deal of time away from their desks. Ultimately we chose to sample IT professionals for two reasons. First, cultural lag predicts that nomadic culture would begin to develop after the enabling technologies (i.e. nomadic computing) have been widely established. This is definitely the case for IT departments, but may not consistently be so for Sales departments. Second, we felt that IT professionals are more likely to have intimate and accurate knowledge of nomadic behaviors and support in their organization than non-IT workers due to the technical aspects of nomadic work (eg. equipment) that would be supported by the IT department. Therefore, for the purposes of this exploratory study, we decided that IT workers would be an appropriate sample.

Procedure

Subjects were recruited via e-mail facilitated through three IT professional groups whose members worked in a variety of IT fields and positions across the midwestern United States. The officers of the professional groups delivered a standardized email message to their members to solicit their participation in the study. The email message included verbiage about the general study goals and procedures along with a link that took respondents to the study's web-based survey and the login information. The email also provided instructions about how to access and complete the survey. As an incentive, participating members from each group were entered in a drawing for an Apple iPod for their group. Eight-hundred and fifty potential participants were contacted. A total of 234 responses were received. Thirty-one responses were eliminated from the analysis due to incomplete or duplicate entries by the same respondent, leaving a final sample of 203 for analysis. A response rate of 23.9 percent was obtained.

Non-response Bias

Early respondents and late respondents were compared to ensure that the study did not suffer from nonresponse bias. Early respondents were those whose surveys were received in the first 25 percent of responses, and late respondents were those whose surveys were received in the last 25 percent of respondents. The characteristics of the respondents and their organizations for the two groups were compared using one-way ANOVA. The variables used in the analysis included IT usage of the organization, number of employees of the organization, geographic scope of the organization, geographic scope of office locations of the organization, and the respondent's supervisory capacity. All the comparisons between the early respondent and late respondent groups rendered insignificant results. The insignificant results suggested that the study did not suffer from non-response bias.

VI. STATISTICAL ANALYSIS AND RESULTS

Sample Characteristics

The characteristics of the respondents and their organizations are summarized in Tables 3-8. In summary, they show that our sample was diverse, both in the type of IT professionals represented as well as in the characteristics of the company for which they worked. This was our goal during recruitment; a diverse sample that would be more likely to provide a more comprehensive view of our nomadic constructs rather than one that would be more limited to a particular industry or even organization.

Table 3. Job Position of Respondents

Respondent's Job Positions	Frequency	Percent (%)
System developer	48	23.6%
System analyst	36	17.7%
IT director	24	11.8%
Database administrator	15	7.5%
Network administrator	13	6.5%
Application architect	12	5.9%
Project manager	10	4.9%
Technical specialist	10	4.9%
IT consultant	10	4.9%
Webmaster	9	4.5%
Trainer	8	3.9%
Unknown	8	3.9%
Total	203	100%

Table 4. Types of Industry of Respondent's Organization

Industry	Frequency	Percent (%)
Financial/insurance	32	15.8%
Education	25	12.3%
Software	19	9.4%
Transportation	16	7.9%
Telecommunication	13	6.4%
Manufacturing	13	6.4%
Government	11	5.4%
Retail	9	4.4%
Professional Services	8	3.9%
Healthcare	8	3.9%
Engineering	7	3.4%

Advertising/marketing	7	3.4%
Construction	6	3.0%
Outsourced customer care	6	3.0%
Hardware	5	2.4%
Hospitality	4	2.0%
Publishing	4	2.0%
Public Services	3	1.5%
Utility	3	1.5%
Unknown	4	2.0%
Total	203	100%

Table 5. IT Usage of Respondent's Organization

Company's IT Usage	Frequency	Percent (%)
Minimal	11	5.4%
Average	68	33.5%
Extensive	124	61.1%
Total	203	100%

Table 6. No. of Employees in Respondent's Organization

Number of Employees	Frequency	Percent (%)
0 – 9	16	7.9%
10 – 99	28	13.8%
100 – 499	53	26.1%
500 – 4999	58	28.6%
5000 or more	48	23.6%
Total	203	100%

Table 7. Geographical Scope of Respondent's Organization

Scope	Frequency	Percent (%)
Local only	12	5.9%
Regional only	49	24.2%
National only	66	32.5%
Multi-national	76	37.4%
Total	203	100%

Table 8. Geographical Scope of Office Locations of Respondent's Organization

Location of Office	Frequency	Percent (%)
Local locations	54	26.6%
Regional locations	57	28.1%
National locations	35	17.2%
Multi-national locations	57	28.1%
Total	203	100%

As can be seen, respondents represented a wide variety of positions in a wide variety of industries. Eleven categories of IT jobs were represented, including system developers, analysts, IT directors as the top three. With respect to the type of industry in which respondents worked, there was significant variety. Additionally, the organizations for which the respondents worked tended to be larger, again not surprising since many smaller organizations today are outsourcing IT functionality.

