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MANAGING A VIRTUAL WORKPLACE: AN INVESTIGATION OF PROCESSES IN VIRTUAL WORK

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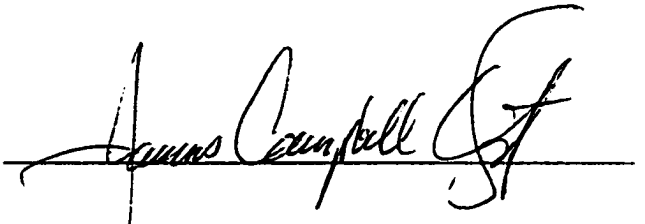

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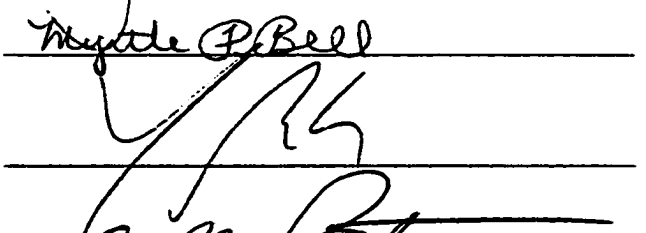

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DEDICATION

This dissertation is dedicated to my mother, Sindoor

MANAGING A VIRTUAL WORKPLACE: AN INVESTIGATION OF PROCESSES IN VIRTUAL WORK

by

MEGHNA VIRICK

Presented to the Faculty of the Graduate School of

The University of Texas at Arlington in Partial Fulfillment

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ABSTRACT

MANAGING A VIRTUAL WORKPLACE: AN INVESTIGATION

OF PROCESSES IN VIRTUAL WORK

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Increasing globalization and rapid advancements in technology are resulting in changes to the traditional work paradigm. Increasingly we are seeing greater dispersion of employees from their managers and a higher use of electronic communication in place of face-to-face interactions. This increase in virtuality in the workplace is the topic of this dissertation, which aims at examining organizational processes that are affected on account of increasing remoteness of employees.

Using research from existing management theory and the limited empirical evidence, a model of the processes in virtual work was developed to further our understanding of current trends in the workplace. The model investigates the impact of virtuality on autonomy and performance assessment of employees. These are, in turn, hypothesized to impact a host of other employee attitudes. The model simultaneously examines the role of leadership on processes such as work life balance, motivation, organizational identification and satisfaction.

A field study was conducted to test the theoretical model that contained ten constructs. Three data sources, namely self reports (from the employee survey), social reports (from supervisor reports of performance) and archival data (from company records) were used for data collection. A web-based survey was administered to employees of one organization resulting in 575 survey responses. Regression analysis and structural equation modeling was used to test the fourteen hypotheses. Of these, eight hypotheses were fully supported, two were partially supported, and four were not supported.

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INTRODUCTION

Statement of the Problem

Rapid advances in information and communications technology have made it possible for more and more employees to be physically distanced from their managers. This spatial and often temporal dispersion of employees has made organizations experiment with various types of virtual work arrangements such as telecommuting, working from satellite or neighborhood work centers, mobile work and so on (Weisenfeld, Raghuram, & Garud, 1999). The lack of physical proximity created by these arrangements between manager and subordinate has made "management by walking around" or "management by observation" a thing of the past (Nilles, 1994).

Researchers have argued that the growth of virtualization where individuals are geographically dispersed and interact with one another via electronic communication has changed workplace dynamics (Staples, 2001a). It has altered the fundamental way in which work is being done by impacting organizational structures and systems, patterns of communication and reporting relationships (Kavan & Saunders, 1998). A large number of organizations, particularly high technology firms have been adopting these new and unconventional forms of work organization fairly rapidly. For example, companies such as Procter & Gamble, IBM, Verifone, Hewlett Packard and AT&T have partially or fully eliminated offices for their sales and customer services (Davenport & Pearlson, 1998). In a recent WorldCom conferencing study (Modalis, 2001), it was found that 31% of those surveyed work in a virtual management structure, namely, their immediate manager or staff members are not located in the same office. The same study found that participation in

virtual work is the highest among employees in the technology industry (87%), followed by management level employees (78%), and those in large companies, namely, companies with more than 500 employees. Implications of these changes in the work envionment is seen in the replacement of hierarchical structures with lateral structures, and the equipping of employees with laptops, cellular phones, pagers, and DSL lines that make it possible for them to operate successfully away from the office.

The management of virtual workers is projected to be a key organizational challenge of the information age (Weisenfeld, Raghuram, & Garud, 2001). Existing management theory has just begun to assess the different factors at work in a virtual environment. For instance, Weisenfeld, et al. (1999) note that the skills required of managers in a traditional work setting are different, and may even conflict with those required to manage a dispersed group of employees. Cascio (2000) argues that virtual work requires a shift from the "focus on time to a focus on results." There is, no doubt, a paradigm shift in the nature of work, due to various environmental, political, economic, and technological factors. To understand how the nature of work has changed over the years, I discuss below the transformation of work from an industrial to an informational model.

The Transformation from an Industrial to an Informational Model of Work

Carlson (1999) talks of the new paradigm of organizational functioning, which has seen a transition from an industrial model to an information model. She notes that work in the information age is viewed from a process orientation perspective. The consequences of this are very dramatic as workflow is no longer strictly linear and there is greater self-management. Mohrman and Cohen (1995) hold a similar view that in such organizations, the focus shifts from lines and boxes on an organization structure chart to connections between people. As a result there are flatter organizational structures, greater flexibility, and more project-based work. In popular press as well, there has been proliferation of terminology that

implies virtuality in organizations such as virtual organizations, virtual corporations, virtual enterprises, and virtual teams (Jackson, 1999). Most of these terms, in Jackson's (1999) view, lack a certain precision, but are important because they indicate an important emerging organizational phenomenon that has far reaching implications on the way we work.

Key Drivers in the Shift to Virtual Work

To understand the paradigm shift in the nature of work, one has to examine the key factors responsible for these changes in the work environment. Why is the workplace changing? What is causing such dramatic shifts in work patterns? It appears that there are two primary drivers that have caused large-scale changes in work patterns and modes of organizational functioning. The first is increasing globalization that has changed the scale of operations of organizations, and the second is increasing technological advancements that have facilitated and provided the tools to make that happen. First, the issue of globalization is discussed:

Globalization and a Borderless World

Evidence in the form of economic indicators points to a world that is increasingly global. From an economic perspective, globalization is assessed by examining changes in capital flows, production systems, and trade in goods and services. In particular assessing level of imports, exports, foreign direct investment, and international finance gives a fairly accurate picture of the increasing number of global transactions taking place in the world today. Eden and Lenway (2001) argue that globalization is much broader than just financial transactions and represents far-reaching changes in the natural order of society.

The globalization phenomenon, has created an invisible continent, a new world that respects no borders (Ohmae, 2000). It consists, according to Ohmae (2000) of a "visible dimension," the "cyber dimension," the "borderless dimension," and the "dimension of high

multiples." The visible dimension consists of the physical world; the cyber dimension refers to the world of the internet; the borderless dimension refers to the world where there are free movements of capital, intellectual property, and talent across the globe. The dimension of high multiples refers to the high valuations of internet companies. In this borderless world, the economy is not so much controlled by countries, but by consumers and investors who determine the flows of capital and the creation of platforms of universal standards by businesses.

Today, "boundarylessness" or the capability to transcend geographical, cultural, and economic barriers has become necessary for firms to compete effectively in the twenty first century (Harvey, Novicevic, & Kiessling, 2001). Collaborating across borders and time zones has become crucial in running a business. Perhaps the most sophisticated form of distance work is seen in the software industry, where software teams composed of members that span the globe, collaborate on projects. Due to the competitive nature of the industry, the urgency to get products out fast, the drive to reduce labor costs, and the need to be close to the customer, such teams use, what Carmel (1999) calls "follow the sun" or "round the clock" development. This system takes advantage of time zone differences in order to hand off work from one location to the next, when cycle time is critical for the product. Thus when a programmer in San Francisco finishes working on debugging a program, he hands it over to a counterpart in Bangalore, India, who is getting to work just as the day ends in San Francisco. The coordination required for such an arrangement to work successfully requires a different mindset and a different set of skills than that required for co-located teams. Simpler examples of distance work are seen in call centers that are being set up in low cost nations. This makes it possible for customers to reach the organization's customer service department 24 hours a day, 7 days a week.

Technology

A critical factor that has made distance work possible is advancements in technology. Technology has been defined as "a form of human cultural activity that applies the principles of science and mechanics to the solution of problems. It includes the resources, tools, processes, personnel, and systems developed to perform tasks and create immediate particular, and personal and/or competitive advantages in a given ecological, economic and social context" (Bush, 1981: 1).

In a broad sense, technological advancements are taking place in all disciplines. However, a simple classification would include categorizing technological advancements into two broad groups: life sciences, and physical sciences/engineering. Within the life sciences, advancements are taking place in areas such as gene therapy, biotechnology, and medical devices; and within the physical sciences, advancements are occurring in such fields as chemical and aerospace engineering and computer science. Figure 1 illustrates the categories within which computing and communication technologies are included.

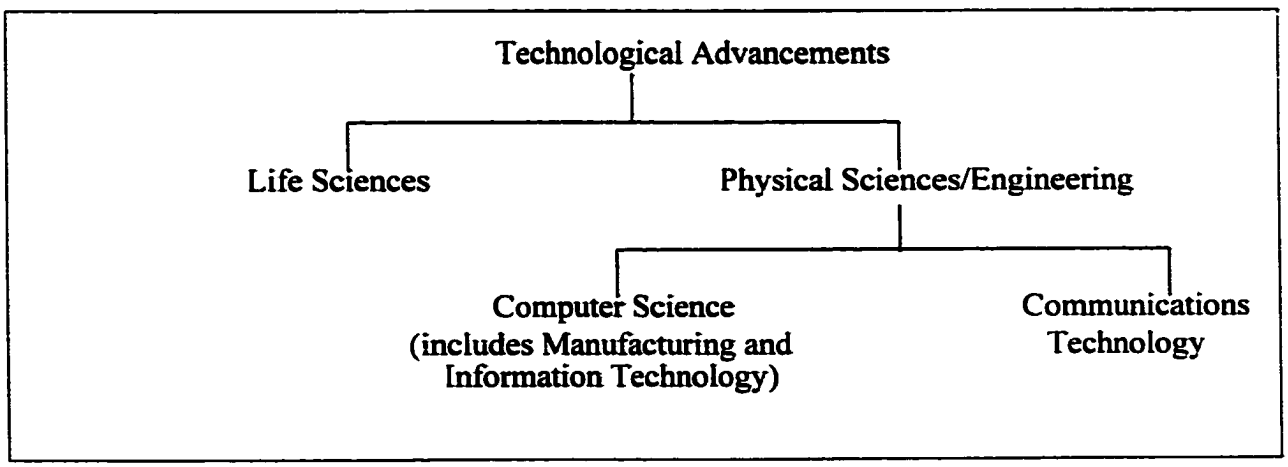


Figure 1. Technological Advancements.

Hitt, Keats, and DeMarie (1998) note that in the recent past, the most significant developments in technology have occurred within the computer science field in manufacturing technologies and information/communication technologies. Manufacturing technologies are those that aim at advancing production systems for organizations. Advanced manufacturing technologies (AMT) refer to those types of technology that enhance the ability to have greater product variety and strategic flexibility. Examples of such technology include computer-aided design (CAD), computer-aided manufacturing (CAM), and flexible manufacturing systems (FMS). Information technology (IT), on the other hand refers to the use of computers for storing, analyzing, accessing and distributing information.

Leavitt and Whisler (1958) in their groundbreaking paper in Harvard Business Review entitled "Management in the 1980s" first used the term information technology, a development due to the advent of the computer, which they foresaw as significantly changing the structure and working processes of most organizations. However, there is no clear consensus on whether communication technologies are considered part of information technology because product developments sometimes involve both.

Townsend, DeMarie and Hendrikson (2001) hold the view that information technology consists of two types of technology: communications technology and computing technology. They argue that when computing technology is connected through powerful communication technologies, a vast amount of information exchange can occur across large geographical distances, and organizational boundaries at high speeds. This causes organizations to change in two critical ways: first, it allows corporations to locate virtually anywhere, and second, it allows them to outsource a large variety of services. These two capabilities create fundamental organizational change.

Research Challenges and Questions

Virtual work is new. It is a creation of the world of high speed internet, cellular phones, videoconferencing, and globalization. This is enabling increasing dispersion of employees and distancing of managers from their direct reports. The lack of collocation creates a virtual environment that has significant implications with respect to managing such employees. Increasingly, more and more research is being done on the "distance manager" or "boundary manager." Fisher and Fisher (2001) note that being a distance manager requires different management skills, perspectives and techniques that are different from that required in traditional supervisory roles. Practitioners are just beginning to grapple with the new change, and academics are just beginning to study the implications of these far reaching changes in the workplace. Hence examining virtual work involves significant challenges of re-examining existing assumptions and exploring new territory.

Research Challenges

Since our assumptions of the physical notions of a workplace are being restructured, there is a need to step back and re-examine the application of existing theories on the workplace of the future. The vast changes brought about by technology and globalization have created somewhat of a lack of fit of virtual work with existing and established knowledge in the field of management and psychology. The research on this topic is also very sparse, which does not enable incremental refinement of existing research. Instead one has to tread new ground, and enter an exploratory domain since the basic assumptions that we operate on are changed. Although the risks of doing research in a new and upcoming field are greater, I believe that there is simultaneously greater challenge in exploring and understanding new organizational realities. Virtual work environments are only projected to increase, and the need to study virtual organizations is critical (Staples, Hulland, & Higgins, 1999). Hence, in this field, there are new opportunities for redefining, understanding, and

developing theory. This is partly what this dissertation attempts to achieve: understanding the implications of a new reality of organizational functioning.

Research Questions

In specifics, this dissertation argues that virtual work arrangements, because of their complexity create some paradoxes in work settings, namely, they create two seemingly contradictory perspectives, both of which are probably true. Pearlson and Saunders (2001) note that there are three different paradoxes of virtuality: increased flexibility and increased structure; greater individuality and more teamwork; more responsibility and greater control. This dissertation focuses on the first paradox: the argument that enhanced virtuality simultaneously increases flexibility as well as structure. In other words, while the flexibility in work processes and methods provided by distributed work arrangements creates advantages for both the employee and the employer, the increase in such flexibility often goes hand in hand with structural changes in the work environment. These structural changes, conceptualized in this study as a heightened focus on outcomes, occurs as a result of the need to accommodate changes in interaction patterns that result due to virtuality. The focus of this dissertation is to treat virtuality as an independent variable and empirically examine its impact on flexibility and structure. These in turn are hypothesized to impact other organizational processes such as motivation, work-life balance, job satisfaction, and performance.

Although not explicitly examined from the point of view of its impact on virtual workplace functioning, this dissertation argues that leadership becomes more critical and challenging in virtual environments and attempts to simultaneously examine the impact of leadership on various organizational processes. For instance, prior research has not examined the impact of leadership on work life balance and organizational identification.

This dissertation examines issues of motivation, job satisfaction, and performance in the context of leadership and virtuality.

Dissertation Overview

The dissertation is organized as follows: Chapter 2 provides an overview of the existing literature in the field. This chapter brings various literatures from different fields and attempts to position the study in the realm of management and organizational behavior. In chapter 3, constructs are defined, a model is proposed, theoretical connections are outlined and hypotheses developed. With the hypotheses clearly laid out, chapter 4 describes the research design used to test the hypotheses. This chapter includes information on the study context, data collection procedure, methodology and statistical analysis used. Chapter 5 contains the results of the study, and chapter 6 includes the conclusion, discussion, limitations, and suggestions for future research.

CHAPTER 2

LITERATURE REVIEW

In this chapter, I review the current state of research in virtual work within a broader framework of knowledge. In the first section is a discussion about current theoretical and empirical work in the field. In the second section, I describe the context that has enabled and facilitated the development of virtual work. This includes a detailed analysis of the role of the forces noted in chapter 1, namely, increasing globalization and technological advancements in impacting the way we work. In the third section, I discuss the organizational imperatives of virtual work, as well as specific types, forms, and conceptualizations of virtual work. Finally, I outline the scope of the dissertation and its specific objectives.

Current State of Research

Changes in the global business environment, shorter product cycles, and increased competition, have altered traditional forms of organization resulting in greater geographical dispersion of employees. Advances in information and communication technologies, which enable managers and employees to be connected electronically to conduct business, have facilitated this geographic dispersion. This has resulted in enhancing virtuality in the workplace and a concurrently greater focus on the study of virtual organizational structures. However, on an absolute scale, very little research exists on virtual work arrangements. The largest body of research is in the information systems field, the primary focus of which is the study of virtuality at the organizational level. Most of these studies are theoretical and examine the phenomenon of virtuality from an overall systems perspective. There are a very small number of empirical studies in this area of research.

At the individual level of analysis, there is some recent literature on remote work (Challagalla, Shervani, & Huber, 2000; Hill, Miller, Weiner, & Colihan, 1998; Raghuram, Garud, Wiesenfeld, & Gupta, 2001). For example one study of remote workers by Staples et al. (1999) examined remote work self-efficacy among 376 employees across 18 organizations. Using the self-efficacy theoretical framework, Staples et al. (1999) found that remote workers' self-efficacy plays an important role in remote work effectiveness. Likewise Raghuram et al. (2001) explored structural (e.g., work independence and evaluation criteria) and relational factors (e.g., trust and organizational connectedness) associated with employee adjustment to virtual work in a telecommunications company.

In a recent paper on virtual work Belanger, Watson-Manheim, and Jordan (2002) noted that between 1998 and 2001, 41 empirical and/or theoretically grounded studies had been done relating to teleworking and virtual work. Of these 6 were literature reviews and 35 were empirical studies. They also noted that the study of communication patterns of virtual workers and choice of mode of communication was the most researched topic in the area. In fact recent interest in the topic of virtual organizations and the communication processes for such organizations have been the study of a special issue in Organization Science (DeSanctis & Monge, 1999). However, specific forms of virtual work arrangements, such as telecommuting or working from home, have been studied extensively since the late 1970s (e.g., Bailyn, 1988; Hartman, Stoner, & Arora, 1991; Tomaskovic-Devey & Risman, 1993; Venkatesh & Vitalari, 1992). Most of these studies are largely descriptive, survey-based, and focus on a practitioner audience. They have also been riddled with definitional problems and a lack of rigor in their research methodology (Shin, Sheng, & Higa, 2000; Belanger et al., 2002).

Snow, Lipnack, and Stamps (1999) note that the literature on virtual teams and organizations has three main characteristics: it is fairly new, it is more conceptual than

empirical, and the empirical data is limited to case studies. They also note that there is tremendous potential for future research in this area. Similar views are held by Sparrow and Daniels (1999) who note that the nascent nature of theory development in this area presents a challenge to researchers.

In an attempt to define the context within which virtual work has emerged, I include below, an analysis of the changes in the nature of work.

The New Work Paradigm

Ransome (1996) in his book "the work paradigm" argues that we are in the process of changing how we perceive work. He notes:

> In the current context for example, technological innovation has made it possible for a growing number of people to 'work from home' rather than 'from the office'. Taken together with other developments such as increases in part-time working, work-sharing and other forms of 'telecommuting', questions of whether we might be on the brink of a more or less radical change in how we perceive work, how it can be organized, and what meaning we should attribute to it, are gradually impressing themselves on the public imagination. Inevitably, the question of the 'future of work' is a matter of growing concern for all of us.

Ransome (1996) outlines how the work paradigm has changed over the centuries. According to him, in early Hebrew and Christian society, the meaning of work was based on religion, and the salvation of the spirit, beyond earthly life. In the medieval age, this notion gradually changed to incorporate the idea that work could be a legitimate way to improve one's life. From the sixteenth century on, a belief in the relationship between capitalism, an economic practice and Protestantism, a belief system, promoted the idea of human rationality and led to the creation of principles of work ethic (Weber, 1930). The protestant work ethic outlined the ways one was to conduct ones' life. Thus from ancient times to the

eighteenth century, the view of work had transformed from one first seen as a punishment, to one seen as an obligation, a duty, and finally to the modern view of work: self-determined activity carried out by individuals. In the late twentieth century, Ransome (1996) argues that that there have been changes in the patterns of working as well as in technological change. Patterns of working have been reflected in the redistribution of the workforce from the manufacturing to services sector; a change in the composition of the workforce as reflected by an increasing number of women; and increasing job insecurity. Technological change and some of the related transitions have created a disequilibrium, which is, according to Ransome (1996), a result of the outdated nature of present conceptions of work, and the one that will emerge in the future.

As mentioned in chapter 1, the two primary drivers of this change in the work environment are globalization and rapid advancements in technology. But before launching into details on these two factors, it is important to clarify the relationship between globalization and technology. Although the discussion in the following section elaborates on globalization and technological advancements, it is not meant to imply that these are mutually exclusive phenomenon. As figure 2 demonstrates, globalization is facilitated by technological advancements, and some of the technological advancements in some fields are probably given a push by the demands of globalization. Harvey, Novicevic, and Kiessling (2001) note that the underlying forces behind globalization of markets are macroeconomic, political, technological, and organizational. Thus technological factors which impact communication, transportation, and product life cycles are one aspect of the overall phenomenon of globalization.

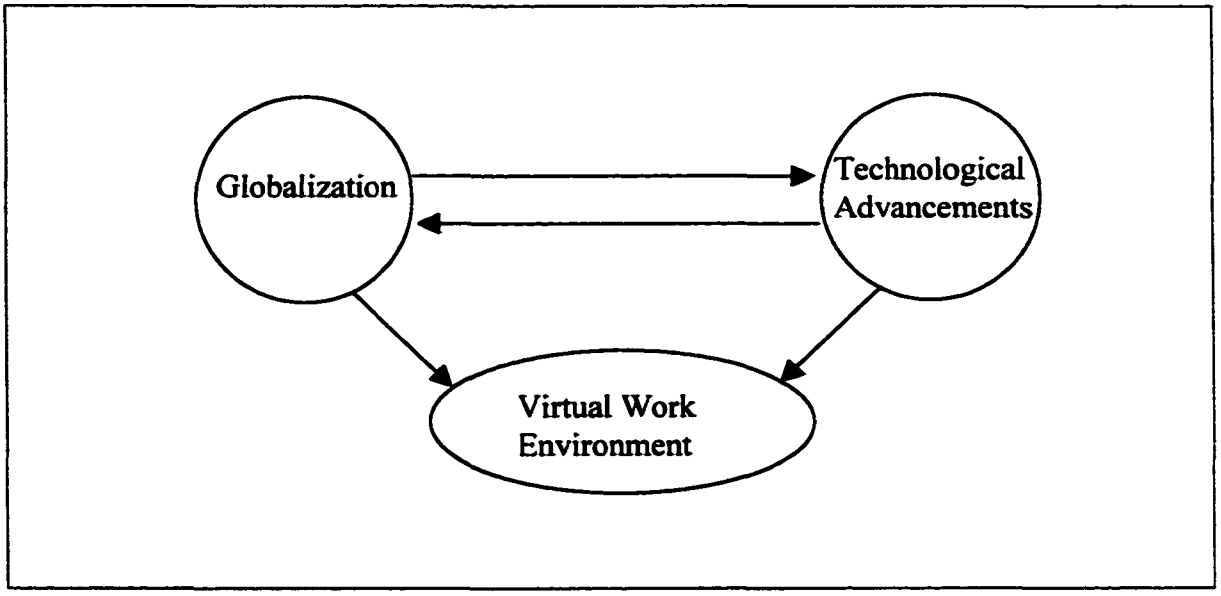


Figure 2. Globalization and Technology as Contributing Drivers to Virtual Work.

Globalization

The term globalization is interpreted differently depending on whether the perspective is sociological, political, economic, or business related. French (2000: 4) notes that globalization "means vastly different things to different people. To some globalization is synonymous with the growth of global corporations whose far-flung operations transcend national borders and allegiances. To others, it signals a broader cultural and social integration, spurred by mass communications and the internet." Her definition of globalization encompasses all of the above as well as growth in trade, investment, travel, computer networking, and transboundary pollution.

Historical Perspective

To understand the phenomenon of globalization, a historical perspective of globalization is needed. This is because globalization is not a new phenomenon (Gray, 1998; Friedman, 2000). Rather, it has assumed different facets, depending on which historical

period is under review. According to Gray (1998: 215), globalization is a historical process that has been under way for centuries, with the ephemeral political project of a worldwide free market."

Trade in the sixteenth, seventeenth, and eighteenth centuries was dominated by the mercantilism and colonization (Mourdoukoutas, 1999). There were no trade barriers and international trade flourished. During the Industrial Revolution, many organizations were formed that operated on a national level. By the end of the First World War, however, most colonies had become independent. Globalization during this period actually took a downturn because as colonies became independent, they started imposing trade barriers due to nationalistic sentiments and to protect their local industries from competition.

The Second World War also had a dampening effect on the process of globalization. After the Second World War, negotiations and discussions on the new post-war economic order led to developments that started the process of globalization again. These developments were seen in the founding of international institutions such as the International Monetary Fund (IMF), the International Bank for Reconstruction and development (World Bank), and a few years later, the General Agreement on Tariffs and Trade (GATT). This laid the foundation of a borderless world market, and led to the formation of a large number of multinational corporations (MNCs).

In the 1970s, to encourage trade, several trading nations reduced their tariff levels to the point where it facilitated trade. Thus the seventies and eighties saw the formation of a large number of MNCs in Europe, Japan, and many new industrialized nations. With concurrent developments such as the weakening of communism, the spread of information technologies, and the creation and expansion of organizations such as the World Trade Organization (WTO), European Union (EU), and North American Free Trade Agreement (NAFTA), the world began to witness rapid globalization (Mourdoukoutas, 1999).

Governments from the 1980s, started liberalizing their economies, and welcoming foreign investments. This stimulated a significant amount of cross border flows of finance, technology and people across the world. Today, globalization has resulted in the opening up of economic linkages between poor and rich nations, and both have benefited in terms of economic development and advancement. There is greater mobility of finance as well as greater mobility of labor. (Buckley & Casson, 2001)

Global Organizations

From the business point of view, academic scholars have focused primarily on MNCs in terms of understanding and studying corporate implications of globalization (Eden & Lenway, 2001). MNCs have facilitated globalization due to their need to find new markets and new sources of labor. Researchers in international business and strategy, in trying to fine-tune distinctions among global corporations devised various typologies and distinctions.

Bartlett and Ghoshal (1989) for instance, distinguish between the multinational company, the global company, the international company and the transnational company. A multinational company is seen as a decentralized federation of local companies linked by controls, with local companies often being run by expatriates from the home country. A global company is one that seeks to obtain economies of scale by producing a standard product for all markets and using its overseas branches purely as a distribution network. An international company is one in which central knowledge and expertise is transferred to local environments. Finally, a transnational company is one in which knowledge and control is distributed. Thus R&D and production, for example will be placed where it makes most sense to place it. Thus, according to Bartlett and Ghoshal (1989), the distinction between the types of international corporations is primarily based on locus of knowledge and skill. The multinational sends its own people to run local firms, the global company retains knowledge at headquarters, and does not distribute knowledge, the international company distributes

knowledge selectively that it thinks the local environment can handle, while the transnational company is a worldwide web of knowledge.

Implications

With increasing global internet based e-business models however, globalization takes on a different meaning altogether. The global reach of the internet is opening up opportunities for all kinds of organizations all over the world. This is enabling the formation of new types of network organization models that are far more dynamic, complex, and information intensive than traditional bureaucracies. Dispersion of organizations across the globe necessitates the creation of distributed work structures and virtual work arrangements due to business demands (Mohrman, 1999). Although globalization creates the need, a large part of this is made possible by the technological advancements in communication technology and the ever-advancing capabilities of the internet. The role of technology is discussed below.

Technology

Figure 1 in chapter 1 referred to technology as having a significant impact on the workplace. Technology has, in fact, always played a major role in organizations: this role has however shifted in the recent past. In the industrial and traditional organizations, the role of technology was primarily to automate physical work done in factories. In the network organizations of today, the role of technology is to be a resource to knowledge workers to enable them to do their work anytime, anyplace, with any group of workers.

Technological Developments

The growth of technology from birth to maturity has significant implications on diffusion and adoption of products. Kendall (1999) notes that there are five phases in the life cycle of technology: technological invention, technological emergence, technological

acceptance, technological sublime, and technological surplus. In the invention stage, technologies are in the process of development. In the emergence phase, the technologies come forth from obscurity and are already being used by early adopters, but are considered emerging because they have not yet been employed to the fullest extent. The acceptance stage implies solid establishment of the technology in the market, while technological sublime is the stage where there is complete and full appreciation of the technology.

Understanding developments in emerging information technologies is critical to understanding projections about changes in the workplace. In an attempt to classify emerging information technologies Kendall (1999) categorized them into groups. These are: decision-supporting technologies, co-operation-supporting technologies and infrastructure-enabling technologies. Decision-supporting technologies aim at directly helping individuals, organizations, and teams to accomplish tasks more efficiently, and make effective decisions. Examples of decision-support technologies include graphical user interfaces (GUI), speech recognition, and hypertext. GUI refers to a program interface that takes advantage of the computer's graphics capabilities to make programs easier to use. Speech recognition deals with designing systems that can recognize spoken words. Finally, hypertext, is a special type of database system in which objects can be linked to each other. Co-operation-based technologies help in better managerial planning and decision-making by improving interactions of multiple agents in a task. This would include group support systems, executive support systems, e-mail and video conferencing. Finally infrastructure-enabling technologies include those that improve the broad environment in which decision-supporting and co-operation-enabling technologies are put into practice. These include help functions (e.g., hypertext help systems); ways to conduct business (e-commerce), and seeking and storing information (search engines).

Impact of Technology on Business

Hitt, Ireland, and Hoskisson (2001) outline three trends through which technology is changing the nature of business competition: the first is the increasing rate of technological change, the second is the information age, and the third is the increasing knowledge intensity. This is discussed below.

The pace of change of technology is seen in much shorter product cycles, and perpetual innovation, namely the speed with which new technologies replace older ones. Often, by the time a product is on the market, the technology used to produce it is already outdated. There is also greater miniaturization of products e.g., cameras, microphones, display screens. There is greater and expanded processing power through the new microchip development and advanced software use portability (Marquardt, 1999). In the software development area, "round the clock development," or taking advantage of the differences in time zones to hand off work between different work locations, in order to reduce cycle time is increasing.

The second factor, particularly relevant to the study of virtual work is the rapid advancements in the communication technologies such as Personal Computers (PC), cellular phones, fax, personalized digitized assistants (PDAs), e-mail, and artificial intelligence technologies. Electronic commerce (E-commerce), business-to-business (B2B) and the resulting building of electronic networks linking organizations to their customers, suppliers, and employees is expanding rapidly, leading to a culture where most transactions between these players will be electronic. There is better telecommunications through developments such as ISDN, DSL, Broadband, and fiber optics.

The third factor, increasing knowledge intensity pertains to the increasing importance of knowledge as a critical resource. This has occurred as a result of an information revolution that is sweeping through the economy. The critical difference between

information and knowledge is that information becomes knowledge when it is analyzed and linked to, and compared with what is already known (Allee, 1997). Dissemination and dispersion of information throughout the organization significantly impacts decision making by making it possible for decisions to be made across a greater number of hierarchical levels (Huber, 1990)

Whether we are dealing with our coworkers or with outside customers and suppliers, our interaction patterns, and way we do business has altered dramatically in the last few years due to technology. Regarding the impact on relationships among organizational stakeholders, DeMarie and Hitt (2000) note that there are five such relationships in organizations among various stakeholders: Employee-to-Employee relationships, Organization-to-Employee relationships, Organization-to-Supplier relationships, Organization-to-Customer relationships, and Organization-to-Outside-Organization relationships. The first two relate directly to this dissertation. Information technology (IT) has significantly altered Employee-to-Employee relationships by the increasing use of virtual teams. Greater sophistication and speed in the electronic infrastructure and the increasing use of online communication systems makes it possible for employees to interact and collaborate on complex projects without meeting face to face. While virtual teams are primarily concentrated in the software sector, it is only a matter of time when it spreads to other parts of the organization. IT has also altered Organization to Employee relationships by the increasing use of telecommuting and contingency workers. Again, telecommuting or working from home, has been adopted more by hi tech organizations that are more willing to experiment with new work arrangements. For the organization, telework can significantly reduce real estate costs, expand the pool of available applicants, and increase productivity. For the individual, it makes it possible to have greater schedule flexibility as well as reduction of commute time.

In addition to the forces of globalization and technology, there have also been some micro level drivers of virtual work in organizations. The following discussion focuses on the other political, economic, and social drivers of remote work from the perspective of the organization, the individual, and society.

Organizational Imperatives of Virtual Work

From a societal perspective, telecommuting as an alternative work arrangement was encouraged by the Clean Air Act, a legislation requiring companies to reduce the number of vehicles commuting to work. The incentive for this, particularly in southern California was the reduction of pollution by lowering traffic emissions and traffic congestion. The Americans with Disabilities Act (ADA) also encourages telecommuting since allowing disabled employees to work from home helps comply with provisions of the ADA.

In addition to societal and environmental considerations, there are organizational reasons for encouraging virtual work. First, elimination or reduction of offices helps reduce real estate costs (Huws, Korte, & Robinson, 1990; Van Sells & Jacobs, 1994). Egan (1997) reports annual savings of $75 million by IBM in real estate expenses on account of reduction of office space. Second, organizations also obtain cost savings by the creation of offshore satellite work centers in places where labor is cheap (Connolly, 1988). Third, flexibility with work options makes it possible for organizations to hire, attract, and retain talent (Huws, et al., 1990; Olson and Primps, 1984). It enables access to a much wider talent pool (Kurland & Egan, 1999). Fourth, dispersing the workforce from the office often enables employees to be more effective in their boundary-spanning role by developing stronger relationships with customers (Huws, et al., 1990). This is positive from the point of view of the organization and an important factor for the increasing use of mobile work in sales.

Types of Virtual Work

Employees may be physically distanced from their managers via various types of work arrangements (Belanger & Collins, 1998). These authors define distributed work arrangements as involving working from home, at least some of the time. Another term, "telework" is often used to encompass the different types of virtual work, although varying definitions of the term exist among both researchers and practitioners. Kurland and Bailey (1999) classify four different types of telework: home-based telecommuting, satellite offices, neighborhood work centers and mobile working. *Home-based telecommuting* refers to employees who work from home on a fairly regular basis. *Satellite offices* refer to a branch office designed to reduce the commute of a group of employees. While satellite offices are exclusively for the use of employees of one company, *neighborhood work centers* are used by a group of companies. *Mobile workers* refer to those who work from anywhere: their cars, on the road, hotels, client sites and so on. IBM Global Services for instance has between 6,000 and 10,000 mobile workers in the U.K. at any one point in time. that provide product support and support for client infrastructure (Wellins, 1999). Several consulting companies such as Ernst & Young and Accenture, increasingly have non-territorial offices and employees equipped with mobile phones, laptops, access to networks, synchronous web-based collaborative tools and so on (Illingworth, 1994). In a national survey conducted by International Telework Association and Council comprising 1,170 telephone interviews researchers, Davis and Polonko (2001) found find that there are approximately 28 million Americans who are teleworkers that work at home, at a telework center or satellite office, work on the road, or some combination of these. Their estimate of the number of teleworkers in the U.S. is higher than previous estimates because they defined telework more broadly by including those who work at satellite offices and those who work on the road. Types of technology commonly used by virtual employees include e-mail,

conference calls, web and video conferencing. High speed digital subscriber lines (DSL) and the increasing use of personal digital assistants (PDAs) make it possible to make physical distance irrelevant as vast amounts of information can be made available anytime, anyplace.

Conceptualization of Virtual Work

The original idea of the virtual corporation was popularized by the book "The Virtual Corporation" by Davidow and Malone (1992). From a review of the academic literature, it appears that virtual work has been defined and conceptualized on three levels: organizational level, group or team level, and individual level.

Organizational Level

At the organizational level, virtual organizations are described as a network of independent partners that are temporarily created to capture the value of a market opportunity (Katzy, 1998). Kraut, Steinfeld, Chan, Butler, and Hoag (1999) in their analysis of virtual organizations note that there are four features defining virtual organizations: first production processes transcend the boundaries of a single firm; second, production processes are flexible with different parties involved at different times; third, the parties are often geographically dispersed; and fourth, coordination is heavily dependent on telecommunications and data networks. DeSanctis and Monge (1999: 694) note that "the components (individual workers, teams, departments, units or firm) that make up a virtual organizaton are geographically distributed, functionally or culturally diverse, electronically linked, and connected via lateral relationships." Virtual enterprises, according to Bleecker (1994) are defined not by physical space, but by collaborative networks using sophisticated computer and communication technology.

Group Level

At the group level, virtual work is conceptualized in the form of teams of individuals that are geographically dispersed, yet are working on a common project. Often, such teams have a temporal nature, and exist for the duration of the project. Once the project is completed, the group is disbanded and other groups are created based on new assignments. Townsend, DeMarie, and Hendrikson (1998: 17) define a virtual team as "composed of coworkers geographically and organizationally linked through telecommunications and information technologies attempting to achieve an organizational link." A stream of literature exists on virtual teams, that has examined interaction and communication patterns, development of trust in teams whose members are located in different countries and continents, have different cultural backgrounds, and work in different time zones (e.g., Jarvenpaa, Knoll, & Leidner, 1998; Kayworth & Leidner, 2000; Lipnack & Stamps, 1997; Townsend, et al., 1998)

Individual Level

A more generic definition offered by Crandall and Wallace (1998) refers to a virtual workplace as a group of people engaged in work, not bound by physical space, traditional limitations of time, or job descriptions. Following on those lines, for the purpose of this study, virtual work is conceptualized, measured and examined at the individual level of analysis. Remote managing occurs when managers are physically separated from their direct reports, namely they are not collocated and thus manage employees remotely (Kurland & Egan, 1999; Staples, et al., 1999). In trying to define virtuality at the individual level, two key dimensions emerge: geographic dispersion of the manager and employee and the frequent use of information and communication technologies (Niederman & Biese, 1999; Staples, et al., 1999). Jobs that involve geographic dispersion of the manager from the employee and high usage of electronic communication are considered more virtual than

others. Typical jobs with high virtuality include those of telecommuters, mobile workers, and high frequency business travelers.

Scope and Contributions of the Study

Within the management arena, research in the field of virtual work is relatively new. Most of the literature to date has been from information systems specialists interested in the role of technology on work effectiveness. Some recent research exists in the management arena, but it is fragmented and still in its infancy. This dissertation also draws from the academic and practitioner research on telecommuting, a form of home-based virtual work that has been studied since the late 1970s.

This study makes the assumption that all jobs have varying levels of virtuality, and attempts to fill a void in a relatively new area of research. Taking virtuality and leadership as the starting point for understanding individual and organizational processes, this dissertation examines the processes by which employee motivation, satisfaction, and performance are impacted. It does not attempt to understand the factors that may impact virtuality in the workplace. Instead, it takes virtuality and leadership as independent variables and examines the impact of these in the workplace.

The first set of relationships that stems from virtuality is based on the argument originally proposed by Pearlson and Saunders (2001) that virtuality simultaneously enhances flexibility and structure. This proposition is tested by examining the impact of virtuality on flexibility, as measured by autonomy in the job, and by examining the impact of virtuality on structure, as measured by a newly constructed variable called outcome orientation. These are in turn hypothesized to eventually impact performance through affecting other variables. The second set of relationships tested in my model, stem from the construct of leadership for innovation. Leadership is an extremely well researched area in study. Although the relationship between the independent variables of virtuality and leadership is not examined,

the rationale for studying them together lies in my belief of the importance of leadership in virtual work settings. Specific hypotheses are examined with respect to the impact of leadership on work life balance, organizational identification, and motivation. The ultimate goal is to assess the impact of these variables on employee performance.

The following are the specific contributions of the study:

1. First, this study attempts to understand the impact of virtuality in the workplace by assessing it at the individual level of analysis. In prior research virtuality has been conceptualized as a dichotomous variable. This dissertation conceptualizes virtuality on a continuum.
2. Second, the study tests an inherent paradox of remote work, namely, that virtuality simultaneously enhances autonomy as well as structure. This has not been done in past research. These in turn are hypothesized to have an effect on motivation, job satisfaction, work life balance, and performance.
3. Third, this study examines the impact of leadership for innovation on the organizational processes of organizational identification, motivation, work life balance, and job satisfaction.
4. Finally, this study introduces a new construct, that of post-layoff workload assessment, and examines its impact on organizational identification, job satisfaction and performance.

CHAPTER 3

PROPOSED MODEL AND HYPOTHESES

This chapter contains three main sections that describe the specific variables used in the study, the manner in which they are related, and how they are proposed to be tested. The first section identifies and explains each of the variables used in the study. In the second section, each of the variables in the study is positioned within the overall framework of a conceptual model, which elaborates on the relationships being tested. There are fourteen relationships or hypotheses being tested in this study. The theoretical rationale for each of these hypotheses is developed in the third section of the chapter, which contains arguments in support of the proposed relationships.

Construct Definitions

In examining the area of virtual work, the following constructs were deemed important for the phenomenon under study: virtuality, autonomy, outcome orientation, leadership. post-layoff workload assessment, motivation, work life balance, organizational identification, job satisfaction and job performance. Below, I define each of the variables under consideration.

Virtuality

Virtuality is defined as the degree of geographic dispersion of an employee from their manager and the use of information and communication technologies to get work done. Earlier researchers have defined virtuality as a dichotomous categorical variable based on geographic proximity of the employee from the manager (e.g., Staples, 2001b). This study aims at measuring virtuality as a continuous variable with two dimensions: geographic dispersion and the use of information and communication technology (ICT).

Autonomy

Autonomy is defined as the control or latitude an employee has over their work situation. Hackman and Oldham (1975) define job autonomy as the "degree to which the job provides substantial freedom, independence, and discretion in scheduling the work and in determining the procedures to be used in carrying it out" (1975: 13).

Outcome Orientation

Enhanced structure in a virtual relationship is conceptualized as outcome orientation. This is defined as the degree to which quantitative and measurable records of output are used in assessing performance. This construct is very similar to the construct outcome-based evaluations proposed by Kurland and Egan (1999) who defined it as the extent to which records of output rather than supervisors' observations form the basis for evaluations. For the purpose of this study, outcome orientation includes not just outcome specificity, but also an element of participation in goal setting.

Leadership for Innovation

The construct of leadership for innovation is meant to define the innovation piece of the transformational leadership dimension. Transformational leadership is defined as a form of leadership that occurs when leaders "broaden and elevate the interests of their employees, when they generate awareness and acceptance of the purposes and the mission of the group and when they stir their employees to look beyond their own self-interest for the good of the group" (Bass, 1990: 2). According to Bass, it comprises of four dimensions: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (Bass, 1985). Idealized influence occurs when leaders engender the trust and respect of their followers by doing the right thing rather than ensuring they do things right. Leaders who engage in inspirational motivation encourage their employees to achieve levels of

performance beyond their own expectations. Leaders who engage in intellectual stimulation help employees to challenge their assumptions and to think about old problems in new ways. Finally, individualized consideration deals with treating employees as individuals, by being compassionate and responding to their needs. For the purpose of this study, two of the dimensions reported by Bycio, Hackett, and Allen (1995) were used. These included individualized consideration and intellectual stimulation. These were re-named as leadership for innovation.

Post-Layoff Workload Assessment

This is defined as the degree to which an individual's workload has changed in a post layoff situation. This construct was deemed appropriate for inclusion in the model since the organization surveyed had started downsizing of employees from about a year from the time that the survey was administered. In the layoff literature, a construct similar to workload assessment was examined by Brockner, Grover, Reed, and Dewitt (1992). However it was conceptually different as it assessed the work effort put forth by individuals in a post-layoff situation. It captured work effort as a dependent variable with the assumption that individual effort was volitional. The present construct of post-layoff workload assessment captures the *difference* in workload to the individual as a result of the same amount of work now being performed by a fewer number of individuals.

Motivation

There are two main types of motivation: extrinsic and intrinsic (Vallerand, 1997). Extrinsic motivation relates to the drive to perform a behavior to achieve specific goals/rewards (Deci & Ryan, 1987). It is caused by a drive that is external to the work itself, such as rewards and recognition. The concept of intrinsic motivation is seen in many of the major theories of work motivation such as Maslow's (1943) self actualization, Alderfer's (1972) growth needs, McGregor's (1960) theory, and McClelland's (1961) achievement

motivation theory. Each of these emphasizes the importance of an internal desire to succeed at challenging tasks and to seek responsibility. According to Deci (1972), a person is intrinsically motivated if they perform an activity for no apparent reward except the activity itself. Intrinsic motivation for the purpose of this study is defined as the drive to engage in work primarily for its own sake, because the work itself is engaging, satisfying, and engaging (Amabile, Hill, Hennessey, & Tighe, 1994; Vallerand, 1997).

There is a widely held view that intrinsic and extrinsic motivation are not just separate processes but that they are incompatible and even antagonistic in their relationship (Deci, 1972). The focus on tangible rewards and payoffs is hypothesized by many to take away from the intrinsic pleasure of doing the task. Research among school students has demonstrated that excessive reliance on extrinsic motivators such as grades and gold stars can be a threat to the personal engagement that students may have in an area of learning (Kohn, 1993). Another view, propagated by Covington and Müeller (2001) is that there may be conditions where both intrinsic and extrinsic motives may coexist.