Respondents tended to work for organizations in which IT usage was "extensive." In conjunction with the larger size of organizations for which respondents worked, the geographical scope of their organizations tended to be large, even multinational in many cases. However, some smaller, local companies were also included.

Data Analysis

This study employed the two-step approach suggested by Anderson and Gerbing [1988] to analyze the model data. AMOS 5.0, an SEM software package, was used for analysis. In the first step, the validity of the measurement model was assessed using Confirmatory Factor Analysis (CFA). CFA allows researchers to test the validity of the factorial structure for a measurement model. In other words, CFA allows researchers to determine the extent to which questionnaire items postulated to measure latent factors or constructs actually do so. The second step involved

testing the causal structure of the proposed research model using the Structure Equation Modeling (SEM) technique (see Figure 1). SEM is a statistical methodology that allows simultaneous analysis of the variables of a hypothesized model to determine the model's consistency with the data. The methodology focuses on examining the strength of the causal relations between the constructs [Bentler 1988]. We also employed the Model Generation Strategy. This strategy allows researchers to iteratively modify the proposed model until it was both theoretically meaningful and statistically well fitting [Joreskog 1993].

The overall fit of the hypothesized model was assessed using six fit indices: Chi-square, Chi-square/df, Normed Fit Index (NFI), Comparative Fit Index (CFI), Root Mean Square Residual (RMR), and Root Mean Square Error of Approximation (RMSEA). According to Marsh and Hocevar [1985], Chi-square/df ratios of up to 3 are indicative of acceptable fit models. While the Chi-square statistic is a global test of a model's ability to reproduce the sample variance/covariance matrix, it is highly sensitive to sample size and model complexity. Therefore, other model-fit indices such as CFI that are independent of sample size should be evaluated along with the Chi-square statistic. CFI was the primary fit-statistic of the six for the purposes of this study, as recommended by Bentler [1992]. A CFI above 0.90 is indicative of a well fitting model [Bentler and Bonnett 1980]. As Browne and Cudeck [1993] suggested, a RMSEA that is less than 0.08 indicates good fit and reasonable errors of approximation in the population. Byrne [1998, p. 115] suggested that a standardized RMR value of 0.05 or less indicates a well-fitting model.

Measurement Model

CFA was performed on all the items simultaneously to evaluate the validity of the items and nine underlying constructs in the measurement model. The initial results suggested that some construct revisions were needed to improve the model fit. Items recommended for deletion were evaluated from both a statistical and a substantive point of view before deletion. The following criteria were used to determine if an item should be deleted:

1. If the item had a low and statistically insignificant (at 0.01 level) factor loading (regression weight) on its corresponding construct.
2. If deletion of the item would not jeopardize the theoretical integrity of the construct.

Eleven items were ultimately deleted. The final measurement model was re-specified to include 32 items to measure the nine constructs of the research model (see Appendix 1). The factor loadings of the items are shown in Table 10. All items have high factor loadings on the constructs they are measuring. The resulting measurement model had a good model-to-data fit (see Table 9).

Table 9. Fit Indices for the Respecified Measurement Model

Chi-square	Chi-square/df	NFI	CFI	RMSEA	RMR
748.57	1.76	0.88	0.95	0.06	0.05

The internal consistency of the measurement model was assessed by computing the composite reliability. These reliability coefficients are displayed for all the latent variables in Table 11. All variables have higher composite reliability coefficients than the benchmark of 0.60 recommended by Bogozzi and Yi (1988). This suggests a high internal reliability of the data exists. Discriminant validity analysis examines whether two constructs are statistically different. Discriminant validity is assessed by calculating the Average Variance Extracted (AVE) proposed by Fornell and Larcker (1981). The AVEs for all the latent variables are displayed in Table 11. An AVE of over 0.5 suggests adequate discriminant validity (Hair, et al., 1998). The AVEs for all the latent variables exceeded 0.5, indicating that adequate discriminant validity exists.

Structural Model

Using the SEM technique, the initial test of the structural model demonstrated reasonable fit between the data and the proposed structural model (χ^2 = 1124.92, df= 449, χ^2/df ratio = 2.51, CFI = 0.89). While the fit indices suggest acceptable fit between the model and the data, the modification indices revealed that some model revisions could improve the fit. Specifically, they indicated that the following five structural paths should be included: AE → AT, ES → AA, ES → VW, ES → SA, and TO → EV (see Table 10 for key to abbreviations). A closer examination of these suggested paths indicated that they could be theoretically meaningful. For example, a company that has a positive assumption about employees is likely to have an adhocracy culture, which is characterized by its emphasis on flexibility, creativity, entrepreneurship, and adaptability [Deshpande, et al. 1993]. As IT has been found to promote these characteristics in organizations, it is reasonable to posit that positive assumptions about employees could lead to positive assumptions about technology. Likewise, the effect of beliefs about supervision on beliefs about anytime anywhere work and beliefs about virtual workgroups is also theoretically justifiable as prior studies have found that lack of an effective supervision mechanism hinders the widespread of non-traditional work arrangements (e.g. anytime anywhere work and virtual group work) [DeSanctis 1984; Roderick and Jelley 1991]. With respect to the

effect of beliefs about supervision on employee job satisfaction, ample research has demonstrated a relationship between supervision and employee job satisfaction [e.g. Smith and Canger 2004; Tepper, et al. 2004]. Finally, a technologically opportunistic company is very likely to value IT as an enabler for its business, thus the link from TO to EV is reasonable. Based on these rationales, the causal structure of the research model was respecified with these five paths freely estimated.

Table 10. Factor Loadings

Item	AE	AT	AA	ES	VW	EV	TO	OS	SA
1	0.92								
2	0.79								
4		0.87							
5		0.79							
6			0.76						
7			0.79						
9			0.88						
11			0.45						
12				0.93					
13				0.94					
14				0.65					
15				0.79					
16					0.88				
17					0.92				
18					0.90				
19					0.82				
22						0.69			
24						0.84			
25						0.94			
26						0.95			
27							0.92		
28							0.89		
29							0.97		
32								0.69	
33								0.61	
35								0.88	
37								0.91	
38								0.72	
39								0.68	
40									0.87
41									0.84
43									0.87

Key:
AE – Assumptions about Employee
AT – Assumptions about Technology
AA – Beliefs about Anytime Anywhere Work
ES – Beliefs about Supervision of Nomadic Worker
VW – Beliefs about Virtual Workgroups
EV – Beliefs about Information Technology
TO – Beliefs about Technology Opportunism
OS – Organizational Support for Employees' Nomadic Behaviors
SA – Employee Job Satisfaction

The revised structural model demonstrated good model fit and made significant improvement over the originally hypothesized model (see Table 12). Figure 2 displays a schematic representation of the resulting model (see Appendix 2). The estimation of the revised model yielded a Chi-square of 838.04 with 443 degrees of freedom. The Chi-square/df ratio was improved from 2.51 to 1.89, with a CFI of 0.93. While RMR (0.06) is slightly higher in the re-specified model than the recommended cutoff of 0.05, it is still well within the range of acceptability. The revised model also had an improved ECVI index (4.99), indicating that the revised model has greater potential for replication in other samples than the initial model (ECVI=6.35). The cutoff for significance used was 0.01. All of the structure paths were statistically significant at the 0.01 level (two-tailed) except TO → SO ($p < .04$; see Table 13). Table 14 displays the structural coefficients and standard errors of the structural paths that were ultimately added to the

model. Overall, the revised research model appears to be statistically well fitting. The 11 hypotheses about the relationships between the constructs in the model were tested through the significance of the structural coefficients. Nine of the 11 were supported.