Organizational Identification

This is defined as a form of social identification which defines the strength of an individual's psychological link to the organization (Ashforth & Mael, 1989; Dutton, Dukerich, & Harquail, 1994; Mael & Ashforth, 1992). It concerns the perception of "oneness" with an organization (Ashforth & Mael, 1989). Smidts, Pruyn, and Van Riel (2001) note that the construct of organizational identification has its roots in social identity theory (Tajfel, 1978). It indicates the extent to which employees see themselves as belonging to the group and as being a typical member of it. Mael and Tetrick (1992) in their study of 263 employed persons demonstrated that organizational identification is conceptually as well as empirically distinct from the related concept of organizational commitment. Whereas organizational commitment refers to belief and acceptance of an

organization's goals and values, organizational identification refers to psychological attachment to an organization or work group.

Work Life Balance

Work Life Balance is defined as the level of equilibrium between the job and family dimensions. It is important to make a distinction between work family balance and work family conflict. Work family conflict results from work demands interfering with the family and from family demands interfering with work (Gutek, Searle, & Klepa, 1991). While the two constructs conceptually measure different things, they are strongly related: those with low work family conflict will tend to have greater work life balance and vice versa. For the purpose of this study, a more generic view was deemed more appropriate. Hence the selection of work family balance over work family conflict as the construct of interest.

Job Satisfaction

Job Satisfaction, defined as one's overall level of contentedness with the job is one of the most studied constructs in organizational research. The earliest attempts to study job satisfaction date back to the 1930s (Roethlisberger & Dickson, 1939), and interest in this construct continues until today. Job satisfaction is studied today as both an outcome and a predictor variable. As a dependent variable, job satisfaction has been shown to be influenced by variables such as experience, education, and performance (e.g., Hulin, Roznowski, & Hachiya, 1985). In recent years, the focus has been to study the impact of job satisfaction on other variables such as turnover intentions (Carsten & Spector, 1987). Job satisfaction has also been associated with other organizational outcomes. Kirkman and Shapiro (2001) note that employees with higher job satisfaction display lower absenteeism (Hackett & Guion, 1985), are more likely to display organizational citizenship behavior (Organ & Konovsky, 1989) and to be overall more satisfied with their lives (Judge & Watanabe, 1993).

Employee Performance

Organizations seek to maximize the performance of their employees in order to achieve high levels of productivity, efficiency and effectiveness. In the academic field of organizational behavior and human resource management, job performance is the most extensively studied criterion variable according to Bommer, Johnson, Rich, Podsakoff, and MacKenzie (1995). Employee performance is defined as attainment or achievement of work objectives. Of the several measures used in research to assess job performance, the most commonly used are performance ratings. Typically performance ratings are obtained from supervisors, peers, subordinates, self, or customers. The most commonly used sources are supervisory ratings, followed by peer ratings (Visweswaran, Ones, & Schmidt, 1996).

Model Development

The model in figure 3 describes the relationships studied. As noted earlier, on the extreme left side of the model are the exogenous constructs of virtuality, leadership for innovation, and post-layoff workload assessment. On the extreme right side of the model is the construct of employee performance. In between are the organizational processes that virtuality and leadership impact and that eventually have an effect on performance. The virtuality to performance leap is a large one and without an understanding of some of the individual level variables in the equation, it is extremely difficult not just for researchers to find relationships, but also for practitioners to be able to use this information for generating improvements in such a new work paradigm.

The model thus investigates the "black box" of intermediate variables in the relationship between virtuality, leadership for innovation, and performance that few have tried to capture. The model can be conceptualized as consisting of three parts, depending on the independent variable from which it stems. The first piece that stems from virtuality proposes that virtuality impacts the variables of autonomy and outcome orientation that in

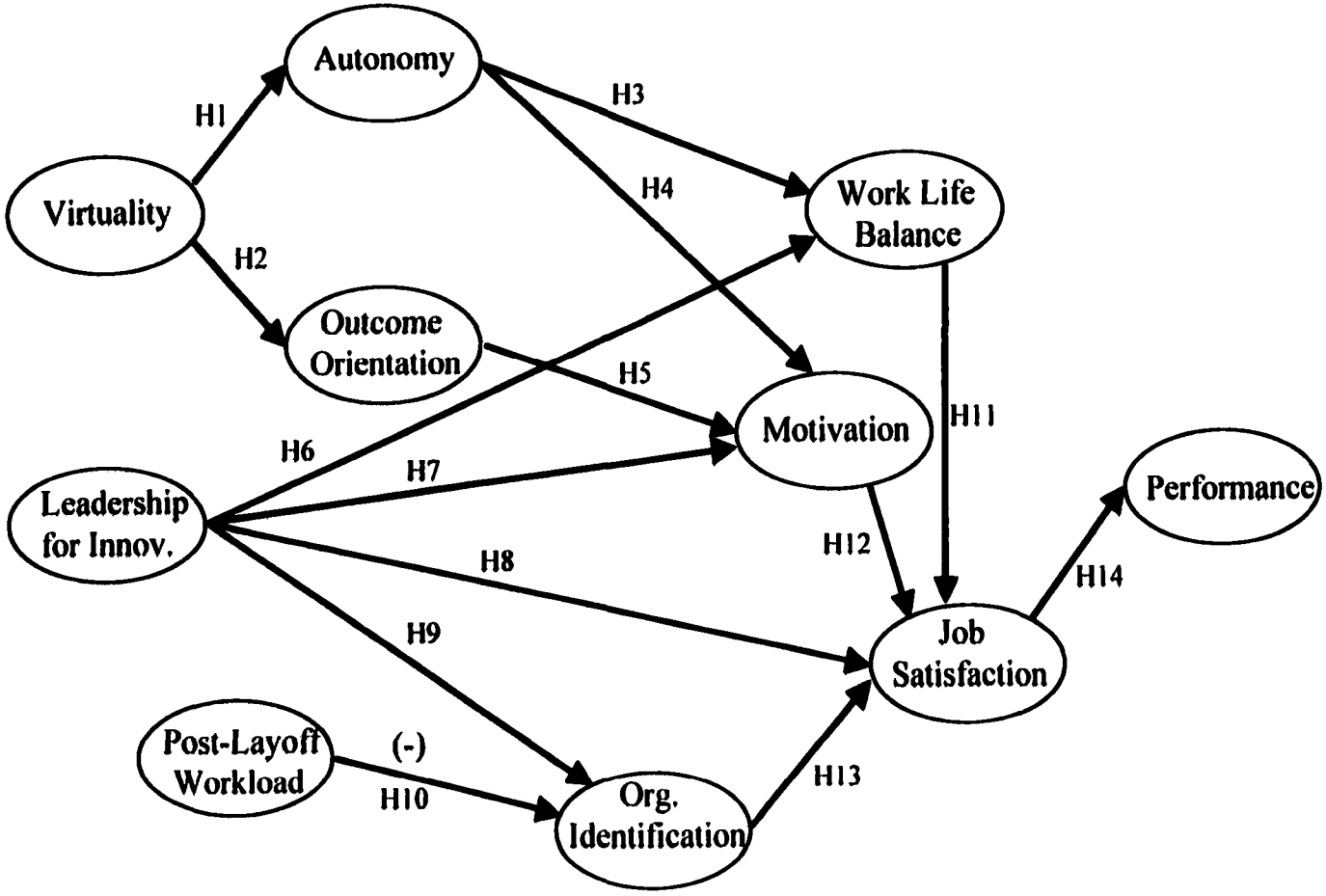


Figure 3. Workplace Virtuality Model.

turn impact employee satisfaction and performance by affecting motivation and work life balance. The second piece assesses the impact of leadership for innovation on work life balance, organizational identification, motivation, and their impact on employee satisfaction and performance. Finally, as this organization had undergone a major layoff about a year prior to the data collection, the third piece of the model explores the impact of post-layoff workload on organizational identification, and through that, to employee satisfaction and performance.

It must be noted that a large piece of the model being tested is in the realm of exploratory research. Most of the literature on virtual work is exceedingly sparse. However, where possible, existing theory is used to develop the specific hypotheses. In the section that follows, I develop the rationale for each of the hypotheses being tested in this study.

Hypotheses Development

In the following pages the theoretical rationale for each of the fourteen hypotheses postulated in this study are explained. Using viewpoints from existing research, arguments are developed for the hypothesized relationships being tested. Of the fourteen hypotheses, thirteen posit a positive relationship between the variables. Hypothesis 10 theorizes a negative relationship.

Hypothesis 1: Virtuality is positively related to Autonomy

Virtuality, demonstrated by increased distance between a manager and employee and increased electronic as opposed to face-to-face interaction, is hypothesized to enhance employee autonomy because the manager is unable to observe the day-to-day actions of employees. From the telecommuting literature there is some evidence that shows that remote work fosters individual autonomy (Olson, 1983). In fact, flexibility and autonomy have been argued to be the main drivers for telecommuters to choose that work arrangement (Humble, Jacobs, & Van Sell, 1995; Huws, Podro, Gunnarson, Weijers, Arvanitaki, & Trova, 1996;

Kraut, 1989). However, there is little research that has empirically investigated this relationship. Hill et al. (1998) in their study of 249 office teleworkers and traditional office workers at IBM, did find telework to significantly impact flexibility in timing and location of work. In their study they found that there was both increased work flexibility (e.g., being able to work at peak personal times such as early in the morning) and increased personal flexibility (e.g., being able to take care of a sick child when needed). Both their qualitative and quantitative analysis led to the same conclusion on flexibility. In fact they also found flexibility to have a positive impact on productivity.

In virtual jobs, distance from the manager and the use of electronic communication is hypothesized to enhance autonomy because the employee has far more freedom and much greater latitude in scheduling his/her work as well as in determining what methods or procedures to use. Thus the more virtual a job the higher will be the degree of autonomy available to the individual.

Hypothesis 2: Virtuality is positively related to Outcome Orientation

Practitioners and academicians in the field of virtual work have, in the past, recommended the assessment of individuals on the basis of measurable targets when it is not possible to observe the employee. In elaborating on the control systems paradox of managing off-site workers, Metzger & Von Glinow (1988: 106) propose that "the more the employee has a set of valued professional skills, typically, the more independent and resistant to controls these professionals become. With fewer 'means' controls in a geographically diffuse workplace, the more 'ends' controls will be required at the point of output." In the absence of physical observation, then, managers with employees who are located in different offices, tend to assess the jobs of such employees more in terms of the outputs or targets (Baruch & Nicholson, 1997; Caldwell & Koch, 2000; Illingworth, 1994; Metzger & Von Glinow, 1988). Thus, the absence of physical observation leads managers to

be more scientific in their evaluation, thus impacting performance positively. Physical proximity on the contrary may cloud judgments about the performance of employees, because it may give managers the impression that an employee is being productive which may not necessarily be the case.

The only study that examined a construct similar to outcome orientation in a similar context is by Kurland and Egan (1999) who did an empirical study of telecommuters to test the moderating effect of outcome-based evaluations on the relationship between telecommuting and justice. They defined outcome-based evaluations as the extent to which records of output rather than supervisor's observations of behavior form the basis for evaluations. They did not find a moderating effect and concluded that one of the reasons for that might be that their study was limited to telecommuters. In this study, the relationship between virtuality and outcome orientation is examined for all employees.

Hypothesis 3: Autonomy is positively associated with Work Life Balance

Greater autonomy affords employees the opportunity to manage their time and work schedules such that there is greater balance in their lives. The work family literature argues that flexibility enables employees to structure their jobs such that it reduces the occurrence of work family conflict (Greenhaus & Parasuraman, 1986) by increasing perceived control (Parasuraman & Alutto, 1981, 1984). In the telecommuting literature, the flexibility model also argues that the increased flexibility and autonomy due to telework can facilitate the scheduling and management of work and family (Huws, et al, 1996; Olson & Primps, 1984). In a longitudinal study of telecommuters, Duxbury, Higgins, and Neufeld (1998) in their research of telecommuters argue that telecommuting helps employees balance their work and family demands better. The reasons for this improved work life balance come from several factors such as increased flexibility and greater control over work scheduling.

Past literature on telework has focused on two alternative models relating to work family issues: the flexibility model and the exploitation model. The flexibility model is based on the logic that telework makes it feasible to balance work and family life, especially for women (Huws et al., 1996). It focuses on the fact that those who perhaps could not be a part of the conventional workforce, can now participate and hold valued jobs. The exploitative argument on the contrary maintains that telework perpetuates exploitation of women (Haddon & Silverstone, 1993; Mirchandani, 1999) since it isolates women from the organization and makes them subject to additional burdens. Sullivan and Lewis (2001) on the basis of a qualitative study that involved 28 in-depth interviews of home-based teleworkers and their co-residents in the U.K. found that these two models are not mutually exclusive, and that being virtual can enhance work life balance while perpetuating traditional work and family roles. Thus my hypotheses is designed to test the strength of the relationship between autonomy provided due to virtuality, and work life balance.

Hypothesis 4: Autonomy is positively associated with greater Motivation

The relationship between autonomy and motivation goes back to research done by Hackman and Oldham (1980) who found autonomy to be one of the five important factors that impacts motivation on the job by making it more meaningful, making the employee feel more responsible, and by ensuring that the employee has knowledge about the progress of work. Researchers have found that enhanced autonomy and flexibility in a job impacts motivation (Richer & Vallerand, 1995). Amabile et al. (1994) also found a connection between autonomy and intrinsic motivation such that the higher the autonomy, the greater the motivation. Providing a high level of autonomy leads to a high level of intrinsic motivation because it enhances the experienced meaningfulness of work (Ilgen & Hollenbeck, 1991). This is also consistent with the literature on psychological empowerment at work (Conger & Kanungo, 1988; Spreitzer, 1995; Thomas & Velthouse, 1990).

Hypothesis 5: Outcome Orientation is positively associated with greater Motivation

The relationship between outcome orientation and motivation can be explained using Hackman and Oldham's (1980) job characteristics model and goal setting theory of motivation (Locke, 1966; Locke, 1967). Outcome orientation refers to the use of performance standards by managers. With regard to performance standards, Bobko and Colella (1994) note that one of the most neglected areas in research is employee reaction to organizational performance standards: especially with respect to motivation and job satisfaction. They note five areas of research that have implications for the study of performance standards: goal setting, feedback, performance expectations, job, and utility analysis. Based on those they argue that defining standards in terms of outcomes is beneficial for organizations and will have a positive impact on employee motivation and performance. They did not however empirically test their propositions. For this study it is proposed that in a virtual setting, as outcome orientation increases, there is greater reliance on output controls and decreased reliance on physical observation. This leads to greater awareness in the mind of the employee of the specificity of the goals that are to be achieved. Using expectancy theory (Vroom, 1964) we can argue that greater outcome orientation increase motivation due to greater instrumentality, namely, the belief that performance is related to rewards. Hence the hypothesized positive relationship between outcome orientation and motivation.

Hypothesis 6: Leadership for Innovation is positively associated with Work Life Balance

Most research in leadership has examined the impact of leadership on motivation and performance of the followers. Few studies have explicitly examined the impact of leadership on work life balance. Cohen and Lei (1997) examined the impact of self-management leadership styles on quality of work life. However, their measure of quality of work life was a composite of satisfaction and commitment measures, as compared to work life balance,

which is the focus of this study. The type of transformational leadership in this study focuses on individualized consideration and intellectual stimulation. Individualized consideration refers to that aspect of leadership that focuses on being sensitivity to the needs of individual employees. Hence logically, it should follow that leadership that is sensitive to the needs of individual employees will tend to have a positive impact on work life balance.

Hypothesis 7: Leadership for Innovation is positively associated with Motivation

Nelson and Quick (1998) note that the leadership process involves primarily setting direction, aligning, and motivating people to action. Transformational leaders, in addition inspire followers to greater levels of achievement. The initial ideas on transformational leadership, developed by Burns (1978) were refined and adapted to the organizational context by Bass (1985). Past research on transformational leadership has demonstrated impact of transformational leadership on subordinates' motivation and satisfaction (House & Shamir, 1993; Hater & Bass, 1988). Transformational leadership has been shown to be correlated with performance and motivation of subordinates (Howell & Avolio, 1993). In a sample of university athletes, Charbonneau, Barling, and Kelloway (2000) noted that athletes' intrinsic motivation mediated the relationship between coaches' transformational leadership and athletic performance. A group-level analysis among army commanders by Masi and Cooke (2000) also found a significant relationship between the transformational leadership style and motivation. Although the focus of leadership for innovation is slightly different than that for transformational leadership, given the non-inclusion of the charisma element, it is believed that the nurturing and innovative aspect of leadership will have a positive impact on motivation.

Hypothesis 8: Leadership for Innovation is positively associated with Job Satisfaction

Previous studies have examined the relationship between leader behavior and job satisfaction. Among recent studies, one done by Pool (1997) involving 125 employees, it

was found that consideration leadership behavior has a positive relationship with job satisfaction. This is consistent with an earlier study by Holdnak, Harsh, and Busharadt (1993). Yousef (2000) also found that those who perceive their leaders as having a participative style of leadership are more satisfied with their jobs. Earlier studies have also pointed to similar evidence of a positive relationship between leadership behaviors and job satisfaction (e.g., House & Filley, 1971; Petty & Bruning, 1980; Savery, 1994), although some other studies have reported finding non-significant and contrary results (e.g., Bartolo, & Furlonger, 2000; O'Reilly & Roberts, 1978). In line with past research, a positive relationship is hypothesized between leadership for innovation and job satisfaction.

Hypothesis 9: Leadership for Innovation is positively associated with Organizational Identification

Wan-Huggins, Roirdan, and Griffeth (1998) examined antecedents and outcomes of organizational identification in a sample of employees from an electric utility company. They proposed and tested three different antecedents of organizational identification: external image of the company, motivating job characteristics, and role-related characteristics and their effect on intent to remain with the company. They found external image and role-related characteristics led to increase in organizational identification over time. In their study, however, they did not explicitly examine the role of leadership in the development of organizational identification.

One of the important predictors of organizational identification is the extent of contact with the organization. Within that context, extent and quality of interaction with the immediate manager or leader is crucial in affecting organizational identification. For instance, Weisenfeld et al. (2001) found social support critical to the development of organizational identification. Their measure of work based social support involved measuring support from peers, manager, and senior management. For the purpose of this

study, it is argued that the immediate manager can play an important role in creating social identity in the work organization. Hence in this study, it is suggested that the greater the level of leadership for innovation, the stronger will be the sense of identification with the organization.

Hypothesis 10: Post-Layoff Workload Assessment is negatively associated with Organizational Identification

Work overload is considered to be the leading stressor for people at work (Nelson & Quick, 1998). In testing Karasek's (1979) demand-control-model, Bleise and Castro (2000) found a positive relation between work overload and psychological strain. Hence it is not surprising that Hom and Griffeth (1995) in their meta-analysis found role overload to be significantly related to turnover ($r = .11$). It appears plausible that role overload may enhance stress to such a degree that the individual no longer identifies with the organization and decided to quit. The organization, having been through a layoff, may have led to increased workload resulting from fewer people doing the same amount of work, thus increasing work overload. For this study, it is hypothesized that the increased responsibilities and workload will decrease psychological attachment to the workplace and lower identification with the organization. Lowered identification may also result from the fact that the survivors have witnessed their coworkers go through the process of separation with the company, and feel a sense of alienation with the corporate restructuring.

Hypothesis 11: Work Life Balance is positively associated with Job Satisfaction

A large part of the literature on work family examines work family conflict, and not work life balance. Although there are conceptual differences between the two, they can be interpreted as being on a continuum. Thus, in most situations, where there is high work family conflict, there is presumed to be low work life balance and vice versa. Hence, borrowing from the work family literature, it is found that while some studies report no

significant relationship of work family conflict with job satisfaction (e.g., Bedeian, Burke, & Moffett, 1988), others have found a significant relationship (e.g., Bacharach, Bamberger, & Conley, 1991). A metaanalysis by Kossek and Ozeki (1998) found that regardless of the type of measure used, there is a consistent negative relationship between work life conflict and job and life satisfaction. A recent study by Parasuraman and Simmers (2001) also found work family conflict was negatively related to job satisfaction among both self-employed and organizationally employed persons. Thus work life balance is hypothesized to have a positive impact on job satisfaction.

Hypothesis 12: Motivation is positively associated with Job Satisfaction

The relationship between motivation and job satisfaction has been studied since Maslow (1954) and Herzberg (1966). Maslow hypothesized a hierarchical order of needs, with the assumption that lower order needs must be satisfied before higher order needs. Herzberg, on the other hand, proposed that job factors such as responsibility, recognition, and advancement have an impact on job satisfaction, and hygiene factors such as salary, working conditions, company policy and administration have an impact on job dissatisfaction. Although empirical support for these theories is limited, Vroom's (1964) expectancy theory has shown some empirical support of the bi-directional nature of the relationship between motivation and satisfaction. Pool (1997), for instance, found motivation to be the most powerful predictor of job satisfaction in a sample of 125 individuals. The relationship between motivation and satisfaction has also been empirically demonstrated in other studies as well (Katzell & Thompson, 1990; Locke & Latham, 1990). Hence a positive relationship is hypothesized between motivation and job satisfaction.

Hypothesis 13: Organizational Identification is positively associated with Job Satisfaction

In past research, organizational identification has been found to have an impact on intent to quit (Wan-Huggins, et al., 1998). However, with respect to the impact of

organizational identification and job satisfaction, Van Knippenberg and Van Schie (2000) did a study where they compared the differential impact of work group identification and organizational identification on job satisfaction. They found a stronger relationship between work group identification and job satisfaction than between organizational identification and job satisfaction. Nonetheless, the authors admit, that there may be individual and inter-organizational differences that may lead to differential impact in other cases. For the purpose of this study, a positive relationship is hypothesized between organizational identification and job satisfaction.

Hypothesis 14: Job Satisfaction is positively associated with Job Performance

There is an extensive discussion in the literature on the question of whether satisfaction causally precedes performance or vice versa (e.g., Bagozzi 1980; Schwab & Cummings 1970). There is greater evidence of performance impacting satisfaction than of satisfaction impacting performance. Some earlier authors did however find positive relationship between satisfaction and performance (Bhagat, 1982; Petty, McGee & Cavender, 1984). A meta-analysis by Iaffaldano and Muchinsky (1985) reported an average correlation of .17 between job satisfaction and job performance. This finding of a weak relationship led to a decline in interest in the job satisfaction and job performance relationship. A recent metaanalysis by Judge, Bono, Thorenson, and Patton (2001) on 312 samples found the mean true correlation between job satisfaction and job performance to be .30. In light of these results Judge et al. (2001) state that there may be renewed interest in the job satisfaction-job performance relationship. The purpose of this study is not to dwell on the directionality of the performance satisfaction relationship. The relationship tested is that between satisfaction and performance.

Table 1 contains a summarized list of all fourteen hypotheses tested in this study. In chapter 4, I discuss the research methodology used for the study.