Table 11. Reliability and Validity

Latent Variables	Composite Reliability	Average Variance Extracted (AVE)
Assumptions about Employee (AE)	0.85	0.73
Assumptions about Technology (AT)	0.82	0.69
Beliefs about Anytime Anywhere Work (AA)	0.82	0.54
Beliefs about Supervision of Nomadic Worker (ES)	0.90	0.70
Beliefs about Virtual Workgroups (VW)	0.93	0.78
Beliefs about Information Technology (EV)	0.92	0.74
Beliefs about Technology Opportunism (TO)	0.95	0.86
Organizational Support for Employees' Nomadic Behaviors (OS)	0.95	0.75
Employee Job Satisfaction (SA)	0.93	0.80

Table 12. Fit Indices for the Revised Structural Model

Chi-square	Chi-square/df	NFI	CFI	RMSEA	RMR
838.04	1.89	0.87	0.93	0.07	0.06

Table 13. Model Hypothesis-Testing Results

Hypothesis	Structural Path	Structural Coefficient	Standard Error	Significance
Assumptions				
H1a	AE → AA	0.34	0.07	p < .001
H1b	AE → ES	-0.54	0.11	p < .001* not supported
H1c	AE → VW	0.46	0.10	p < .001
H1d	AT → EV	0.24	0.10	p < .003
H1e	AT → TO	0.76	0.15	p < .001
Values				
H2a	AA → OS	1.00	0.17	p < .001
H2b	VW → OS	0.22	0.06	p < .002
H2c	ES → OS	0.43	0.09	p < .001
H2d	EV → OS	0.27	0.12	p < .005
H2e	TO → OS	-0.19	0.08	p < .042** not supported
Artifacts				
H3	OS → SA	0.65	0.08	p < .001

* Even though the structural path (AE → ES) is statistically significant (p < .001), the effect of AE on BS was found to be negative while it was hypothesized as positive.
** not significant at the 0.01 level

Table 14. Structural Coefficients and Standard Errors for Added Structural Paths

Structural Path	Structural Coefficient	Standard Error
AE → AT	0.97	0.10
ES → AA	-0.64	0.05
ES → VW	-0.37	0.06
ES → SA	-0.44	0.05
TO → EV	0.64	0.06

VII. DISCUSSION

Building on existing organizational culture theory, this study proposes a research model that describes the underlying assumptions, espoused values, and artifacts of nomadic culture, their relationships, and the effect of organizational support of employees' nomadic behaviors on employee job satisfaction. Overall, strong support was found for the proposed nomadic culture model over a sample of IT professionals from a variety of organizations. These findings are consistent with Schein's [1984] original organizational culture model and provide evidence that nomadic culture follows a pattern similar to that of general organizational culture. The results showed that an organization's underlying assumptions about both employees and technology significantly impacted the postulated espoused values. More specifically, the study found that organizations who saw employees as autonomous and self-directed possessed positive belief about the value of anytime-anywhere work and the effectiveness of virtual teams.

In addition, the study also found that organizations with positive underlying assumptions about the value of technology also tended to believe that technology offered value to organizations and that organizations should proactively respond to new technologies. While these relationships are not surprising, they are important to the development of theory of nomadic culture as nomadic work is heavily reliant on technology. An interesting additional finding was that organizations that saw employees as autonomous and self-directed also tended to have positive underlying assumptions about technology. This finding is consistent with how one would expect an organization with a employee-friendly culture to think as technology tends to promote the flexibility, creativity, entrepreneurship, and adaptability of an organization [Deshpande, et al. 1993].While this relationship was not initially posited, in retrospect it seems obvious, particularly given the nomadic work practices' heavy reliance on technology.

The research model posited that the five espoused values would all have a significant relationship with the artifact organizational support for nomadic behaviors. This was in fact supported for four of the five values: those about anytime-anywhere work, virtual workgroups, effectiveness of supervision of nomadic workers, and the value and effectiveness of information technology. Thus, an organization that holds explicit beliefs that nomadic work adds value to the organization, that remote supervision of nomadic workers can be performed effectively, that virtual teams are effective, and that technology is valuable to the organization would also tend to actually provide the opportunities and required equipment necessary for nomadic work. This again reinforces the observation that nomadic culture can be viewed in the context of Schein's organizational culture model. However, we did not find a significant relationship between an organizations' valuing Technological Opportunism and its support for nomadic behaviors. This may be a reflection of the growing integration of technology, and particularly nomadic computing technologies, into the mainstream. So an organization does not necessarily have to be an early adopter any longer to be a facilitator of nomadic work.