TABLE 1

LIST OF HYPOTHESES

HYPOTHESIS 1:	Virtuality is positively associated with Autonomy
HYPOTHESIS 2:	Virtuality is positively associated with Outcome Orientation
HYPOTHESIS 3:	Autonomy is positively associated with Work Life Balance
HYPOTHESIS 4:	Autonomy is positively associated with Employee Motivation
HYPOTHESIS 5:	Outcome Orientation is positively associated with Motivation
HYPOTHESIS 6:	Leadership for Innovation is positively associated with Work Life Balance
HYPOTHESIS 7:	Leadership for Innovation is positively associated with Motivation
HYPOTHESIS 8:	Leadership for Innovation is positively associated with Satisfaction
HYPOTHESIS 9:	Leadership for Innovation is positively associated with Organizational Identification
HYPOTHESIS 10:	Post-Layoff Workload Assessment is negatively associated with Organizational Identification
HYPOTHESIS 11:	Work Life Balance is positively associated with Job Satisfaction
HYPOTHESIS 12:	Motivation is positively associated with Job Satisfaction
HYPOTHESIS 13:	Organizational Identification is positively associated with Job Satisfaction
HYPOTHESIS 14:	Job Satisfaction is positively associated with Performance

CHAPTER 4

RESEARCH METHOD

With the theoretical grounding established in chapters 1–3, the next step is to outline the research design for the study. This refers to the strategy used to test the hypotheses outlined in chapter 3. In the following pages, I discuss the elements of the research strategy, in particular, the organization in which the study was done, the data collection process, the pretest and pilot, and finally the field-test of the model. The section on organizational context contains information on the field setting in which the study was conducted. The section on data collection contains information on the actual process used for administering the survey. The section on pretest and pilot provides details on the steps used to refine the survey until the point of the launch of the final survey. Finally, the section on field test of the model elaborates on specifics about the measures used for the constructs, strategies relating to handling of missing data, validity concerns, factor analysis results for assessing effectiveness of measures, unidimensionality testing, and preliminary data diagnostics.

Organization

The study was conducted in a leading global telecommunications organization based in the Dallas-Fort Worth metroplex. The organization is over a hundred years old with operations in more than 100 countries. The U.S. market constitutes one of its more significant geographical business areas. In selecting the organization, criteria used were firm size, firm location and interest in participation in the research. There were several factors favoring the selection of this organization. First, this organization is a highly successful organization with leading edge products in every sector of the telecommunications sector. It has major facilities and offices across North America. In 2001, the number of employees in

the U.S. was over 10,000. Second, the organization had an interest in the topic of virtual work and its managerial implications. As a result, I received co-operation from the organization in terms of survey administration and access to archival information, which added significantly to the quality of the data. Based on the potentially large number of employees targeted for the survey, a single company was determined as sufficient for the study.

Questionnaires were made available to all exempt employees of the company, numbering about 4,000. Exempt employees are defined as per the provisions of the Fair Labor Standards Act (FLSA) of 1938. Executive, professional, administrative and outside sales occupations are exempt from FLSA coverage and as such the minimum wage and overtime pay provisions of the FLSA do not apply. Non-exempt occupations are covered and include most hourly jobs. The reason for exclusion of the non-exempt jobs for this study was twofold: first most non-exempt jobs being mostly administrative jobs would be very low in virtuality; and second, the intent of the study was to focus on knowledge workers.

The survey being voluntary, incentives were used to encourage participation and ensure a good response rate. Six winners were selected for a drawing of prizes among the respondents. Prizes sponsored by the company included mag-lites, obtained from the company gift store.

Data Collection

The process of data collection was done in coordination with the Corporate Employee Initiatives Department of the company. Instead of a paper and pencil survey, it was decided that conducting a web-based survey would be more in line with the company culture. Thus a web-based survey was designed and installed on the organization's internal intranet system. To prevent unauthorized access into the survey, and to enable matching of responses to archival data, respondents were required to enter their employee identification (ID) number

to access the survey. Once the survey was completed and the employee clicked on the "submit" button, the responses were entered into to a file specially created for the survey. While doing the survey, employees had the ability to go back to earlier parts of the survey, if they felt the need to change their response to a particular question. However, employees did not have the ability to complete, save, and send, part of the survey, and complete the rest of the sections later.

Once all the responses were in, the file containing the responses was imported into a data file, and the process of matching done based on the employee IDs. Matching involved combining the survey responses of each employee with their archival data, which was drawn from various employee databases. Both the task of the design of the web-based survey, and the data matching to obtain the demographic and performance information was accomplished with the assistance of two representatives of the company.

Pretest and Pilot

Once the initial draft of the questionnaire was developed, initial pre-testing was done using faculty input on the survey. Subsequently, a web version of the survey was created and feedback was obtained from some employees of the HR department. At this stage, most comments related to fixing technical glitches, and re-wording questions to enhance clarity and reduce ambiguity.

The next step was to conduct the pilot test to further improve the survey in terms of clarity of instructions, technical design and content. Randomly selected employees of the organization participated in this exercise. Questionnaires were sent to 40 employees and 15 responses were received. A reminder was sent as a result of which 12 additional responses were received. This brought the total number of responses to 27, yielding a response rate of 72%.

Along with the pilot survey, a cover letter explaining the intent of the survey (appendix B) and a one-page Survey Feedback Form (appendix C) was sent to the participants for their specific feedback on the survey. Of the 27 respondents that completed the survey, 19 of them completed the survey feedback form. The feedback form contained questions about the clarity of the questions, clarity of the instructions, time taken to complete the survey, and a space for open-ended comments. Feedback from the employees led to some modifications in terms of clarification of the instructions and questions. The average time taken for the respondents to complete the survey was 19 minutes, very close to the time I had predicted for the survey, namely, 20 minutes.

Analysis of the pilot data indicated that the reliabilities of the constructs as measured by Cronbach's alpha (Cronbach, 1951) were adequate, all of them being at or above 0.84. Univariate analysis of the data revealed some patterns on the basis of which some of the measures were fine-tuned. Changes were made to three of the constructs. In brief, two of the constructs, those of leadership and motivation were refined further by dropping some of the items. Also the construct of post-layoff workload assessment was introduced into the model this point. This construct was introduced based of acknowledgement of the fact that the organization had undergone several waves of layoff starting from about a year prior to the administration of the survey. Hence there was a strong likelihood that enhanced workload due to fewer individuals doing the same job might provide additional information in explaining some of the phenomenon under study.

The final survey was launched in June 2002. There was a delay in the administration of the survey because of several rounds of layoffs that resulted in the loss of over 1,100 people during that period. This resulted in a reduction in the group of people surveyed from about 5,500 to about 4,400. However, to reduce the impact of the layoffs on the survey, it was decided to wait for a while for things to normalize. Two weeks prior to the planned launch

of the survey, announcements were made using various communication media. The communication channels used included a newsletter that was mailed to employees once week, intranet home page announcements, announcements on bulletin boards, news flashes, and e-mails. The survey was maintained on the main company website for a period of two weeks, and in the Human Resources website for a period of three weeks.

Field Test of the Model

Measures

A wide range of measures was collected from different sources for this study. Most of the measures were obtained from the employee survey. Some of the data such as that relating to demographic information and job performance was obtained from archival records maintained by the company. As there was a mix of archival data with some self-report measures via survey data, there was some control for common method variance in data collection (Campbell & Fiske, 1959). The constructs used in this model and their operationalizations are indicated in the next few paragraphs. Some of the measures used for the constructs have been used in previous research and have been found to have good psychometric qualities. Of these, some have been adapted or shortened. There are also some other constructs for which new scales have been constructed. The survey instrument is included in appendix A.

The operationalization of the variables is described below.

Virtuality

Virtuality is a critical construct for this study. It was conceptualized at the individual level of analysis and defined as geographical dispersion of an employee from his/her manager and the use of electronic communication. The measure of virtuality was created for the purpose of the study. It consists of seven items on a seven-point Likert-type scale ranging from "strongly disagree" to "strongly agree." An example of an item is "I do a large

part of my job away from the office where my manager is located." Questions 1–7 in section III of the survey instrument measure virtuality.

Autonomy

Autonomy was measured with a scale from Price (1997). The scale was developed from items taken from several authors (Breaugh, 1985; Breaugh, 1989; Breaugh & Becker, 1987). Three items of the measure assess the "method" facet of work autonomy, and four collect data pertinent to the "scheduling" facet. Price (1997) reported reliabilities of .92 and .86 respectively for these two dimensions. The autonomy construct was also measured on a seven-point scale ranging from "strongly disagree" to "strongly agree." An example item of the "method" facet is "I am able to choose the way to go about my job (procedures)." An example item of the "scheduling" facet is "I have flexibility over when I begin and end each work day." Questions 1–6 of section III, second set, of the survey instrument measure autonomy.

Outcome Orientation

Outcome orientation assesses the extent to which objective criteria, namely, goals, and measurable targets are used to evaluate performance outcomes. This instrument was developed for the survey. It was designed on the basis of an earlier measure called outcome-based orientation developed by Kurland and Egan (1999). Their measure of outcome-based evaluation consisted of eight items adapted from Ouchi (1977), Greenhaus, Parasuraman, and Wormley (1990), and Touliatos, Bedeian, Mossholder, and Barkman (1984). It measured the extent to which records of output, rather than observations by the supervisor is the basis for evaluations. Cronbach's alpha reported was .84. The authors however noted some weaknesses of the measure, relating to the anchors used for the scale. Hence, new items were devised based on similar conceptual ideas.

The measure consisted of eight items on a seven-point scale ranging from "strongly disagree" to "strongly agree." An example item is "I am aware of the level of achievement expected in my job." Questions 1–8 of section III, third set, of the survey instrument measured outcome orientation.

Leadership for Innovation

In this study leadership was measured using a short version of the Multifactor Leadership Questionnaire or MLQ (Bass & Avolio, 1992). The MLQ is one of the most widely used instruments to measure transformational and transactional leader behaviors. For the pilot a shortened version was used that contained seven items from the four dimensions of transformational leadership: attributed charisma, inspirational leadership, intellectual stimulation, and individualized consideration. For the final survey, a refinement of the MLQ as developed by Bycio, Hackett, and Allen (1995) was used that was further adapted and that contained two dimensions: individualized consideration and intellectual stimulation. Although the intent of the study was to measure three of the dimensions of transformational leadership, organizational sensitivities of a layoff situation led to reduction of the items such that eventually only two of the dimensions remained. The final scale consisted of five items. Of these three were aimed at measuring "intellectual stimulation," and two were aimed at measuring the "individualized consideration" dimension of leadership. As a result, the transformational leadership item was rephrased as "leadership for innovation" so as not to be misleading. Respondents were asked to indicate the extent to which they agreed or disagreed on each item on a seven-point scale ranging from "strongly agree" to "strongly disagree." Examples of items used in the scale include: "My manager enables me to think of old problems in new ways" for the intellectual stimulation dimension; and "My manager treats each subordinate as an individual" for the individualized consideration dimension. Questions 1–5 of section V of the survey instrument measure leadership for innovation.

Motivation

Motivation for the purpose of this study was initially conceptualized based on Amabile, Hill, Hennessey, and Tighe's (1994) work on intrinsic and extrinsic motivation. For the pilot study, motivation was measured using six items from work preference inventory (Amabile et al., 1994). Of these, three items measure intrinsic motivation and three measure extrinsic motivation. The original scale contained 30 items that assessed intrinsic and extrinsic motivation as primary scales. The secondary scales included those of enjoyment, challenge, outward, and compensation. The secondary scales in the original study did not hold well in the adult sample that Amabile et al. (1994) used. Three items that loaded highest on the adult sample were therefore used to measure intrinsic motivation. An example item is "The more difficult the problem, the more I enjoy trying to solve it." The scale used was a four-point scale from "never" to "always." Although the estimated Cronbach's alpha for the scale was .84 for the pilot, as mentioned earlier, the construct appeared to be more of a "trait" based as opposed to a "state" based measure of the motivation construct. The original intent of the study was to measure motivation more as a "state" based phenomenon. As a result, new items were formulated based on existing theory that aimed at measuring both intrinsic and extrinsic motivation. Example of an intrinsic item is "I find my current job to be very enjoyable and rewarding for its own sake." Example of an extrinsic item is "My job helps me get recognition and status at work." These questions were measured on a seven-point scale ranging from "strongly agree" to "strongly disagree." Questions 1–7 of section IV, second set of the survey instrument measures motivation. For the study, a six-item scale was used for motivation. Of these, the question relating to financial goals "My job helps me achieve my financial goals" was dropped from the final analysis. Rationale for excluding this item is explained later in the section on convergent and divergent validity.

Post-Layoff Workload Assessment

Post-layoff workload assessment was initially measured with a three-item scale developed specifically for this study. The items were assessed on a seven-point scale ranging from "strongly agree" to "strongly disagree." Items 7–9 of section VI, third set measure post-layoff workload assessment. An example item is "These days a person in my job is expected to produce more than a year ago." The reliability of the scale was $\alpha = .31$. Upon further investigation and factor analysis of the data, it was felt that one of the questions was not appropriate. The question was "Compared to a year ago, someone in a position like mine has greater resource support to do the job." Hence this item was dropped and post-layoff workload assessment was measured with a two-item measure.

Organizational Identification

For the purpose of this study, organizational identification was measured using a scale developed by Mael and Ashforth (1992). Various instruments have been used in past research to measure organizational identification (e.g., Patchen, 1970 at the University of Michigan's Survey Research Center). The key concepts in Patchen's (1970) theory of identification included similarity, membership and loyalty. Cheney's (1982) Organizational Identification Questionnaire (OIQ) is also a widely used instrument today for the assessment of organizational identification. However for this study the scale developed by Mael and Ashforth (1992) was used. Weisenfeld, et al. (2001) had used this scale in their study of remote workers and reported a Cronbach's alpha of .84. This construct was assessed on a seven-point scale ranging from "strongly agree" to "strongly disagree." Questions 4 to 8 of section VII of the survey instrument measure organizational identification. An example item for the survey included: "When I talk about (company name), I usually say 'we' rather than 'they'."

Work Life Balance

For this study, work life balance was measured using a scale adapted from Hill, Hawkins, Ferris, and Weitzman (2001). The measure is a five-item measure that is assessed on seven-point scale response format from "strongly agree" to "strongly disagree." Hill et al. (2001) reported an alpha of .83 for the work life balance measure. Example of an item is "It is very easy is it for you to balance the demands of my work and my personal and family life." Questions 1–6 of section VI, third set of the survey instrument measures work life balance.

Job Satisfaction

Job satisfaction was measured with three items adapted from the Michigan Organizational Assessment Questionnaire (Seashore, Lawler, Mirvis, & Cammann, 1982). This was measured on a seven-point scale from "strongly agree" to "strongly disagree." An example is: "All in all, I am satisfied with my job." Zhou and George (2001) obtained a reliability of .84 with this scale. Questions 1–3 of section VII of the survey instrument measures job satisfaction.

Performance

This was obtained from archival company records. Performance was measured using performance evaluations that occurred about one month prior to the administration of the survey. The performance ratings were done by the immediate supervisor of the employee, and underwent subsequent approval at the next higher level. The rating scale ranged from 1 to 20, with higher numbers indicating better performance. The performance measure consisted of four dimensions, each having an equal weight of 5 points. The composite number was made available for analysis. In addition to the ratings, information on salary raises was also obtained. However, this was not used for the analysis since in the last year of operations, the majority of employees did not receive any salary raises.

Demographics

Information on demographic variables was also collected. This was also obtained from archival records for several reasons. First, omitting the section from the survey significantly shortened the survey, and it was felt that respondents would be more inclined to complete it. Second, asking for demographic information on a survey ran counter to the cultural environment in the organization. It was felt that such questions would evoke a negative response, and perhaps lower the response rate. Finally, it was felt that there would be more accuracy and completeness of data if this information were collected from company records.

The demographic variables collected included personal information and job related information. Personal information included variables such as age, sex, education level, and marital status. Job related information included department, time spent in organization, and time spent in current job.

Data Preparation and Preliminary Analysis

This section presents an overall description of the steps followed in data preparation including handling of missing data, convergent and divergent validity testing, unidimensionality testing, and preliminary data diagnostics.

Data Cleanup and Handling of Missing Data

The first step in the analysis was to prepare the data for analysis. This was done by first re-coding the data such that a higher number would indicate a higher value of the construct under measurement. The values for each of the negatively worded items were also re-coded so as to be consistent with the rest of the data. To identify the bad surveys, namely surveys in which employees merely entered a series of one single number, standard deviations of the scores of each respondent were calculated. Although some of the

respondents had low standard deviations, upon detailed examination of the responses, it was felt that none of those needed to be weeded out.

To get a better understanding of missing responses, the survey contained an eighth column for those who wanted to respond "not applicable" for any particular question. The intention of that was to differentiate whether the non-response was due to simple oversight, or whether it was due to the question being not applicable to the employee' particular job situation. This would help in making judgments about the quality of the data and to see whether or not the dataset was representative of the group being investigated. Table 2 gives some descriptives of the items such as mean and standard deviation, as well as the number of non-responses due to missing at random, number of non-responses due to individual questions being marked as not-applicable, and the number and percent of valid responses.

As can be seen from table 2, the number of non-responses due to "respondent error" or "no response" was very low. It ranged from 1 to 6, which in a sample of 575, amounts to between 0.17% and 1.04%. For the non-responses due to questions being "not applicable," the numbers were much higher. They ranged from 0 to 69, with 69 amounting to 12% of the sample. However, it must be noted that most of the "not applicable" responses related to the questions on the construct of virtuality. Three of the seven questions on virtuality had over 40 missing responses, with the maximum missing responses being 69 for question 1, amounting to about 12% of the sample. For all of the other constructs, the maximum "not applicable" missing responses were less than 3%.

Due to missing data issues, a strategy had to be devised to manage and address it. To understand why the questions on virtuality were tagged as "not applicable" further analysis was done using the demographic variables. The intent was to find some patterns among those respondents so that an explanation could be found for the results.

TABLE 2

ITEM LEVEL DESCRIPTIVES AND MISSING DATA

ITEMS	MEAN on a scale 1–7	SD	MISSING DATA	RESPONSES MARKED AS NOT APPLICABLE	VALID RESPONSES	PERCENT VALID DATA
Virtuality						
Large part of job away from office	2.95	2.34	3	69	503	87.48
Unable to work without remote access	4.59	2.40	1	41	533	92.70
Manager able to physically observe	3.01	2.06	1	10	564	98.09
Manager and I work in same office	2.27	2.02	3	4	568	98.78
Remotely access network frequently	4.13	2.33	3	55	517	89.91
Manager and I have frequent meetings	3.12	1.95	2	2	571	99.30
Most calls from home or the road	2.29	1.79	1	61	513	89.22
Autonomy						
Able to choose job procedures	5.55	1.50	2	4	569	98.96
Control over taking few hours off	5.37	1.51	3	6	566	98.43
Control over scheduling of work	5.23	1.61	4	6	565	98.26
Can determine sequencing of activities	5.70	1.27	3	4	568	98.78
Flexibility over beginning/ending day	4.98	1.83	3	7	565	98.26
Free to select methods to use	5.49	1.38	3	4	568	98.78
Outcome Orientation						
Objective criteria used to evaluate	4.89	1.69	5	8	562	97.74
Goal setting and assessments used	4.75	1.67	5	9	561	97.57
Written records used to evaluate	4.34	1.64	6	9	560	97.39
Aware of achievement expected	5.55	1.39	4	2	569	98.96
Standards for performance evaluation	4.90	1.61	6	6	563	97.91
Manager and I jointly set objectives	4.62	1.76	4	11	560	97.39
Involved in setting goals	5.04	1.62	5	11	559	97.22

Table 2—*Continued.*

ITEMS	Mean on a scale 1–7	SD	MISSING DATA	RESPONSES MARKED AS NOT APPLICABLE	VALID RESPONSES	PERCENT VALID DATA
Motivation						
Find job to be interesting	5.63	1.25	2	0	573	99.65
Job helps me get recognition	4.82	1.57	3	2	570	99.13
Job important to career goal	5.10	1.47	3	2	570	99.13
Job gives personal satisfaction	5.47	1.33	1	0	574	99.83
Job helps achieve financial goals	5.79	1.08	2	1	572	99.48
Job provides opportunities	5.52	1.39	3	0	572	99.48
Job enjoyable for its own sake	5.25	1.40	1	2	572	99.48
Leadership For Innovation						
Suggests new ways of looking at job	4.99	1.61	1	4	570	99.13
Gives individualized attention	5.13	1.69	1	6	568	98.78
Treats subordinates as individuals	5.77	1.39	1	3	571	99.30
Helps me re-think ideas	5.04	1.61	2	7	566	98.43
Old problems in new ways	4.99	1.59	2	6	567	98.61
Work Life Balance						
Easy to balance demands	4.73	1.55	1	0	574	99.83
Feel drained at end of day	3.66	1.61	2	0	573	99.65
Sufficient time away from job	4.78	1.47	1	0	574	99.83
Able to separate on vacation	5.14	1.60	1	3	571	99.30
All in all, successful in balancing	5.07	1.40	1	0	574	99.83
Family dislike work preoccupation	4.63	1.59	3	13	559	97.22

Table 2—*Continued.*

ITEMS	Mean on a scale 1–7	SD	MISSING DATA	RESPONSES MARKED AS NOT APPLICABLE	VALID RESPONSES	PERCENT VALID DATA
Post-Layoff Workload Assessment						
Produce more than a year ago	5.52	1.39	3	5	567	98.61
Devoting more hours than a year ago	5.16	1.53	5	5	565	98.26
Greater resource support than a year ago	3.41	1.91	4	4	567	98.61
Job Satisfaction						
I like my job	5.96	1.08	2	0	573	99.65
Like working at (company name)	6.01	1.09	2	0	573	99.65
All in all satisfied with job	5.72	1.17	4	0	571	99.30
Organizational Identification						
Talk about company say 'we'	5.82	1.23	2	0	573	99.65
Company successes my successes	5.62	1.34	3	0	572	99.48
Interested in what others think	5.74	1.19	2	0	573	99.65
Praise feels like personal complement	5.51	1.33	2	0	573	99.65
Feel bad if media criticizes company	5.34	1.38	6	0	569	98.96
Job Performance (obtained from archival records)*	14.93	2.45	164	N/A	411	71.47

* Scale used ranged from 1 to 20

As no patterns could be detected based on demographics, it was important to determine how to deal with missing data. Roth (1994) notes missing data causes two major problems: first it decreases statistical power to detect relationships, and second, it can bias parameter estimates such as correlation coefficients downward. Common methods for handling missing data within the social sciences include casewise deletion, pairwise deletion, and imputation techniques, such as mean substitution, regression imputation, and hot deck imputation. More complex algorithms such as the expectation maximization algorithm also exist (Dempster, Laird, & Rubin, 1977). Recently Schafer & Graham (2002) recommend the use of Bayesian multiple imputation and maximum likelihood to deal with missing data (Schafer & Graham, 2002). Casewise deletion involves deleting an entire record if there is any missing data. This results in significant loss of data. Pairwise deletion involves the procedure where each pairwise correlation in the input matrix for the analysis is computed on the maximum available sample for that pairing of variables of missing data. This technique results in less loss of data than in casewise deletion. However, for all practical purposes pairwise deletion reverts back to listwise deletion when creating composite scores for the constructs under study. Overall mean substitution replaces the missing values by the mean across all observed items responses. This technique has the drawback of reducing the available variance in the model because missing values are substituted with the variable means for the existing data. This leads to underestimation of the covariances. Regression imputation uses existing relationships between the variables to estimate missing data. These are generally recommended when data are missing in nonrandom patterns, and when more than 20% of the data are missing (Raymond & Roberts, 1987). Hot deck imputations involve finding a similar case to the case with missing data, and using that score. However, there is not much evidence for the effectiveness of this technique.