The research model also considered whether job satisfaction would be impacted by the extent of support an organization provides its nomadic workers. A significantly positive relationship between organizational support for nomadic behaviors and employee job satisfaction was found. This finding was suggestive of a positive role that nomadic culture may play on employee job satisfaction. It confirmed our contention that nomadic culture has positive effect on organizations and further underscored the importance of cultivating a nomadic culture in today's business environment in order to facilitate an effective organization.

There were some surprising results related to the beliefs about remote supervision, one of the espoused values. Our prediction that organizations that viewed employees as autonomous and self-directed would tend to also believe that supervision of nomadic employees could be effectively conducted was not supported. In fact, beliefs about remote supervision were found to negatively impact employee job satisfaction, and valuing virtual workgroups and anytime-anywhere work. That is, when respondents reported that their organization believed that nomadic workers could be effectively supervised, they tended to also report that their organization did not see nomadic work or virtual teams as beneficial, and they reported a lower job satisfaction. This suggests that the role of supervisory activity in a nomadic work environment is more complex than previously anticipated. For example, it is unclear if a nomadic work environment is steering supervisory activity toward an evaluation of the work output or the behaviors and appearance of nomadic workers (e.g. How long is the nomadic worker connected? How many messages has the nomadic worker sent?) [Jessup and Robey 2002]. Another possible explanation for the negative relationship between the effectiveness of remote supervision and other constructs may be that the value of nomadic work as perceived by employees diminishes if strong supervision is imposed on nomadic workers. In a flexible work environment, employees may prefer to be self-directed and turn to their supervisors for support rather than supervision. Thus, the role of management shifts from supervision to facilitation. This brings up an interesting point; it shows that simply moving to a nomadic work environment without reevaluating the supervisor-subordinator relationship may in fact lead to lower employee satisfaction.

Another possible explanation of the inverse supervision results may be related to the fact that the majority of our respondents were not full-time supervisors. In our study, 163 out of 203 respondents reported spending less than 40 percent of their time supervising others at work. So they may have been interpreting the questionnaire items from their own perspective as primarily supervisees. Consequently, they may have had experiences with their own nomadic work being poorly supervised and so extrapolated that their organization held the belief that even though they supported nomadic work and workers, the supervision was not effective.

VIII. IMPLICATIONS FOR RESEARCH, PRACTICE, AND FUTURE DIRECTIONS

Several implications for research and practice emerge from our findings. The most important implication of our work is that it has provided a theoretical foundation for studying nomadic culture. This is the first known study to construct a conceptual model of nomadic culture and empirically validate the model. In line with Schein's [1984] theory of organizational culture, this study found that the assumptions-values-artifacts relationship was also evident in

nomadic culture. The model offers a better understanding of the components and underlying theories that form the concept of nomadic culture. Future research can build on the theoretical ground established by this study.

From the perspective of practice, the model of nomadic culture described in this study provided actionable recommendations for enhancing the organization's ability to utilize nomadic computing technologies to achieve better results. In today's environment, technology alone is no longer enough to create sustainable competitive advantages [Porter 2001]. In the case of nomadic computing, while the technologies have been adopted by many companies to offer flexible work arrangement to their employees, the results have been mixed [McGregor 2006]. Therefore, social and cultural elements that accompany the technology need to be understood in order to amplify the effectiveness of the technology. Our model provides a first step in this understanding. The model of nomadic culture proposed and validated by this study could also serve as a culture audit tool for organization to determine the extent to which nomadic culture exists in the organization. The model can also be utilized as a guideline for developing nomadic culture. For an organization interested in cultivating nomadic culture, besides providing the obvious artifacts (e.g. technologies, policies, and training), more importantly it needs to develop the underlying assumptions and values among its leadership and employees since these assumptions and values will ultimately determine the artifacts and how artifacts are implemented. Two categories of assumptions and values, employee-related and technology-related, were found to be important. Cultivating them can be a significant key to creating a sustainable competitive advantage based on nomadic work-enabling technologies. We also recognize that, sometimes, artifacts need to be in place before the favorable assumptions and values can develop. In the case of Best Buy, skeptics of nomadic work changed their perspectives towards the nomadic work program after seeing the initial success at divisions that implemented it [Conlin 2006]. The positive assumptions and values will eventually lead to more wide-spread and enthusiastic support for nomadic work throughout the organization.