For this study, mean substitution was used for handling missing data. Mean substitution is recommended when less than 10% of the data are missing (Donner, 1982). Roth and Switzer (1999) also notes that if missing data is in the range of 5% or less, one need not worry too much about the choice of missing data technique used. This is the case with eight of the constructs in this study, which have less than 3% missing data. The problematic construct is that of virtuality, which comprised seven questions. Of the seven questions, four had data missing in the 8%–13% range. Using pairwise deletion would lead to a decline in sample size for the virtuality construct from 575 to 436. This decline would be enlarged when computing correlations. For example, when computing the correlation between virtuality and outcome orientation, the sample size drops down to 425. In this dataset, over 99% of the non-responses were due to the questions being marked as "not applicable." Mean substitution was deemed appropriate for the study because overall means would not be affected, nor would the covariances between the variables.

To empirically check whether or not the correlations between the variables were affected by using mean substitution, correlations between the variables were calculated using mean substitution, listwise deletion, and pairwise deletion techniques. Results are given in table 3 which includes four sets of correlations: composite scores with mean substitution, factor scores with mean substitution, listwise deletion, and pairwise deletion As can be seen from the table, the pattern of results appears to be highly similar with each of the methods used for handling missing data. This strengthens the case for using mean substitution.

Convergent and Divergent Validity

Although most of the scales used in this study were adapted from established scales, there were some that were created for this study. Hence it was important to demonstrate convergent and divergent validity. The nine constructs measured in the survey instrument

TABLE 3

CORRELATION COMPARISON MATRIX

CS-M: COMPOSITE SCORES WITH MEAN SUBSTITUTION
CS-L: COMPOSITE SCORES WITH LIST-WISE DELETION
FS-M: FACTOR SCORES WITH MEAN SUBSTITUTION
CS-P: COMPOSITE SCORES WITH PAIRWISE DELETION

	1	2	3	4	5	6	7	8	9	10
1. Virtuality (CS-M)										
Virtuality (FS-M)										
Virtuality (CS-L)										
Virtuality (CS-P)										
2. Autonomy (CS-M)	.03									
Autonomy (FS-M)	.05									
Autonomy (CS-L)	.01									
Autonomy (CS-P)	.00 (n=429)									
3. Outcome Orientation (CS-M)	.04	.20**								
Outcome Orientation (FS-M)	.06	.20**								
Outcome Orientation (CS-L)	.06	.21**								
Outcome Orientation (CS-P)	.07 (n=425)	.20** (n=537)								

* p<.05 ** p<.01
Sample size using composite scores and factor scores : n = 575
Sample size using list wise deletion : n = 387
Sample size using pairwise deletion : listed below each correlation

Table 3—*Continued.*

	1	2	3	4	5	6	7	8	9	10
4. Leadership for Innovation (CS-M)	-.06	.19**	.50**							
Leadership for Innovation (FS-M)	-.06	.19**	.51**							
Leadership for Innovation (CS-L)	-.03	.17**	.48**							
Leadership for Innovation (CS-P)	-.03	.18**	.51**							
	(n=423)	(n=543)	(n=539)							
5. Post-Layoff Workload (CS-M)	.13**	.02	.06	.09*						
Post-Layoff Workload (FS-M)	.13**	.01	.08*	.14**						
Post-Layoff Workload (CS-L)	.12**	-.00	.09	.12*						
Post-Layoff Workload (CS-P)	.14*	.03	.06	.09*						
	(n=430)	(n=547)	(n=544)	(n=551)						
6. Motivation (CS-M)	.11**	.31**	.51**	.48**	.07*					
Motivation (FS-M)	.13**	.31**	.50**	.49**	.09*					
Motivation (CS-L)	.10*	.35**	.53**	.49**	.09					
Motivation (CS-P)	.13**	.31**	.51**	.49**	.07					
	(n=433)	(n=548)	(n=545)	(n=550)	(n=558)					
7. Work Life Balance (CS-M)	-.17**	.11**	.11**	.04	-.31**	.12**				
Work Life Balance (FS-M)	-.20**	.12**	.10**	.00	-.35**	.13**				
Work Life Balance (CS-L)	-.14**	.10*	.12*	.02	-.29**	.16**				
Work Life Balance (CS-P)	-.15**	.10**	.09*	.03	-.31**	.11**				
	(n=425)	(n=538)	(n=536)	(n=542)	(n=551)	(n=549)				

* p<.05 ** p<.01

Sample size using composite scores and factor scores : n = 575

Sample size using list wise deletion : n = 387

Sample size using pairwise deletion : listed below each correlation

Table 3—*Continued.*

	1	2	3	4	5	6	7	8	9	10
8. Org. Identification (CS-M)	.15**	.13**	.42**	.36**	.12**	.58**	.06			
Org. Identification (FS-M)	.21**	.12**	.40**	.34**	.16**	.58**	.03			
Org. Identification (CS-L)	.18**	.13**	.45**	.37**	.18**	.60**	.01			
Org. Identification (CS-P)	.19**	.13**	.42**	.37**	.12**	.58**	.06			
	(n=431)	(n=550)	(n=546)	(n=553)	(n=559)	(n=559)	(n=550)			
9. Job Satisfaction (CS-M)	.00	.22**	.44**	.44**	.00	.73**	.26**	.66**		
Job Satisfaction (FS-M)	.02	.25**	.45**	.46**	.02	.78**	.25**	.65**		
Job Satisfaction (CS-L)	.02	.24**	.47**	.43**	.06	.75**	.27**	.69**		
Job Satisfaction (CS-P)	.03	.23**	.45**	.45**	.01	.74**	.26**	.66**		
	(n=433)	(n=553)	(n=550)	(n=556)	(n=562)	(n=562)	(n=553)	(n=566)		

* p<.05 ** p<.01

Sample size using composite scores and factor scores : n = 575
Sample size using list wise deletion : n = 387
Sample size using pairwise deletion : listed below each correlation

summed to 48 items. As a first step, an item-item correlation matrix was created with the 48 items. As expected, the general direction of the numbers indicated that the within construct correlations were higher than the between-construct correlations. For the purpose of this study it was deemed appropriate to use maximum likelihood factor analysis with oblique rotation (direct oblimin). The reason for using an oblique rotation was that the factors under study are likely to be correlated with each other. Oblique rotation would allow the measurement of these inter-construct relationships. In this way a more representative measurement of factor structure could be obtained.

Upon doing a factor analysis using maximum likelihood as the estimation procedure, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy for factor analysis was .90. This is excellent, as anything over .80 is considered meritorious (Hair, Anderson, Tatham, & Black, 1998). Bartlett's test of sphericity, which is a statistical test for the presence of correlations among the variables was large (18,027; df 1,128, $p < .01$) and indicated that the items shared common factors. These two tests together indicated adequate factorability of the data. For the selection of number of factors, the approach based on eigenvalues over 1.0 was used (Hair, Anderson, Tatham, & Black, 1998). Nine factors emerged, that accounted for 59.43 % of the total variance of the items.

Table 4 shows the factor loadings. Loadings less than .30 have been suppressed for ease of presentation. As can be seen, for the most part, the factor analysis generated a pattern matrix with simple structure. The factor structure corresponded extremely well with the theoretically generated items in the constructs. For all the constructs, except for job satisfaction and motivation, the items loaded on the predicted factors. The factor loadings for autonomy, outcome orientation, leadership for innovation, post-layoff workload assessment, and organizational identification were in the range .50 and above. For work life balance, one item had a low loading of .48. For the construct of virtuality, although all the

TABLE 4

EXPLORATORY FACTOR ANALYSIS

	Factors								
	1	2	3	4	5	6	7	8	9
Virtuality									
Manager and I work in same office	0.88								
Manager able to physically observe	0.77								
Large part of job away from office	0.74								
Manager and I have frequent meetings	0.55								
Most calls from home or the road	0.50								
Unable to work without remote access	0.34								
Remotely access network frequently	0.33								
Autonomy									
Control over scheduling of work		0.79							
Can determine sequencing of activities		0.75							
Free to select methods to use		0.70							
Able to choose job procedures		0.67							
Control over taking few hours off		0.64							
Flexibility over beginning/end day		0.62							

Table 4—*Continued.*

	Factors								
	1	2	3	4	5	6	7	8	9
Outcome orientation									
Goal setting and assessments used			0.96						
Objective criteria used to evaluate			0.94						
Written records used to evaluate			0.72						
Standards for performance evaluation			0.68						
Manager and I jointly set objectives			0.65						
Involved in setting goals			0.59						
Aware of achievement expected			0.56						
Work Life Balance									
All in all successful in balancing				-0.94					
Easy to balance demands				-0.73					
Sufficient time away from job				-0.71					
Able to separate on vacation				-0.66					
Family dislike work preoccupation				-0.61					
Feel drained at end of day				-0.48					

Table 4—*Continued.*

	Factors								
	1	2	3	4	5	6	7	8	9
Leadership for Innovation									
Old problems in new ways					- 0.97				
Helps me rethink ideas					- 0.96				
Gives individualized attention					- 0.76				
Suggests new ways of looking at job					- 0.72				
Treats subordinates as individuals					- 0.65				
Post-Layoff Workload Assessment									
Producing more than a year ago						0.86			
Devoting more hours than a year ago						0.83			
Organizational Identification									
Praise like personal compliment							0.88		
Interested in what others think							0.88		
Feel bad if media criticizes company							0.72		
Company successes my successes							0.69		
Talk about company, say 'we'							0.54		

Table 4—*Continued.*

	Factors								
	1	2	3	4	5	6	7	8	9
Job Satisfaction									
Like my job							0.80		
All in all satisfied with job							0.68		
Like working at (company name)							0.55		
Motivation									
Find job to be interesting							0.51	0.33	
Job enjoyable for its own sake								0.49	0.40
Job important to career goals									0.54
Job provides opportunities								0.30	0.53
Job gives personal satisfaction								0.33	0.50
Job helps me get recognition									0.48
Job helps achieve financial goals									-

items loaded on the same factor, the factor loadings for the last two items were fairly low, .33 and .34.

The only unanticipated aspect of the factor structure related to the factor loadings for the eighth and ninth factor relating to job satisfaction and motivation, the items of which loaded on the same factor. This is not surprising given the high correlation between the two constructs. This factor was led by the job satisfaction items, all of which had the highest loadings on that factor. Of the motivation items, all but one had cross loadings with a separate factor that could be classified as the "motivation" factor. The only question in the motivation set, which stood by itself, and did not load on any factor was the one relating to the financial or money aspect of motivation. This was actually very encouraging and suggested the data corresponded to theoretical constructs as the clearly "extrinsic" motivation item, the one relating to money, stood out from the rest of the extrinsic factors. This may have been because the other extrinsic items such as career goals and recognition. were really interpreted by the employees as being intrinsic. This is not surprising given past research on motivation where the intrinsic and extrinsic motivation items tend to be sometimes, indistinguishable. Given, the data patterns, the decision was made that all of the motivation items, except for the one relating to money be treated as a separate motivation factor, and, due to theoretical reasons, separate from job satisfaction.

Thus, it can be concluded based on the common factor analysis that the data demonstrated convergent and divergent validity. In chapter 5, I discuss additional preliminary statistical analysis conducted on the measures including the unidimensionality analysis and reliability testing.

CHAPTER 5

RESULTS

This chapter contains a detailed statistical analysis of the data collected for the study. There are three sections in this chapter. The first section contains a description of the demographic characteristics of the respondents. Following this, the second section contains details of the preliminary statistical procedures conducted for the study. These include power analysis, unidimensionality testing, reliabilities testing, univariate diagnostics, and basic correlational analysis. Following this, the last section contains the actual results of the hypotheses tests using both composite scores and factor scores.

Sample Size and Demographic Characteristics

Responses to the survey were received from 575 of the 4,400 exempt employees in the organization, leading to a response rate of 13%. Although this response rate was much lower than that received in the pilot study, judging from past surveys done in the organization, this was a fairly typical response rate. A detailed break-up of the demographic characteristics of the respondents is presented in table 5. As mentioned earlier, the demographic data was obtained from archival records by matching the employee IDs from the survey to other databases maintained by the human resources department.

Analysis of the demographic data revealed that some of the data was missing, and some of it was difficult to interpret. The specific demographic data related to age, education, race sex, marital status, tenure in job, and tenure in the company. The mean age of the respondents was 40 years. Of the respondents 68% were male and 65.9% were married. 71.8% had a college degree or higher. In terms of race 87.8% were white, 5.6% were Asians, and 3.3% were African Americans. The average number of years in current job was

TABLE 5

SUMMARY OF SAMPLE CHARACTERISTICS

VARIABLES	CATEGORIES	NUMBER	VALID PERCENT
Sex	Male	374	68.1
	Female	175	31.9
	Missing	26	
	TOTAL	575	100.00
Race	White	483	87.9
	African American	18	3.3
	Hispanic/Latino	14	2.6
	Asians	31	5.6
	American Indian	1	0.2
	Other	3	0.5
	Missing	26	
	TOTAL	575	100.00
Age	20-29	89	16.2
	30-39	174	31.6
	40-49	172	31.3
	50–60	96	17.5
	60 and above	19	3.5
	Missing	25	
	TOTAL	575	100.00
Educational Level	Doctorate	5	2.1
	Masters	72	30.8
	Some graduate	2	0.9
	Undergraduate	231	98.7
	Some college	2	0.9
	No Degree	29	12.4
	Missing	234	
	TOTAL	575	100.00
Marital Status	Married	342	65.9
	Single	143	27.6
	Divorced	34	6.6
	Missing	56	
	TOTAL	575	100.00

Table 5—*Continued.*

VARIABLE	CATEGORIES	NUMBER	VALID PERCENT
No. of Dependent Children	None	254	44.2
	1	104	18.1
	2	134	23.3
	3	62	10.8
	4	16	2.8
	5 or more	5	0.9
	TOTAL	575	100.00
Tenure in Job	Less than 1 year	15	2.9
	1 – 2 years	140	27.0
	2 – 4 years	269	51.8
	4 – 6 years	60	11.6
	More than 6 years	35	6.7
	Missing	56	
	TOTAL	575	100.00
Tenure in the Company	Less than 1 year	9	1.7
	1 – 2 years	88	17.0
	2 – 4 years	110	21.2
	4 – 6 years	82	15.8
	6 – 10 years	98	18.8
	10 – 15 years	68	13.1
	15 – 20 years	34	6.5
	More than 20 years	30	5.8
	Missing	56	
	TOTAL	575	100.00

3.1 years, and average number of years worked for the same organization was 7.4 years. Survey data revealed that over 98% of the respondents were full-time employees. In addition, 15% or 85 of the respondents were telecommuters, and 39% or 224 participated in the flextime program.

Data Diagnostics

This section contains four parts. The first part, power analysis, discusses the level of power, based on the sample size of the study, for testing the relationships. The second part explains the results of the unidimensionality testing which demonstrates the accuracy and strength of the measures. Following unidimensionality analysis, the reliabilities are then reported by calculating the Cronbach's alpha for each of the measures. The last section explains the univariate diagnostics performed on the data to ensure that there was no violation of the assumptions required for running regression analyses.

Power Analysis

Statistical power analysis involves the design and assessment of the probability of a research study to detect effect sizes. Mone, Mueller, and Mauland (1996) examined articles in seven leading journals between 1992 and 1994, and noted both the lack of attention to power analysis, as well the low power levels of most studies. They also noted the emphasis of researchers has been more to avoid Type I errors, namely, on finding relationships that do not exist, than on Type II errors, namely, overlooking significant differences that do exist. Generally accepted methods of enhancing power include increasing the sample size, raising the alpha level, improving reliability and precision of the instrument, and looking for large effect sizes. For most studies, a power level of .80 is considered to be the minimum acceptable level (Cohen, 1992).

Power analysis was conducted for both the correlation and regression analysis. For correlations, effect sizes of .10 are considered small, .30 are considered medium, and .50

and above are considered large (Cohen, 1988). For the sample size of 575 in this study, the power to detect small effect sizes was .77, and the power to detect medium and large effect sizes was over .995, assuming an alpha of .05. For the regression analysis, Cohen (1988) described effect sizes of $r^2 = 0.02$ as being considered low, $r^2 = 0.15$ as being considered medium, and $r^2 = 0.35$ as being considered high. With the sample of n = 575, and assuming alpha of 0.05, the power for testing the regressions was .92 for small effect sizes, and over .995 for medium and large effect sizes. In sum, we have a high level of power for this study.

Unidimensionality Testing

In chapter 3, details of the common factor analysis were provided, and it was determined that the underlying factor structure was a simple structure, and that there was convergent and divergent validity. The next step was to test for unidimensionality of each of the constructs. This involved factor analyzing each of the constructs separately using maximum likelihood estimation techniques (Gerbing & Anderson, 1988). The purpose of this exercise was to assess the unidimensionality of the items in the construct in order to refine them further.

Table 6 reports the unidimensionality results of the nine constructs measured by the survey instrument. The table reports the numbers on the Kaiser-Meyer-Olkin test of sampling adequacy, and the Bartlett's test of sphericity, both of which test the data for its adequacy and appropriateness for factor analysis. Further details are provided on the number of factors extracted, the chi-square statistic, and the percent of variance accounted for by that factor. Except for post-layoff workload assessment and job satisfaction, which had too few items that made factor analysis inappropriate (as indicated by the Kaiser-Meyer-Olkin test results), all the other constructs were tested for unidimensionality. Virtuality demonstrated two dimensions: three of the questions that aimed at measuring geographic distance of the employee from the manager loaded on one factor, and three other questions

TABLE 6

UNIDIMENSIONALITY ANALYSIS AND RELIABILITIES

Construct	Kaiser Meyer Olkin Test	Bartlett's Test	No. of Items in Factor	Factors Extracted	Chi-Square	Percent Variance Accounted for	Coefficient Alpha
Virtuality	0.80	1,370.60**	7	2	39.38**	51.58	.79
Autonomy	0.83	1,487.19**	6	1	186.08**	50.28	.85
Outcome Orientation	0.88	2,754.02**	7	1	283.52**	59.76	.91
Leadership for Innovation	0.84	2,381.67**	5	1	112.62**	70.11	.92
Post-Layoff Workload	0.50	436.63**	2		FA not appropriate		.84
Motivation	0.88	1,993.19**	6	1	142.25**	52.95	.89
Work Life Balance	0.84	1,511.69**	6	1	73.79**	51.06	.85
Org. Identification	0.86	1,825.29**	5	1	38.64**	65.05	.89
Job Satisfaction	0.74	1,145.51**	3		FA not appropriate	76.62	.90

* p<.05 ** p<.01

that aimed at measuring the use of electronic communication, loaded on the second factor. Only one item that was meant to load on geographic distance, displayed cross loadings. However, the item had a stronger loading on the geographic distance factor than on the electronic communication factor. Thus it appeared that the measure of virtuality was consistent with the hypothesized dimensions. All of the other constructs, namely those of autonomy, outcome orientation, leadership for innovation, post-layoff workload assessment, work life balance, motivation, and job satisfaction emerged as a one-factor solution with variances ranging from 50% to 76%.

Reliabilities

Reliabilities were assessed using Cronbach's alpha: a measure of internal consistency of a construct based on the average inter-item correlation (Cronbach, 1951). In checking estimates of reliability, I checked to see if the reliability estimates would significantly improve upon dropping any items. The reliabilities of all of the constructs were quite good. The following paragraph contains details of the reliability analysis.

The Cronbach's alpha for the virtuality scale was $\alpha = .79$. Additional reliability analysis of the two dimensions of virtuality was done. The dimension relating to geographic dispersion of the employee from the manager, measured by four questions, had a coefficient alpha of .82. The second dimension, relating to the use of electronic communication, as measured by three questions had a coefficient alpha of .66. For autonomy the estimated overall reliability of this scale was $\alpha = .85$. Separate reliabilities calculated for the two different dimensions of the scale included $\alpha = .75$ for the "method" facet of autonomy and $\alpha = .81$ for the "scheduling" facet of autonomy. The former consisted of two items, and the latter four items. The estimated reliability of the seven-item scale for outcome orientation was $\alpha = .91$. For the construct of leadership for innovation, coefficient alpha was $\alpha = .92$ for the composite measure. When broken down into the two dimensions of intellectual

stimulation and individualized consideration, reported reliability estimates were $\alpha = .91$ for intellectual stimulation (four item measure) and $\alpha = .82$ for individualized consideration (two item measure). Motivation had a coefficient alpha of .89, post-layoff workload assessment had a reliability of .89, organizational identification $\alpha = .89$, work life balance $\alpha = .85$, and job satisfaction was $\alpha = .89$. In conclusion, most scales had reliabilities over .80, indicating satisfactory measures. Virtuality had the lowest reliability (.79) which is also fairly good. The internal reliability coefficients are presented in table 6.

Confirmatory Factor Analysis

With the unidimensionality analysis results indicating adequate variance explained, and satisfactory reliabilities, a confirmatory factor analysis was done to test the factor structure. Earlier results from the exploratory factor analysis, in which I did not specify the assignment of observed variables to latent constructs, had indicated simple structure. As a next step, confirmatory factor analysis, which involves specifying which observed variables would be assigned to specific latent constructs was done.

Measurement theory suggests the use of at least three observed variables for each latent construct. As such performance, which was a single observed variable. was excluded from the confirmatory factor analysis. Figure 4 shows the input model with all the constructs treated as exogenous variables, and the bi-directional arrows representing allowing of correlations among them. Maximum likelihood was used as the estimation technique for the confirmatory factor analysis and structural equation modeling was used to test the measurement model.