One specific interesting avenue for future work would be to examine the temporal development of nomadic culture in organizations. The present research examined only one point in time. But how does such a culture develop? What are the roadblocks and enablers along the path to successful and unsuccessful nomadic culture instantiations? How would direct intervention affect the development of nomadic culture versus a " hands-off " approach in which it is allowed to just develop on its own? Such questions could be very useful for businesses facing the incorporation of nomadic work in their organizations.

Another promising avenue for future research is to investigate the impacts of nomadic culture on other organizational performance measures (e.g. productivity, decision-making effectiveness, and revenues and profits). An integral part of Schein's [1984] theory of culture is how the cultural elements address problems in the organization. Understanding these impacts will help corporations make more effective IT investments as well as work policy decisions. This work also could form the basis for interesting research on the dynamics of nomadic culture within organizations or the actual dynamics of 'having' a nomadic culture.

Finally, culture can be manifested at many different levels. While this study focused on nomadic culture at the organizational level, studying the effect of different national cultures on nomadic culture may offer interesting findings. Subcultures such as nomadic culture are derived from and bear traits of their parent cultures. In this light, one can argue that a parent culture, such as the national culture, can affect the formation and sustainability of a nomadic culture. For example, in a country where the division between work and leisure is clear, the formality of an office is valued, and face-to-face interaction is imperative, nomadic culture may be difficult to cultivate by organizations. Studies [e.g. Bandyopadhyay and Fraccastoro 2007] have also found that national cultures to be a significant determinant of a user's intention to use a technology. As nomadic culture has deep roots in technology, organizations in different national cultures are likely to demonstrate different levels of receptiveness to nomadic culture. Dimensions of national culture proposed by Hofstede [1994], power distance, individualism, masculinity, and uncertainty avoidance are likely to have profound influence on the formation and sustainability of nomadic culture in organizations. Similarly, the type of parent organizational culture may exert influence on a nomadic culture. Cameron and Freeman [1991] classified organizational cultures into four broad categories: clan, hierarchy, market, and adhocracy. As one may speculate, the adhocracy culture, characterized by creativity and adaptability, is likely to be nomad-friendly, whereas the hierarchy culture, emphasizes on order and formal structure, may impede the cultivation of nomadic culture. Studying the impact of parent cultures and other organizational cultures on nomadic culture offers fertile research opportunities.

IX. LIMITATIONS

There are several limitations to the current research that should be noted. First, the sample size, while adequate, could be larger and drawn from a wider region. This study also used IT professionals exclusively as subjects, which does limit the generalizeability of the results. In view of the findings of this study, it would be very interesting to examine the actual behaviors of nomadic workers in the field, as well as to study their actual culture and the nomadic culture of their organizations. Perhaps a comparison between two groups of samples (nomadic and non-

nomadic) would also lead to new insights on nomadic culture within an organization. Another limitation was the supervision capacity of respondents. Since the supervision construct provided inconclusive results, it would be interesting to study a sample of people with more supervisory responsibilities. Additionally, we employed self-reported survey data about the organization for which the respondents worked. This relied on the perceptions of the respondents of their organization's assumptions, values, and artifacts. A next step would be to supplement our research survey with objective data and information such as published work policies along with qualitative data from groups of subjects within the same organizations.

Another limitation of this study is the measure of employee satisfaction. Employee satisfaction was measured at the individual level in this study while nomadic culture was measured at the organizational level. This mixing of different levels of analysis likely affected the validity of the analysis. Therefore, the impact of organizational support of employees' nomadic behaviors on employee job satisfaction needs to be interpreted with caution. It is recommended that, in future research, data be collected that utilizes a number of respondents within the same organization whose responses can be aggregated so that all the constructs are represented at the organizational level. Finally, another limitation may be timing. That is, our inclusion of the construct of an espoused value related to technological opportunism may not be relevant to nomadic culture today as the underlying technologies are quickly becoming mainstream. In fact, in the course of conducting this study, these technologies moved even more definitively into the mainstream.

X. CONCLUSION

Nomadic computing is a growing trend in business that is likely to continue to expand. As workforces mobilize, the cultural changes needed to sustain anytime anywhere work practices become increasingly critical for success. This paper proposes a research model describing nomadic culture based on Scheins' [1984] levels of culture, and looks at its effect on job satisfaction. The nomadic culture research model provides a detailed, preliminary picture of the underlying assumptions, espoused values, and artifacts of nomadic culture and their interrelationships. In the process of developing the model, the study also provides a theoretical basis for the identified constructs and develops a 32-item survey to measure the constructs.

In conclusion, nomadic culture will become an increasingly important subculture in many if not all organizations. It is a complex concept but one that will have to be addressed by organizations today and in the near future. Research over the past 30 years has shed significant light on the topic of organizational culture which can be used to guide a more focused examination of nomadic culture specifically. The development and testing of a model of nomadic culture in this paper advances theory and research on this important topic.

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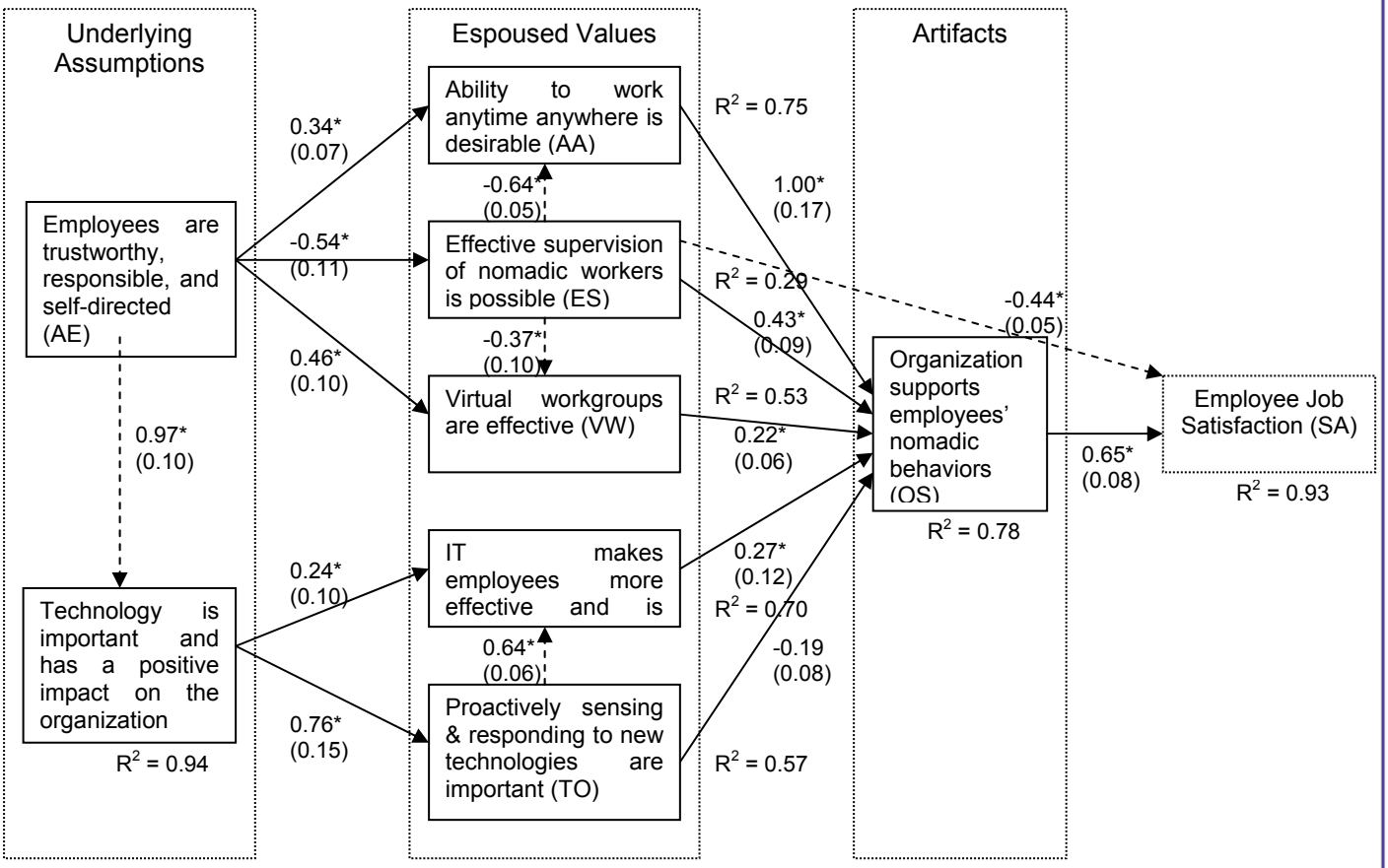
APPENDIX 1: MEASUREMENT ITEMS