The factor loadings generated from the confirmatory factor analysis are indicated in Table 7. These factor loadings indicate the extent to which each of the observed variables represents the latent variables. Analysis of the factor loadings indicate that the two items on

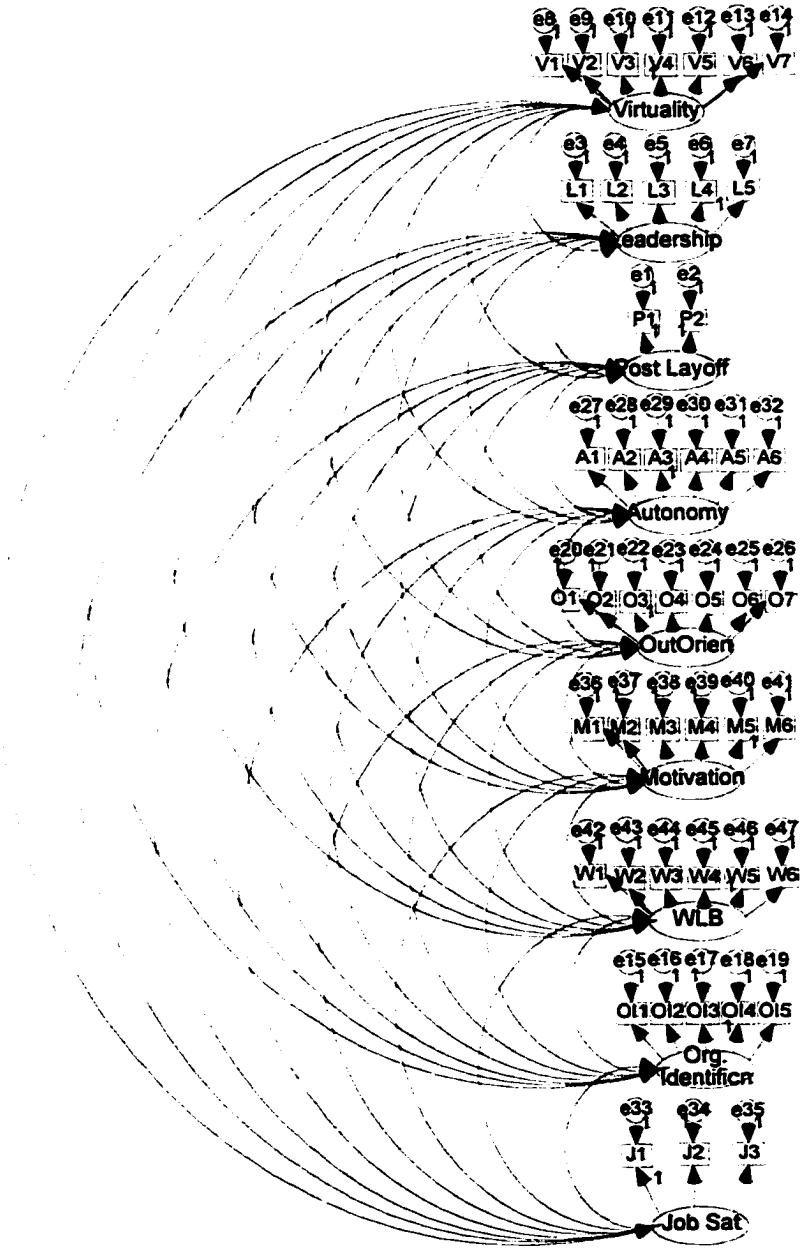


Figure 4. Confirmatory Factor Analysis Input Model.

TABLE 7

CONFIRMATORY FACTOR ANALYSIS

	Factors								
	1	2	3	4	5	6	7	8	9
Virtuality									
Manager and I work in same office	0.84								
Manager able to physically observe	0.77								
Large part of job away from office	0.74								
Manager and I have frequent meetings	0.54								
Most calls from home or the road	0.50								
Unable to work without remote access	0.37								
Remotely access network frequently	0.37								
Autonomy									
Control over scheduling of work		0.81							
Can determine sequencing of activities		0.75							
Free to select methods to use		0.70							
Able to choose job procedures		0.65							
Control over taking few hours off		0.66							
Flexibility over beginning/end day		0.64							

Table 7—*Continued.*

	Factors								
	1	2	3	4	5	6	7	8	9
Outcome orientation									
Goal setting and assessments used			0.90						
Objective criteria used to evaluate			0.89						
Written records used to evaluate			0.72						
Standards for performance evaluation			0.73						
Manager and I jointly set objectives			0.77						
Involved in setting goals			0.69						
Aware of achievement expected			0.66						
Work Life Balance									
All in all successful in balancing				0.90					
Easy to balance demands				0.73					
Sufficient time away from job				0.75					
Able to separate on vacation				0.64					
Family dislike work preoccupation				0.63					
Feel drained at end of day				0.56					

Table 7—*Continued.*

	Factors								
	1	2	3	4	5	6	7	8	9
Leadership for Innovation									
Old problems in new ways					0.94				
Helps me rethink ideas					0.92				
Gives individualized attention					0.80				
Suggests new ways of looking at job					0.79				
Treats subordinates as individuals					0.70				
Post-Layoff Workload Assessment									
Producing more than a year ago						0.87			
Devoting more hours than a year ago						0.82			
Organizational Identification									
Praise like personal compliment							0.89		
Interested in what others think							0.89		
Feel bad if media criticizes company							0.73		
Company successes my successes							0.79		
Talk about company, say 'we'							0.70		

Table 7—*Continued.*

	Factors								
	1	2	3	4	5	6	7	8	9
Job Satisfaction									
Like my job								0.90	
All in all satisfied with job								0.89	
Like working at (company name)								0.82	
Motivation									
Find job to be interesting									0.81
Job enjoyable for its own sake									0.88
Job important to career goals									0.64
Job provides opportunities									0.79
Job gives personal satisfaction									0.83
Job helps me get recognition									0.62
Job helps achieve financial goals									-

the virtuality scale, namely those relating to remote access, displayed low loadings of about .37. This was similar to the results from the CFA. For all the other constructs, loadings were satisfactory.

Since there is no one single test that we can use to make a determination about the overall fit between the data and the specified model, multiple indices were used such as the comparative fit index (CFI; Bentler, 1990); Tucker–Lewis index (TLI; Tucker & Lewis, 1973), normed fit index (NFI; Bentler & Bonnett, 1980), and root mean square error of approximation (RMSEA; Steiger, 1990). Table 8 displays the fit indices. Although the indices of CFI (.83), NFI (.83), and TLI (.87) are slightly below the recommended levels, the RMSEA at .06 indicates a good fit of the model.

Univariate Diagnostics

Univariate diagnostics were performed on item-level and construct-level data. Histograms, stem and leaf plots, were examined for all of the constructs. Table 9 shows the descriptive statistics for construct composite scores, namely the means, standard deviation, skewness and kurtosis for all of the variables. Skewness measures the symmetry of the distribution, and typically values outside the range of –1 to +1 are considered substantially skewed. The data indicates that except for job satisfaction, the skewness values were within acceptable range. All the variables, except for virtuality were slightly negatively skewed. For kurtosis, which is a measure of the peakedness or flatness of a distribution, except for job satisfaction, the data appeared, by and large, to demonstrate normality. However, since the overall distributions did not show significant departures from normality, and since the intention was to use regression, which is a fairly robust statistical procedure, the decision was taken that it is not necessary to transform any of the variables. Once the item-level data was checked, two sets of measures were created for each variable: the first, composite scores was done by summing the scores of the items relating to that construct and dividing by the

TABLE 8

GOODNESS OF FIT MEASURES FOR
THE MEASUREMENT MODEL

	Goodness-of-Fit Measure	Estimated Model	Criteria for good model fit
1.	Comparative Fit Index (CFI)	.83	Values close to 0.9 indicate good fit (0 = no fit 1 = perfect fit)
2.	Root Mean Square Error of Approximation (RMSEA)	.06	Values less than .08 indicate good fit
3.	Goodness-of-Fit Index (GFI)	.80	Values close to 0.9 indicate good fit (0 = no fit 1 = perfect fit)
4.	Tucker-Lewis Index (TLI)	.87	Values close to 0.9 indicate good fit (0 = no fit 1 = perfect fit)
5.	Normed Fit Index (NFI)	.83	Values close to 0.9 indicate good fit (0 = no fit 1 = perfect fit)

TABLE 9

DESCRIPTIVE STATISTICS FOR CONSTRUCT COMPOSITE SCORES

	Mean	SD	Skewness	Std Error	Kurtosis	Std Error
1. Virtuality	3.19	1.38	0.80	0.10	0.27	0.20
2. Autonomy	5.38	1.15	-1.09	0.10	1.45	0.20
3. Outcome Orientation	4.87	1.31	-0.91	0.10	0.41	0.20
4. Leadership for Innovation	5.18	1.37	-1.06	0.10	0.63	0.20
5. Post-Layoff Workload	5.34	1.35	-0.68	0.10	-0.07	0.20
6. Motivation	5.30	1.13	-1.09	0.10	1.14	0.20
7. Work Life Balance	4.67	1.16	-0.52	0.10	0.00	0.20
8. Org. Identification	5.61	1.09	-0.99	0.10	1.29	0.20
9. Job Satisfaction	5.90	1.02	-1.70	0.10	4.10	0.20
10. Job Performance*	14.93	2.45	-0.27	0.12	0.28	0.24

* Scale 1–20; sample size = 411
Sample Size = 575

number of items; the second, factor scores, was done by deriving factor scores generated from the factor analysis.

Correlation Analysis

Before testing for the main effects, the Pearson Product moment correlations for all the variables were examined. The sample size for all the variables is identical due to the application of mean substitution for handling missing data.

Tables 10 and 11 illustrate the correlations computed for the study. Table 10 contains the correlations computed using *composite scores*. Table 11 shows the correlations based on the *factor scores*. A comparison correlation matrix which includes four sets of correlations: correlations based on composite scores with mean substitution, based on factor scores with mean substitution, based on composite scores with listwise deletion and composite scores with pairwise deletion is contained in table 3, in chapter 4. As we can see from the tables, the resulting correlations using the two different scores are remarkably similar, and have only minor differences. This lends greater support to conclusions derived from the analysis of this data

Hypothesis Testing

Composite Scores and Factor Scores

Correlation and regression analysis was done using two sets of measures of the variables. The first set of analyses was done using the composite score for the variables. This assumes equal weighting being given to each of the items that compose the variable. The second set of analyses was done using factor scores that were derived from the factor analysis. This method of computing the scores for the variables is based on differential weightings of the items in that factor. The factor score were created using regression method which assigns scores that have a mean of zero and a variance equal to the squared multiple

TABLE 10

CORRELATION MATRIX USING COMPOSITE SCORES

	1	2	3	4	5	6	7	8	9	10
1. Virtuality										
2. Autonomy	.03									
3. Outcome Orientation	.04	.20**								
4. Leadership for Innovation	-.06	.19**	.50**							
5. Post-Layoff Workload	.13**	.02	.06	.09*						
6. Motivation	.11**	.31**	.51**	.48**	.07*					
7. Work Life Balance	-.17**	.11**	.11**	.04	-.31**	.12**				
8. Org. Identification	.15**	.13**	.42**	.36**	.12**	.58**	.06			
9. Job Satisfaction	.00	.22**	.44**	.44**	.00	.73**	.26**	.66**		
10. Job Performance (n=411)	.11*	.11*	.18**	.17**	.08	.14**	-.07	.14**	.10*	

* p<.05 ** p<.01

Coefficient alphas indicating scale reliabilities are in parentheses on the diagonal

TABLE 11

CORRELATION MATRIX USING FACTOR SCORES

	1	2	3	4	5	6	7	8	9	10
1. Virtuality										
2. Autonomy	.05									
3. Outcome Orientation	.06	.20**								
4. Leadership for Innovation	-.06	.19**	.51**							
5. Post-Layoff Workload	.13**	.01	.08*	.14**						
6. Motivation	.13**	.31**	.50**	.49**	.09*					
7. Work Life Balance	-.20**	.12**	.10**	.00	-.35**	.13**				
8. Org. Identification	.21**	.12**	.40**	.34**	.16**	.58**	.03			
9. Job Satisfaction	.02	.25**	.45**	.46**	.02	.78**	.25**	.65**		
10. Job Performance	(Performance was a one item measure – hence factor scores were not generated)									

* p<.05 ** p<.01

correlation between the estimated factor scores and the true factor values.

It has been noted by Pedhazur and Schmelkin (1991) that that the topic of factor scores is quite complicated due to its indeterminancy, namely that more than one set of factor scores can be created that can be considered legitimate. Hence they are of the opinion that factor scores have limited usefulness. Hair, et al. (1998) hold the view that if generalizability is desired, then composite scores work better.

Bollen (1989) and James, Mulaik, and Brett (1982) provide the conceptual grounding for using results of common factor analysis when theory is used to guide interpretation. Hair et al. (1998: 119) note "Factor scores represent the degree to which each individual scores high on the group of items that have high loadings on a factor. Thus high values on the variables with high loadings on a factor will result in a higher factor score." Factor scores are very useful when dealing with latent variables that have multiple measures, particularly from multiple sources. Although I did not have multiple sources of data, I did generate factor scores that were used for the subsequent regression analysis. The intention of doing the analysis using both methodologies was to investigate convergence of the composite score and factor score solutions and to make a judgment on the strength of the relationship studied. No doubt, convergence of solutions would lend greater credibility to the hypotheses being tested, and one could make a stronger case of the existence or absence of a relationship based on the analysis.

For this study, the factor scores were derived using maximum likelihood estimation with direct oblimin rotation. First, all of the 48 items were entered into a factor analysis and factor scores emerged for all of the constructs. Since there was simple structure and the loadings were in the theoretically predicted direction for the constructs of virtuality, autonomy, outcome orientation, leadership for innovation, post-layoff workload assessment, work life balance, and organizational identification, the factor loadings of these constructs

was generated from the overall factor analysis. Examination of the pattern matrix revealed that the loadings on leadership for innovation and work life balance were negative. However, these numbers have been adjusted to be positive so as to be consistent. For the job satisfaction and motivation items, separate factor analyses were conducted, using maximum likelihood with direct oblimin rotation for generating the factor scores. This was done because of the cross loadings these constructs had in the exploratory factor analysis.

Regression Analysis

Linear regression was used for testing the hypotheses. Hypotheses were tested by regressing Y, the dependent variable, on X, the independent variable.

The regression equation can be represented as follows:

Equation: $\hat{Y} = Bo + B1X1$

Hypotheses Test: $Ho : \beta 1 \leq 0$

$Ha : \beta 1 > 0$

Test procedure: Reject Ho if $t > .05$

The results of the hypotheses tests are presented in the next few pages. The initial results are presented using the composite scores of the variables. Thus, when not explicitly stated, the results of the regression refer to the results using the composite scores. After the explanation of the hypotheses results based on the composite score, the subsequent paragraph contains the results based on the factor scores. This enables us to make a judgment on whether or not the conclusions about the support for the hypotheses are the same using both sets of scores: composite and factor. This provides an additional element of triangulation in the results reported. In the following section, each of the hypotheses results are analyzed in the same order in which they were presented in chapter 3.

Hypothesis 1: Virtuality is positively related to Autonomy

The first hypothesis proposed that greater virtuality on the job will be related to greater job autonomy. Examining the correlation between the variables indicated that virtuality did not have a linear relation with autonomy ($r = .03$, $p = .46$). In other words, employees high on virtuality did not feel that they had greater autonomy in their jobs. Regression results using composite scores, also reported a similar pattern of results. Virtuality did not have an impact on autonomy ($t = 0.73$, $p = .46$). Thus none of the variation in autonomy could be explained by virtuality as indicated by the r^2 value of .00. The results of the regression analysis using the composite scores are illustrated below in table 12.

TABLE 12

REGRESSION ANALYSIS RESULTS OF THE
OF THE RELATIONSHIP BETWEEN
VIRTUALITY AND AUTONOMY

Hyp.	Sample size	Predictor	Dependent Variable	Standardized beta coefficient	t-value	R-square	Result
1	N=575	Virtuality	Autonomy	.03	0.73	.00	Not Supported

Analysis based on composite scores
$F = 0.53$, $p = .46$
* $p<.05$ ** $p<.01$

To test for convergence of solutions using composite scores and factor scores, a separate regression analyses was done using the factor scores generated from the factor analysis. Results were similar to those obtained using the composite scores: the correlation coefficient between virtuality and autonomy was ($r = .05$, $p = .17$), and the t-value from the regression analysis was 1.36 ($p = .17$), indicating lack of support of the hypothesis.

Hypothesis 2: Virtuality is positively related to Outcome Orientation

The second hypothesis states that virtuality is positively related to outcome orientation. In other words the greater the virtuality in the job, the greater will be the use of objective performance standards used to evaluate the individual. However, it was found that the correlation between virtuality and outcome orientation was low (r = .04, p = .26), indicating lack of a linear relationship between the variables. Regressing the variables also led to the same conclusion, (t = 1.10, p = .26) leading one to believe that employees with high virtuality are not necessarily managed with a more outcome-oriented managing system. Table 13 contains the regression results.

TABLE 13

REGRESSION ANALYSIS RESULTS OF THE RELATIONSHIP BETWEEN VIRTUALITY AND OUTCOME ORIENTATION

Hyp.	Sample size	Predictor	Dependent Variable	Standardized beta coefficient	t-value	R-square	Result
2	N=575	Virtuality	Outcome Orientation	.04	1.10	.00	Not Supported

Analysis based on composite scores
F = 1.23, p =.26
* p<.05 ** p<.01

Lack of support for this hypothesis was also found when re-doing the analysis using the factor scores generated from the factor analysis. Correlation between virtuality and outcome orientation was not significant (r = .06, p = .12). The results from the regression analysis also did not lend support to the hypothesis (t = 1.53, p = .12), and (F = 2.36, p = .12), lending support to the analysis based on composite scores.

Hypothesis 3: Autonomy is positively associated with Work Life Balance

The third hypothesis states that autonomy is positively related to work life balance. Correlation between autonomy and work life balance was not very high ($r = .11$, $p < .01$), and regression results ($t = 2.84$, $p < .01$), indicated that the hypotheses that the slope is zero is rejected. The implication is those with greater autonomy in their jobs do have better work life balance. The argument for this hypothesis is that the enhanced flexibility provides employees the ability to address family concerns and responsibilities. Although the results are not very strong, there is no doubt a linear relation between the two.

TABLE 14

REGRESSION ANALYSIS RESULTS OF THE RELATIONSHIP BETWEEN AUTONOMY AND WORK LIFE BALANCE

Hyp.	Sample size	Predictor	Dependent Variable	Standardized beta coefficient	t-value	R-square	Result
3	N=575	Autonomy	Work Life Balance	.11	2.84**	.01	Supported

Analysis based on composite scores
$F = 8.07$**
* p<.05 ** p<.01

Analysis based on the factor scores also demonstrated similar findings. The correlation between autonomy and work life balance was .12 ($p < .01$). Regressing work life balance on autonomy led to the conclusion that about 1% of the variation in work life balance can be explained by autonomy. Thus the r^2 was identical using the two data scores. Regression using the factor scores led to a t value of 3.07 ($p < .01$)

Hypothesis 4: Autonomy is positively associated with greater Motivation

The fourth hypothesis states that autonomy is positively related to employee motivation. Autonomy was positively correlated with motivation ($r = .31$, $p < .01$) indicating that greater autonomy in the job corresponds with higher levels of motivation. Running a regression led to the conclusion that the proportion of variation in motivation that can be accounted for by variation in autonomy is .10. A significance test that the slope was zero was rejected based on a t-value of 8.06 ($p < .01$). Thus we can say with confidence that hypothesis 4 was supported and that greater autonomy in the job does have a positive impact on motivation.

TABLE 15

REGRESSION ANALYSIS RESULTS OF THE
OF THE RELATIONSHIP BETWEEN
AUTONOMY AND MOTIVATION

Hyp.	Sample size	Predictor	Dependent Variable	Standardized beta coefficient	t-value	R-square	Result
4	N=575	Autonomy	Motivation	.31	8.06**	.10	Supported

Analysis based on composite scores
F = 64.96**
* p<.05 ** p<.01

Using factor scores, the correlation between autonomy and motivation was also .31 ($p < .01$) and the regression results indicated the existence of a linear relationship between the variables ($t = 8.02$, $p < .01$). Results are remarkably similar using both analyses. Variance explained or r^2, was also .10 using both sets of scores, providing evidence of the stability of the results for this hypothesis.

Hypothesis 5: Outcome Orientation is positively associated with greater Employee Motivation

The fifth hypothesis states that outcome orientation is positively related to employee motivation. This hypothesis was supported. R-Squared, the proportion of the variation in motivation that can be accounted for by variation in outcome orientation was .26. Correlation (using factor scores) between employee motivation and outcome orientation was .51. The regression results indicated a linear relationship between the variables with the significance test indicating a t-value of 14.25 ($p < .01$), and $F = 203.13$ ($p < .01$). The implication is that the more employees are assessed using objective criteria and performance standards, the higher will be their level of motivation.

TABLE 16

REGRESSION ANALYSIS RESULTS OF THE RELATIONSHIP BETWEEN OUTCOME ORIENTATION AND MOTIVATION

Hyp.	Sample size	Predictor	Dependent Variable	Standardized beta coefficient	t-value	R-square	Result
5	N=575	Outcome Orientation	Motivation	.51	14.25**	.26	Supported

Analysis based on composite scores
F = 203.13**
* p<.05 ** p<.01

Analysis based on the factor scores also indicated that the greater the use of objective performance standards, the higher the employee motivation ($r = .50$, $p < .01$). The percent of variation in motivation that was explained by outcome orientation using factor scores was .25. Regressing motivation on outcome orientation also indicated support for the hypothesis ($t = 14.15$, $p < .01$). The F-test was also significant: $F = 203.13$, $p < .01$. Thus similar results were obtained using composite scores and factor scores.

Hypothesis 6: Leadership for Innovation is positively associated with Work Life Balance

The sixth hypothesis states that leadership for innovation is positively related to work life balance. This hypothesis was not supported. Regressing work life balance on leadership for innovation in a linear regression led to a t-value of 0.99 (p = .31). Correlation between the variables was also very low (r = .04, p = .31). Therefore, leadership provided by immediate manager, as measured by the dimensions of individualized consideration and intellectual stimulation, appears to have little impact on the work life balance of employees. Table 17 presents the results of the regression analysis.

TABLE 17

REGRESSION ANALYSIS RESULTS OF THE RELATIONSHIP BETWEEN LEADERSHIP FOR INNOVATION AND WORK LIFE BALANCE

Hyp.	Sample size	Predictor	Dependent Variable	Standardized beta coefficient	t-value	R-square	Result
6	N=575	Leadership for Innovation	Work Life Balance	.04	0.99	.00	Not Supported

Analysis based on composite scores
F = 0.99, p = .31
* p<.05 ** p<.01

Re-doing the analysis using factor scores led to similar conclusions about the lack of support of the hypotheses. There was a non-significant relation between leadership for innovation and work life balance (r = .00, p = .82), and none of the variation in work life balance could be explained by leadership and (t = 0.21, p = .82).

Hypothesis 7: Leadership for Innovation is positively associated with Motivation

The seventh hypothesis states that leadership for innovation is positively related to employee motivation. Correlation between leadership for innovation and motivation was extremely high ($r = .48$, $p < .01$), implying that high levels of leadership for innovation are associated with high levels of motivation among employees. Regression results also showed strong support for this hypothesis: t-value = 13.33 ($p < .01$), F = 177.85 ($p < .01$). Results of the regression analysis using composite scores are shown in table 18.