Constructs		Measurement Items
Assumption about Employees (AE)	I1*	We believe that people are responsible and trustworthy.
	I2*	We believe that people are motivated to work.
	I3	We believe that people can work effectively on their own.
Assumption about Technology (AT)	I4*	We believe that organizations should keep pace with how to use new information technologies in their industry.
	I5*	We believe that information technology has a positive effect on organizations.
Beliefs about Anytime Anywhere Work (AA)	I6*	We believe that employees' ability to work anytime anywhere is important in our industry.
	I7*	We believe that employees' ability to work anytime anywhere can be a competitive advantage for our organization.
	I8	We believe that employees should work in their office in order to do their job well.
	I9*	We believe that employees who work anytime anywhere are more productive.
	I10	We believe that employees who work anytime anywhere are more satisfied.
	I11*	We believe that working anytime anywhere adversely affects the quality of one's work.
Beliefs about the Supervision of Anytime Anywhere Employees (ES)	I12*	We believe that supervision of anytime anywhere employees is NOT effective.
	I13*	We believe that supervision of anytime anywhere employees is time consuming.
	I14*	We believe that supervision of anytime anywhere employees is hard to administer.
	I15*	We believe that managers lose managerial control over employees who work anytime anywhere.
Beliefs about Virtual Workgroups (VW)	I16*	We believe that virtual workgroups (i.e. Employees who use technology to work together without regularly meeting face to face) make organizations more flexible.
	I17*	We believe that virtual workgroups make organizations more responsive.
	I18*	We believe that virtual workgroups are as effective as traditional (face-to-face) workgroups.
	I19*	We believe that virtual workgroups are as cohesive as traditional workgroups.
	I20	We believe that virtual workgroup members trust each other as much as traditional workgroup members.
	I21	We believe that virtual workgroup members communicate as effectively as traditional workgroup members.
Beliefs about the Value of IT (EV)	I22*	We believe that the use of IT makes employees more productive.
	I23	We believe that IT makes employees more effective.
	I24*	We believe that employees utilize the technology with which they are provided.
	I25*	We believe that IT allows employees to work anytime anywhere.
	I26*	We believe that IT is essential to achieving organizational goals and objectives.
Beliefs about Technological Opportunism (TO)	I27*	We believe that we should be the first in our industry to detect technological developments that may potentially affect our business.
	I28*	We believe that we should actively seek intelligence on technological changes in the environment that are likely to affect our business.
	I29*	We believe that we should be quick to detect changes in technologies that might affect our business.
	I30	We believe that we should periodically review the likely effect of changes in technologies on our business.
	I31	We believe that we should respond very quickly to technological changes in the environment.
Organizational Support for Employees' Nomadic Behaviors (SO)	I32*	How many employees in your department regularly work from home or another location?
	I33*	How many employees in your department have flexible work schedule?
	I34	How many employees in your department work at their own pace?
	I35*	Working anytime anywhere is an option for employees in our department.
	I36	In our department, employees are evaluated based on their performance rather than time they spend in their office.
	I37*	Working anytime anywhere is facilitated in our department.
	I38*	Employees are provided with the necessary equipment to work anytime anywhere (e.g. laptops, PDAs, mobile phones, pagers, etc…).
	I39*	Employees are given training on how to use provided technologies to work anytime anywhere.
Employee Job Satisfaction (SA)	I40*	Generally speaking, I am satisfied with my job.
	I41*	I am satisfied with the amount of personal growth and development I get in doing my job.

Constructs		Measurement Items
	I42	I am satisfied with the people I talk to and work with on my job.
	I43*	I am satisfied with the amount of support and guidance I receive from my supervisor.

* The item was retained for data analysis



* significant at the 0.01 level; ----- new structural path

Appendix 2: Figure 2. Final Nomadic Culture Model (parenthesized values represent standard errors.)

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