TABLE 18

REGRESSION ANALYSIS RESULTS OF THE RELATIONSHIP BETWEEN LEADERSHIP FOR INNOVATION AND MOTIVATION

Hyp.	Sample size	Predictor	Dependent Variable	Standardized beta coefficient	t-value	R-square	Result
7	N=575	Leadership for Innovation	Motivation	.48	13.33**	.23	Supported

Analysis based on composite scores
F = 177.85**
* p<.05 ** p<.01

Strong support of this analysis using composite scores was reiterated by the analysis done using factor scores. The correlation between leadership for innovation and motivation was marginally higher ($r = .49$, $p < .01$). R^2 or the variation in motivation that could be explained by leadership for innovation was 24% as indicated by the regression analysis. The t-test was significant ($t = .13.59$, $p < .01$), indicating support for the hypotheses.

Hypothesis 8: Leadership for Innovation is positively associated with Job Satisfaction

The eighth hypothesis states that leadership for innovation is positively related to job satisfaction. The correlation between leadership for innovation and job satisfaction was extremely high ($r = .44$, $p < .01$), implying that higher levels of leadership for innovation are associated with higher job satisfaction. Regressing job satisfaction on leadership for innovation led to the conclusion that 19% of the variation in job satisfaction can be explained by leadership for innovation (t-value = 11.91, $p < .01$). Table 19 contains the results of the regression analysis using composite scores.

TABLE 19

REGRESSION ANALYSIS RESULTS OF THE RELATIONSHIP BETWEEN LEADERSHIP FOR INNOVATION AND JOB SATISFACTION

Hyp.	Sample size	Predictor	Dependent Variable	Standardized beta coefficient	t-value	R-square	Result
8	N=575	Leadership for Innovation	Job Satisfaction	.44	11.91**	.19	Supported

Analysis based on composite scores
F = 141.97**
* p<.05 ** p<.01

Analysis based on the factor scores demonstrated similar results. The correlation between leadership for innovation and job satisfaction was .46 ($p < .01$), very similar to that obtained with the composite scores. Also the results of the regression analysis indicated to similar results: t-value 12.55 ($p < .01$), F = 157.53 ($p < .01$).

Hypothesis 9: Leadership for Innovation is positively associated with Organizational Identification

The ninth hypothesis states that leadership for innovation is positively related to organizational identification. Past research has not explicitly examined the impact of leadership on organizational identification, and it appears from the high correlation between the constructs ($r = .36$, $p < .01$), that leadership for innovation does have a positive impact on facilitating employees develop a strong psychological attachment with the organization. Regression analysis indicated a t-value of 9.39 ($p < .01$), and the r^2 was .13 implying that 13% of the variation in organizational identification can be explained by leadership for innovation. Hence, there was strong support for this hypothesis.

TABLE 20

REGRESSION ANALYSIS RESULTS OF THE RELATIONSHIP BETWEEN LEADERSHIP FOR INNOVATION AND ORGANIZATIONAL IDENTIFICATION

Hyp.	Sample size	Predictor	Dependent Variable	Standardized beta coefficient	t-value	R-square	Result
9	N=575	Leadership for Innovation	Org. Identification	.36	9.39**	.13	Supported

Analysis based on composite scores
F = 88.3**
* p<.05 ** p<.01

Using factor scores, I found results that corroborated the analysis based on composite scores. The correlation between leadership for innovation and organizational identification was quite high ($r = .34$, $p < .01$), and the t-value was $t = 8.67$ ($p < .01$), indicating strong support for Hypothesis 9 using factor scores.

Hypothesis 10: Post-Layoff Workload Assessment is negatively associated with Organizational Identification

The tenth hypothesis states that post-layoff workload increase is negatively related to organizational identification. Although the hypothesized relationship between post-layoff workload assessment was negative, the correlation between the variables turned out to be positive and significant. The strength of association as indicated by the correlation was .12, ($p < .01$), implying that the greater the increase in workload, the stronger the organizational identification. Regression results corroborated this finding ($t = 2.95$, $p < .01$). Hence this hypothesis was not supported.

TABLE 21

REGRESSION ANALYSIS RESULTS OF THE RELATIONSHIP BETWEEN POST-LAYOFF WORKLOAD ASSESSMENT AND ORGANIZATIONAL IDENTIFICATION

Hyp.	Sample size	Predictor	Dependent Variable	Standardized beta coefficient	t-value	R-square	Result
10	N=575	Post-Layoff Workload Assessment	Org. Identification	.12	2.95**	.01	Not Supported

Analysis based on composite scores
F = 8.71**
* p<.05 ** p<.01

Analysis based on the factor scores also demonstrated the same pattern of results ($r = .16$, $p < .01$), and ($t = 3.21$, $p < .01$). Although the test was significant, the hypothesized relationship was opposite in terms of directionality of the relationships being tested. Hence, analysis using factor scores also did not enable rejection of the hypothesis that the slope was zero. Thus increase in workload following layoffs does not appear to alienate employees by reducing their identification with the company.

Hypothesis 11: Work Life Balance is positively associated with Job Satisfaction

The eleventh hypothesis states that work life balance is positively related to job satisfaction. It appears that work life balance is extremely important in determining job satisfaction levels among employees. The degree of association indicated by the correlation between work life balance and job satisfaction was .26 ($p < .01$), and regression results were also significant (t value = 6.61, $p < .01$). The percent of variation in job satisfaction that can be explained by work life balance issues as indicated by the r^2 was 7%. The results of this hypothesis are consistent with past research on the negative relationship between work life conflict and job satisfaction (Kossek & Ozeki, 1998). Results of the regression analysis based on composite scores are illustrated in table 20.

TABLE 22

REGRESSION ANALYSIS RESULTS OF THE RELATIONSHIP BETWEEN WORK LIFE BALANCE AND JOB SATISFACTION

Hyp.	Sample size	Predictor	Dependent Variable	Standardized beta coefficient	t-value	R-square	Result
11	N=575	Work Life Balance	Job Satisfaction	.26	6.61**	.07	Supported

Analysis based on composite scores
F = 43.69**
* p<.05 ** p<.01

Using factor scores led to the same conclusion about the positive relationship between work life balance and job satisfaction. The correlation between the variables was high .25 ($p < .01$), and regression results corroborated support for the hypothesis ($t = 6.32$, $p < .01$). Thus there is support for the relationship between work life balance and job satisfaction.

Hypothesis 12: Motivation is positively associated with Job Satisfaction

The twelfth hypothesis states that employee motivation is positively related to job satisfaction. This hypothesis was supported, as is not surprising given past evidence on the relationship between motivation and satisfaction. The correlation between the two constructs was the highest among the variables examined ($r = .73$, $p < .01$). The strength of the association between the constructs was even evident in the factor analytic results, which had seen these two constructs load together on the same factor. Regressing satisfaction on motivation led to rejection of the significance test that the slope was zero ($\beta 1 = 0$) was rejected based on a t-value of 26.02 ($p < .01$).

TABLE 23

REGRESSION ANALYSIS RESULTS OF THE RELATIONSHIP BETWEEN MOTIVATION AND JOB SATISFACTION

Hyp.	Sample size	Predictor	Dependent Variable	Standardized beta coefficient	t-value	R-square	Result
12	N=575	Motivation	Job Satisfaction	.73	26.02**	.54	Supported

Analysis based on composite scores
F = 677.44**
* p<.05 ** p<.01

That motivation is positively related to satisfaction was also found in the second run of analyses done using factor scores. The r^2 that emerged from the regression analysis using factor scores was .61, higher than that the one that emerged from using the composite scores, which was .54. Correlation between motivation and job satisfaction using the factor scores was .78 ($p < .01$). Regression analyses also led to strong support of the hypothesis ($t = 30.37$, $p < .01$)

Hypothesis 13: Organizational Identification is positively associated with Job Satisfaction

The thirteenth hypothesis states that organizational identification is positively related to job satisfaction. The correlation between organizational identification and job satisfaction was exceptionally high (r = .66, p < .01), indicating that those who have a strong psychological attachment with the organization are extremely satisfied with their jobs. In addition to examining the correlation, regression analysis of the data also indicated strong support for hypothesis 13, (t-value = 21.27, p < .01), indicating that the proportion of variation in job satisfaction that can be accounted for by organizational identification is 44%. Results of the regression analysis using composite scores can be seen in table 24.

TABLE 24

REGRESSION ANALYSIS RESULTS OF THE RELATIONSHIP BETWEEN ORGANIZATIONAL IDENTIFICATION AND JOB SATISFACTION

Hyp.	Sample size	Predictor	Dependent Variable	Standardized beta coefficient	t-value	R-square	Result
13	N=575	Org. Identification	Job Satisfaction	.66	21.27**	.44	Supported

Analysis based on composite scores
F = 452.69**
* p<.05 ** p<.01

Using factor scores the proportion of variation in job satisfaction that could be explained by organizational identification was 42%, very similar to the results obtained from the composite scores. Both correlation (r = .65, p < .01), and regression analysis (t = 20.54, p < .01) results provide additional support for the hypothesis

Hypothesis 14: Job Satisfaction is positively associated with Job Performance

The fourteenth hypothesis states that job satisfaction is positively related to employee performance. Correlation between job satisfaction and job performance was moderate ($r = .10$, $p < .05$), implying that high levels of satisfaction are associated with high job performance among employees. Regression results also showed moderate support for this hypothesis: t-value = 2.03 ($p < .01$), F = 4.11 ($p < .05$). Results of the regression analysis using composite scores are shown in table 23. For performance, factor scores were not generated, since this was a single item measure. Hence results using factor scores are not reported.

TABLE 25

REGRESSION ANALYSIS RESULTS OF THE RELATIONSHIP BETWEEN JOB SATISFACTION AND EMPLOYEE PERFORMANCE

Hyp.	Sample size	Predictor	Dependent Variable	Standardized beta coefficient	t-value	R-square	Result
14	N=409	Job Satisfaction	Performance	.10	2.03	.00	Supported

Analysis based on composite scores
F = 4.11, p = .04
* p<.05 ** p<.01

In summary, results indicate that there was support for ten of the fourteen hypotheses proposed in the model using the composite and factor scores. Table 26 shows the results of the regression analysis based on factor scores, which have led to results similar to that obtained from the composite scores. Figure 5 illustrates the model of relationships with the results from the regression analysis using composite scores. In the following section, I have used structural equation modeling to estimate the model using all the constructs simultaneously.

TABLE 26

REGRESSION RESULTS USING FACTOR SCORES

Hypothesis	Sample size	Independent	Dependent	Standardized beta coefficient	t-value	R-square	Result
1	N = 575	Virtuality	Autonomy	.05	1.36	.00	Not Supported

Hypothesis	Sample size	Independent	Dependent	Standardized beta coefficient	t-value	R-square	Result
2	N = 575	Virtuality	Outcome Orientation	.06	1.53	.00	Not Supported

Hypothesis	Sample size	Independent	Dependent	Standardized beta coefficient	t-value	R-square	Result
3	N = 575	Autonomy	Work Life Balance	.12	3.07**	.01	Supported

Hypothesis	Sample size	Independent	Dependent	Standardized beta coefficient	t-value	R-square	Result
4	N = 575	Autonomy	Motivation	.31	8.02**	.10	Supported

Hypothesis	Sample size	Independent	Dependent	Standardized beta coefficient	t-value	R-square	Result
5	N = 575	Outcome Orientation	Motivation	.50	14.15**	.25	Supported

* p<.05 ** p<.01

Table 26—*Continued.*

Hypothesis	Sample size	Independent	Dependent	Standardized beta coefficient	t-value	R-square	Result
6	N = 575	Leadership	Work Life Balance	.00	.21	.00	Not Supported

Hypothesis	Sample size	Independent	Dependent	Standardized beta coefficient	t-value	R-square	Result
7	N = 575	Leadership	Motivation	.49	13.59	.24	Supported

Hypothesis	Sample size	Independent	Dependent	Standardized beta coefficient	t-value	R-square	Result
8	N = 575	Leadership	Job Satisfaction	.46	12.55**	.21	Supported

Hypothesis	Sample size	Independent	Dependent	Standardized beta coefficient	t-value	R-square	Result
9	N = 575	Leadership	Org. Identification	.34	8.67**	.11	Supported

Hypothesis	Sample size	Independent	Dependent	Standardized beta coefficient	t-value	R-square	Result
10	N = 575	Post-Layoff Workload Assessment	Org. Identification	.16	3.97**	.02	Not Supported

* p<.05 ** p<.01

Table 26—*Continued.*

Hypothesis	Sample size	Independent	Dependent	Standardized beta coefficient	t-value	R-square	Result
11	N = 575	Work Life Balance	Job Satisfaction	.25	6.32**	.06	Supported

Hypothesis	Sample size	Independent	Dependent	Standardized beta coefficient	t-value	R-square	Result
12	N = 575	Motivation	Job Satisfaction	.78	30.37**	.61	Supported

Hypothesis	Sample size	Independent	Dependent	Standardized beta coefficient	t-value	R-square	Result
13	N = 575	Org. Identification	Job Satisfaction	.65	20.54**	.42	Supported

* p<.05 ** p<.01

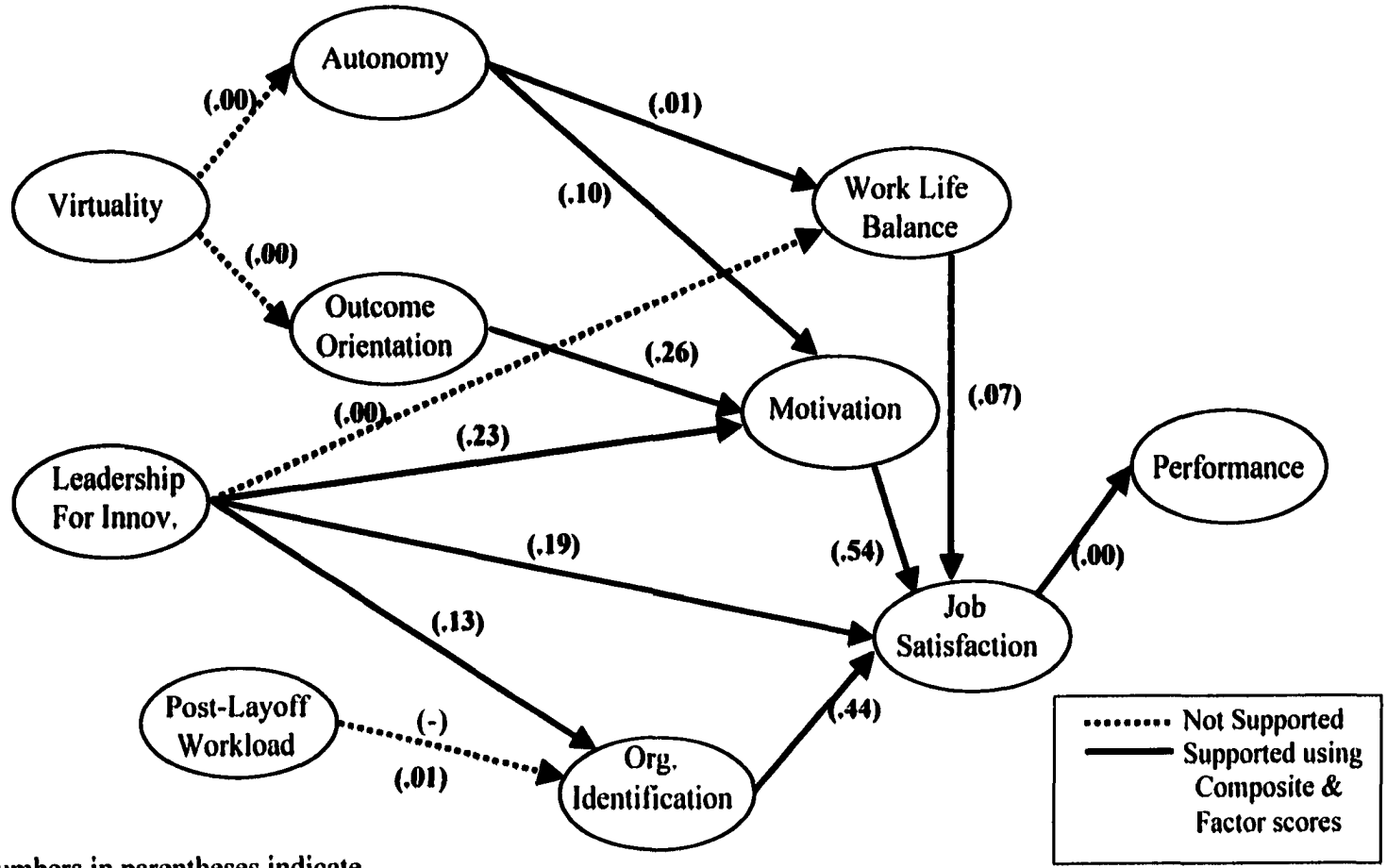


Figure 5. Workplace Virtuality Model Results using Regression.

Structural Equation Modeling (SEM)

In the earlier section on regression analysis, each of the hypotheses were tested separately. To enable simultaneous estimation of the model, structural equation modeling was done. This statistical technique is becoming increasingly popular for testing theories in the behavioral sciences. More importantly, it was felt that the ability of SEM to take measurement error into account in the analysis would give more accurate estimates of the causal relationships between the latent variables (Hair et al., 1998). SEM is often used to test alternative or competing models, with the aim of finding out which model best fits the data. For this study however, a confirmatory modeling strategy was used to test the goodness of fit of the proposed model. Earlier, I had already established simple structure through unidimensionality and factor analysis. I also tested the measurement model using SEM. This involved examining relationships between the manifest and the latent variables. Next, I tested the structural model to examine the relationships between the latent variables.

Model Estimation: Structural Model

I used AMOS version 4.0 to analyze the structural model. Figure 6 contains the input model that was tested. In the model, ellipses represent the 9 latent variables, rectangles represent the 49 observed variables, including the one for performance, and circles represent the 54 error terms. Two sets of results are examined. The first relates to whether or not the model has adequate fit. The second set of results relates to whether or not the parameter estimates from the analysis support the relationships between the variables. As MacCallum and Austin (2000: 218) note, "a finding of good fit does not imply that effects hypothesized in the model are strong. In fact, it is entirely possible for relationships among variables to be weak, or even zero, and for a hypothesized model to fit extremely well."

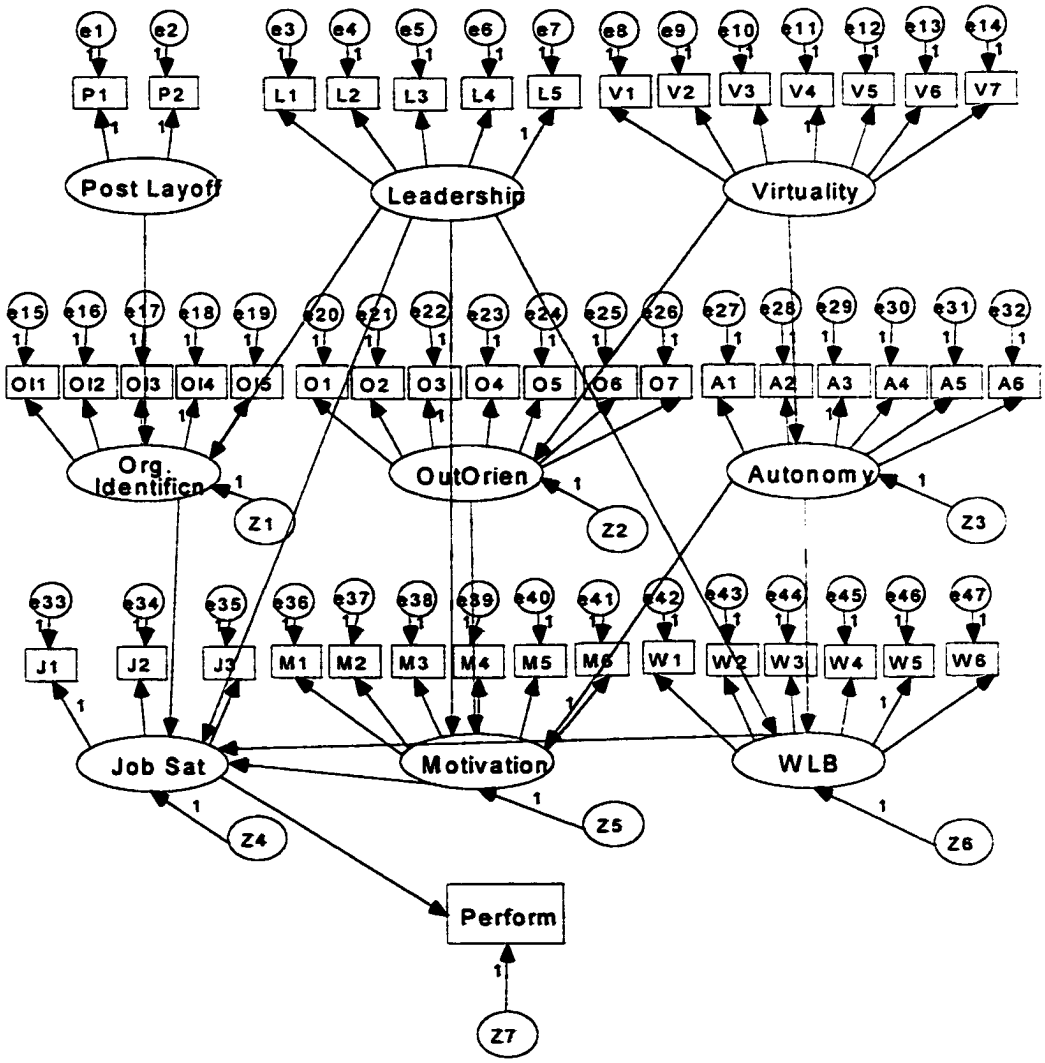


Figure 6. Workplace Virtuality—SEM Input Model.

Assessment of Model Fit

Multiple measures of fit were examined to evaluate the structural model as recommended (Hair et al., 1998). One of the commonly used goodness-of-fit measures is the chi-square test. However, researchers (e.g. Thompson & Daniel, 1996; Bentler & Bonnett, 1980) have noted the problems associated with relying on the chi-square statistic since it is highly sensitive to sample size. As the sample size increases, the chi-square tends to get inflated, leading us to reject the model. At the same time SEM does require large sample sizes. Due to this, determination of model fit requires examining multiple indices of goodness-of-fit (Schumacker & Lomax, 1996). Researchers have suggested several indices of fit. In an attempt to find out which SEM fit indices are more robust, to non-normality. estimation method, and sample size, Fan & Wang (1998) did a Monte Carlo study to assess the effects of the confounding factors on the indices. They found that the centrality index and the root mean square error of approximation (RMSEA) performed the best. They also noted the recent interest in the use of RMSEA.

Table 27 gives some of indices for model fit as well as the criteria for determining adequacy of model fit. For most indices the criteria of fit are based on differences between the observed and the reproduced covariance matrix (Schumacker & Lomax, 1996). Analysis of the results indicates an overall acceptable model fit. The chi-square statistic was 3,261.46 (df, 1068), indicating rejection of the model. However, as noted earlier, the chi-square is highly sensitive to sample size, hence it can be misleading. Analysis of some of the other fit indices indicated that the comparative fit index (CFI; Bentler, 1990) was .83; root mean square error of approximation (RMSEA; Steiger & Lind, 1980), an index of model misfit, was 0.07; normed fit index (NFI; Bentler & Bonnett, 1980) was .77; Tucker Lewis index (TLI; Tucker & Lewis, 1973) was .82. Although the CFI and TLI fit indices for the model are slightly lower than that recommended level of 0.9, the RMSEA indicated a good fit.

TABLE 27

GOODNESS OF FIT MEASURES FOR
THE ESTIMATED MODEL

	Goodness-of-Fit Measure	Estimated Model	Criteria for good model fit
1.	Comparative Fit Index (CFI)	.83	Values close to 0.9 indicate good fit (0 = no fit 1=perfect fit)
2.	Root Mean Square Error of Approximation (RMSEA)	.07	Values less than .08 indicate good fit
3.	Goodness-of-Fit Index (GFI)	.74	Values close to 0.9 indicate good fit (0 = no fit 1=perfect fit)
4.	Tucker-Lewis Index (TLI)	.82	Values close to 0.9 indicate good fit (0 = no fit 1=perfect fit)
5.	Normed Fit Index (NFI)	.77	Values close to 0.9 indicate good fit (0 = no fit 1=perfect fit)

Assessment of Parameter Estimates

Table 28 contains the maximum likelihood estimates along with their standard errors (S.E.) and the critical ratios (C.R.). The maximum likelihood estimates are similar to the standard least square solution for regression coefficients. The critical ratio is similar to a t-value. Estimates with critical ratios more than 1.96 are significant at the .05 level. Using this criterion, I will now examine the each of the hypotheses in the model.

Results of the structural equation analysis indicate lack of support for Hypotheses 1 and 2, implying that virtuality does not have a relationship with autonomy and outcome orientation. The third hypothesis, which suggested a positive relationship between autonomy and work life balance, was also not supported. Strong support for hypotheses 4 which posited a relationship between autonomy and motivation was also found. Likewise strong support was found for hypothesis 5 implying a positive relationship between outcome orientation and motivation. Similar to the findings from the regression analysis, there was lack of support for hypothesis 6 which posited a positive relationship between leadership for innovation and work life balance. Leadership for innovation was strongly related to motivation (hypothesis 7) and organizational identification (hypothesis 9).

Interestingly enough, hypotheses 8, which suggested a positive relationship between leadership for innovation and job satisfaction was not supported. This finding is contradictory to the results of the regression analysis, which had predicted an r^2 of .19 implying that 19% of the variation in job satisfaction can be explained by leadership for innovation.

The hypothesized negative relationship between post-layoff workload assessment and organizational assessment (hypothesis 10) was not supported. However, there was support for the relationships between work life balance and job satisfaction (hypothesis 11); between motivation and job satisfaction (hypothesis 12); and between organizational identification and job satisfaction (hypothesis 13). Finally, the positive relationship

TABLE 28

STRUCTURAL PARAMETER ESTIMATES FOR THE ESTIMATED MODEL

Relationship	Maximum Likelihood Estimate	Standardized Estimate	Standard Error	Critical Ratio
1. Virtuality–Autonomy	.02	.03	.04	0.53
2. Virtuality–Outcome Orientation	.04	.06	.03	1.09
3. Autonomy–Work Life Balance	.06	.07	.05	1.27
4. Autonomy–Motivation	.16	.19	.04	3.97*
5. Outcome Orientation–Motivation	.38	.38	.05	7.62*
6. Leadership–Work Life Balance	.01	.01	.04	0.28
7. Leadership–Motivation	.28	.35	.03	7.68*
8. Leadership–Job Satisfaction	.01	.00	.01	0.54
9. Leadership–Organizational Identification	.30	.37	.04	7.47*
10. Post-Layoff–Organizational Identification	.12	.12	.05	2.44*
11. Work Life Balance–Job Satisfaction	.09	.15	.02	4.34*
12. Motivation–Job Satisfaction	.49	.68	.02	15.41*
13. Organizational Identification–Job Satisfaction	.26	.37	.02	9.70*
14. Job Satisfaction–Performance	.28	.10	.14	1.95

* $p<.05$

between job satisfaction and performance was supported (hypothesis 14).

Since the SEM was done by including performance, the number of cases included in the analysis was 411. Thus a second model was analyzed by not including performance. Results for model fit improved slightly (CFI=.85; RMSEA=.06; NFI=.80 TLI=.84)

For the full model, the standardized structural coefficients are indicated in the model in figure 7. In chapter 6, I discuss the results described above, and outline the overall contributions and limitations of the study.

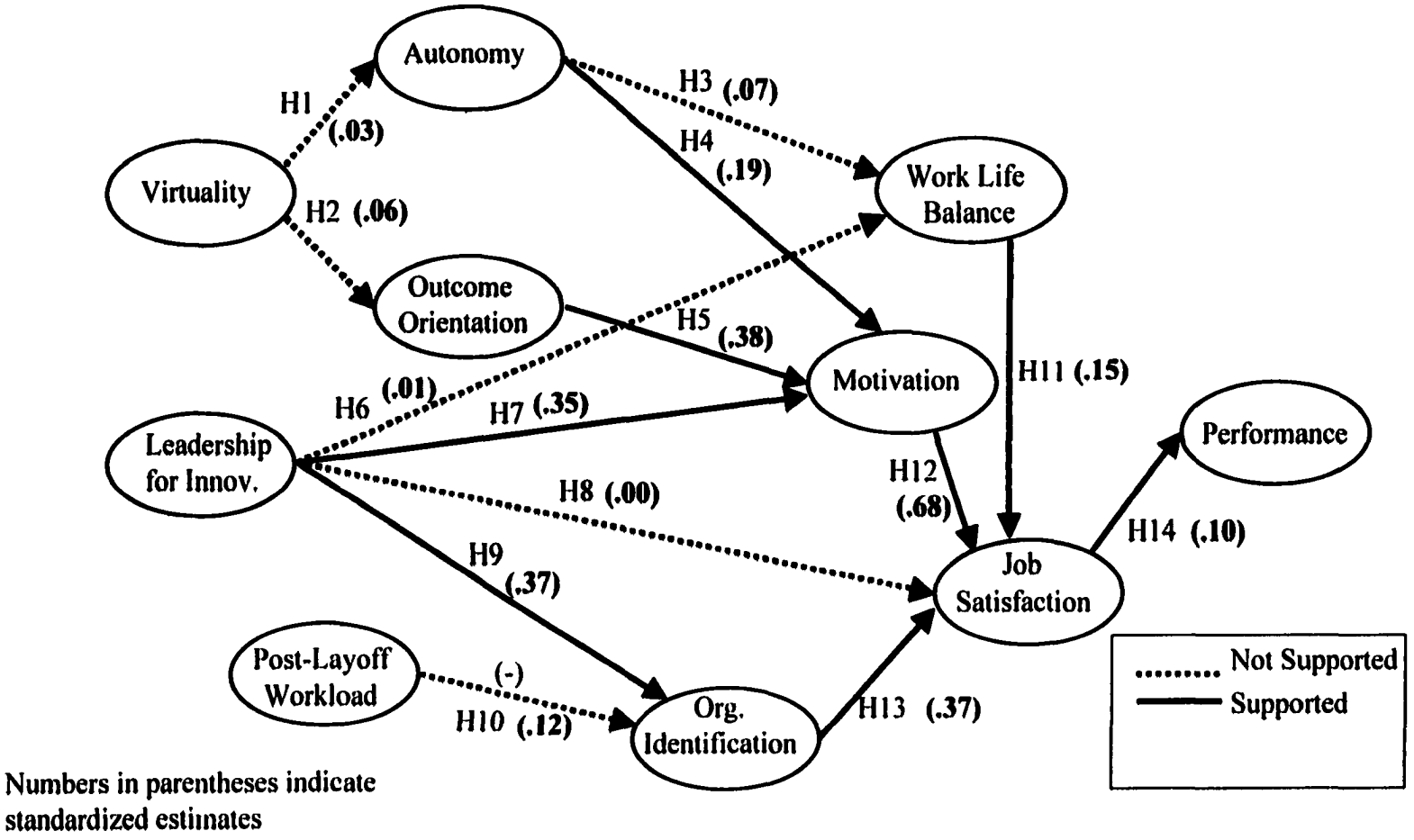


Figure 7. Workplace Virtuality Model Results Using SEM.

CHAPTER 6

DISCUSSION

In this chapter, I begin with a review and summary of the findings from the regression analysis and structural equation modeling used to test the hypotheses. While the last chapter elaborated on the individual hypotheses tests, in this chapter I evaluate the results of each of the hypotheses, and summarize the major findings of the study. This leads to a discussion of the study's contributions in the second section. In the third section, I discuss the limitations of the study. Finally, in the fourth section, I conclude the chapter by discussing the implications of the study, and provide suggestions for future academic research.

Review of Findings and Summary

This study aimed at exploring issues relating to a virtual workplace. Fourteen hypotheses were tested in a model containing relationships between ten constructs. Table 29 contains a summary of the results of the hypotheses based on regression analyses using composite scores, regression analysis using factor scores, and structural equation modeling. As can be seen, with respect to all the hypotheses except for hypotheses 3 and 8, there is complete convergence with respect to the conclusions. Empirical analysis indicated full support for eight, partial support for two, and lack of support for four of the fourteen hypotheses. The discussion relating to these is contained in the following paragraphs.

The first set of hypotheses related to those emerging from the construct of virtuality. The proposition that enhanced virtuality in the workplace is paradoxical since it simultaneously enhances autonomy and outcome orientation, did not hold up in this sample. The first hypothesis which proposed that the higher the virtuality, the greater the autonomy, was not supported. To further investigate this phenomenon, the hypothesis was tested by

TABLE 29

LIST OF SUPPORTED HYPOTHESES

1	2	3	
✖	✖	✖	HYPOTHESIS 1: Virtuality is positively associated with Autonomy
✖	✖	✖	HYPOTHESIS 2: Virtuality is positively associated with Outcome Orientation
✓	✓	✖	HYPOTHESIS 3: Autonomy is positively associated with Work Life Balance
✓	✓	✓	HYPOTHESIS 4: Autonomy is positively associated with Motivation
✓	✓	✓	HYPOTHESIS 5: Outcome Orientation is positively associated with Motivation
✖	✖	✖	HYPOTHESIS 6: Leadership is positively associated with Work Life Balance
✓	✓	✓	HYPOTHESIS 7: Leadership is positively associated with Motivation
✓	✓	✖	HYPOTHESIS 8: Leadership is positively associated with Job Satisfaction
✓	✓	✓	HYPOTHESIS 9: Leadership is positively associated with Org. Identification
✖	✖	✖	HYPOTHESIS 10: Post-Layoff Workload is negatively associated with Org. Identification
✓	✓	✓	HYPOTHESIS 11: Work Life Balance is positively associated with Job Satisfaction
✓	✓	✓	HYPOTHESIS 12: Motivation is positively associated with Job Satisfaction
✓	✓	✓	HYPOTHESIS 13: Org. Identification is positively associated with Satisfaction
✓	✓	✓	HYPOTHESIS 14: Job Satisfaction is positively associated with Performance

1 = Regression Analysis using Composite Scores
2 = Regression Analysis using Factor Scores
3 = Structural Equation Modeling

✓ Hypothesis Supported
✖ Hypothesis Not Supported

separating the two facets of autonomy, the method facet and the scheduling facet. Results indicated that the correlation between the method facet of autonomy and virtuality was greater (r = .09, p = .03) than between the scheduling facet of autonomy and virtuality (r = -.00, p = .91). This is surprising considering that past research has held that one of the strongest advantages of enhanced virtuality is the flexibility it offers to the employees.

With respect to the impact of virtuality on outcome orientation also, the hypothesis was not supported. This finding is not surprising in light of a finding by Kurland & Egan (1999) that outcome-based evaluations do not moderate the relationship between telecommuting and perceptions of justice. Hence it appears that managers tend to have a consistent system of evaluating all employees, and do not use different evaluation systems for employees in a virtual context.

However, upon further reflection, it may be that one of the reasons for this weak relationship in this sample may be that a fairly substantial number of employees, even with low virtuality were participants of the flextime program. To control for the effect of flextime participation, a separate analysis was conducted, and it was found that high virtuality did correspond with a high level of autonomy for those in the flextime program (r = .18, p = .01). Interestingly, the mean score for virtuality for the flextime participants was 2.96, lower than the mean virtuality score for the entire group, which was 3.19.

To rule out the possibility that the use of mean substitution may have altered the results, or that those with medium level of virtuality may be masking the relationships, a parallel analysis was conducted by doing a median split on the data using pairwise deletion. The group was divided into two groups of low and high virtuality using cutoff scores of 2.42 and 3.71 to divide the groups. The relationships did not hold up for either of the groups.

The third hypotheses, which posited a relationship between autonomy and work life balance was supported when using regression, but demonstrated lack of support when the

model was tested using SEM. Thus there was only partial support for this hypothesis. Hypothesis 4 which predicted a positive relationship between autonomy and motivation was supported. There was also a positive relationship between outcome orientation and motivation, implying that employees view the use of objective performance standards positively. Both work life balance and motivation were also found to positively impact job satisfaction.

The second set of hypotheses examined the impact of leadership for innovation on a set of variables. There was no support for the relationship between leadership for innovation and work life balance. Although the individualized consideration dimension of leadership was hypothesized to positively impact work life balance, perhaps the influence of leadership does not extend to work life issues. In my view, assessment of the overall work culture of the organization would throw more light on the role of leadership with respect to work life balance. Leadership was found to have a strong relationship with motivation and organizational identification. This is not surprising given past research on leadership and the importance of leadership in motivating and encouraging employees to greater levels of achievement by influencing their levels of motivation. Leadership for innovation is clearly critical to the way employees identify with the organization.

However, in examining the relationship of leadership with job satisfaction, the results from the structural equation modeling clearly differed from the regression analysis. While the regression analysis indicated a significant positive relationship between leadership and satisfaction, there was lack of support for the relationship in the SEM. Thus it appears that leadership for innovation does not have a *direct* impact on job satisfaction. Rather the impact of leadership on job satisfaction appears to be mediated by motivation and organizational identification.

The third set of hypotheses examines the impact of post-layoff workload on organizational identification as well as the impact of organizational identification on job satisfaction. The hypothesized negative relationship that increased workload due to layoffs would decrease organizational identification did not hold up. Rather the results were significant in the opposite direction. In trying to understand the reasoning behind these results, one explanation that may explain the results, comes from the literature on layoffs. It could be, for instance, that due to widespread layoffs in the economy, the reduction in workforce did not come as a surprise to the employees. And since the determination of layoffs was done either on the basis of performance or on the basis of entire business groups being asked to leave, the ones that remained in the job felt a greater attachment to the organization due to feelings of being valued. This may explain why an increase in workload was seen as an opportunity to exert more effort and be considered more valuable to the organization (Greenhalgh & Rosenblatt, 1984)

The hypothesized positive relationship between organizational identification and job satisfaction was supported. This corroborates the finding by Van Knippenberg & Van Schie (2000) who found a correlation of .18 between organizational identification and job satisfaction. Although Van Knippenberg & Van Schie (2000) had measured two different aspects of identification, namely, organizational and work group identification, their contention that taking a common focus on identification would underestimate the results did not hold in this sample of employees. The relationship between organizational identification and job satisfaction is stronger in this study.

Regarding the results from the SEM, although the structural model had fit indices that were slightly below the recommended levels, one must consider the complexity of the model, which contained 49 items and 10 constructs. Examination of the modification indices indicated that including a direct path between leadership and outcome orientation, and

between organizational identification and motivation could make some model improvements. However, since the intention of doing the SEM was to test the model fit of the original model, no adjustments were made to the model. As such the exogenous variables and the error terms were also left uncorrelated. Testing alternative models was outside the scope of this dissertation. Hence, it is quite feasible that model improvements can be generated by additional item pruning and by making adjustments to the paths between the latent variables.

In sum, results indicate a clear lack of evidence for support for the hypothesized relationships stemming from virtuality. Virtuality does not appear to have any impact on either job autonomy or outcome orientation. Even SEM analysis, which reduces Type II errors (namely, of overlooking relationships when they do actually exist) did not indicate support for the hypotheses, lending greater support to the findings. The strongest finding that appeared related to the impact of leadership on motivation and organizational identification of employees. It also appears that motivation and organizational identification mediate the relationship between leadership for innovation and job satisfaction

Contributions of the Study

Changes in the work paradigm have highlighted increasing virtuality in the workplace. The academic field has just begun to explore these issues of virtuality, at the individual, team, and organizational level. This study is among the first few to empirically explore virtuality at an individual level of analysis and examine its impact on various organizational processes.

Specifically, there are three major contributions of this study. First, this study uses rigorous research methodology to evaluate virtuality, a growing popular reality in the workplace. Second, it calls into question some of the arguments made in the literature on the impact of virtuality in the workplace. Third, it highlights the role of leadership in enhancing

motivation and organizational identification among employees. Each of these is discussed in detail below.

The first contribution of this study relates to the use of rigorous science to test assumptions about virtuality in the workplace. There is a plethora of current research and popular press on growing virtuality and how best we should manage it. Implications of changes to the workplace on account of increasing geographic dispersion of employees is projected to impact the network of relationships and interaction patterns among employees. In examining this phenomenon, however, one must acknowledge that the true test of theories lies in their validation from rigorous empirical analyses, qualitative or quantitative. We see evidence of this from very early developments in the scientific arena. For instance, Copernicus, in 1513 developed the theory that it is the sun and not the earth that is the center of the universe. His findings were considered implausible, and it was Galileo who invented the telescope in 1609, who was able to demonstrate support for the Copernican theory (Sobel, 2000). Although Galileo was later found guilty of heresy by the Inquisition at the Catholic church, support was subsequently found for the Copernican theory by Newton's theory of universal gravitation in 1687. Thus, history has shown that development of theories in new arenas go through a series of tests until they are established. In that sense, this research attempts to test current theorizing about the changing work paradigm by using empirical data and strong methodological techniques to test popular ideas about virtuality in the workplace.

The second contribution of this study relates to the non-findings relating to the impact of virtuality in the workplace. Popular literature and "troubadouring" have hyped the virtual workplace, and this study calls into question the utility, impacts, and proposed benefits of virtuality. Results from my study runs counter to established theoretical assumptions about the impact of virtuality. Results from my sample of 575 high tech

employees do not indicate any significant differences in the way employees high in virtuality are managed as compared to employees low on virtuality. Their levels of autonomy do not differ significantly, neither are they managed more in terms of objective standards than employees low on virtuality. Hence, using the seven-item measure of virtuality, with the two dimensions of geographic dispersion and use of electronic communication, the assumptions relating to managing virtual employees were not supported. This tells us that managers may not generally make distinctions in the way they manage their virtual employees as compared to non-virtual employees. Whether this is due to managers' efforts at avoiding cognitive dissonance, justice issues, or due to managers' tendencies to develop styles of managing employees based on other attributes, remains to be explored. Obviously, this study examined only one aspect of virtuality in the workplace, and there may be other assumptions that need empirical testimony to validate assumptions made about a changing workplace.

The third major contribution of the study relates to the findings relating to the impact of leadership in organizations. It is argued that the primary role of leadership is to motivate employees and encourage them to attain higher levels of performance. Having a motivated workforce is critical to success and survival, particularly in the current fluid and dynamic business environment. In the academic world, the importance of leadership in fostering motivation, and in challenging subordinates have been well acknowledged by researchers. This study makes a contribution to existing leadership research by empirically demonstrating leadership to be critical in motivating and influencing employees in a high tech environment. In addition, this study also found leadership to be important to creating and developing feelings of identification with the organization. With the concept of lifetime employment fast disappearing, it becomes extremely important for organizations to identify what factors can create and enhance the bond that employees have with the organization.

With regard to the impact of leadership on job satisfaction, it appeared, from the SEM, that the impact of leadership on job satisfaction is mediated both by motivation and organizational identification. This implies that if leaders are able to enhance motivation and create stronger bonds of identification with the organization, it will concurrently impact the satisfaction level of employees.

Study Limitations

It is important to mention the limitations of this study. I will elaborate on five limitations of this study. These relate to external validity concerns, internal validity concerns, cross-sectional design/common method variance problems, low response rate, and quality of archival data

First, the design of the study being a field setting, threats to external validity are weak as compared to an experiment (Cooke & Campbell, 1976). However, generalizability concerns do remain since this was a one-company study and one cannot say with complete confidence that the study population was representative of employees in other organizations. The situation may be different in traditional organizations that have been slower to accept virtual work arrangements. Nonetheless, the organization researched was a medium to large sized company in the high tech sector with significant international operations. Although the research was confined to the US operations of the company, it extended to all of the exempt employees of the company, numbering over 4,400. As a result, generalizability of the findings of the study to other organizations should be high.

Second, with regard to internal validity, although in general, the researcher has less control in a field study than in a lab setting, the realism of context did not detract from the use of theoretically sound instruments for measuring the constructs under study. Where appropriate, established measures were used, and, if not appropriate, measures were devised. The use of previously used measures is a strength of the study in terms of internal validity.

However, the delay in the administration of the survey due to several rounds of layoffs that occurred within the organization created an environment that was not reflective of business as usual. Hence, in order to not compromise the validity of the study, it was important to disassociate the effects of the layoffs from the survey. This resulted in a gap of six months from the time of the administration of the pilot to the launch of the final survey. Also, since layoffs were an industry-wide phenomenon, rather than one involving this single company, I believe that the layoffs contribute to the unique opportunity to measure related phenomenon with those employees who remain with the company.

Third, this study uses cross sectional data. In other words, the data was collected on almost all of the independent and dependent variables at the same point in time. A one-time snapshot of the data makes judging causality or the directionality of relationships impossible (James, Mulaik, & Brett, 1982). Also, this study used one primary method of obtaining data for the dependent and the independent variables: the survey questionnaire. Getting data from a variety of sources such as interviews, and other secondary data enables one to reduce common method variance or mono-method bias. However, given the design of the study, and the non-availability of secondary sources of data, this was not possible for most of the constructs measured in this study. The strength of the study is that where possible, for example in the case of performance, I did obtain archival data from company records.

Fourth, some critics may challenge the low response rate on the survey. The response rate in the pilot was excellent (72%). Obviously the pilot respondents felt a greater responsibility as their feedback on the survey was explicitly solicited. For the final study however, the response rate dropped to 13%. Restructuring within the organization may have been partially responsible for this low response rate. However, upon further investigation, it was discovered that surveys conducted in this organization in the recent past approximated an average response rate of 9%–10%. To that extent, concerns about the response rate being

terribly low are unwarranted, especially since in terms of absolute numbers, the sample size of 575 enabled me to have more than adequate power for testing the relationships. There are also some concerns of non-response and self-selection bias, namely, did those who did not respond differ significantly from those who did not. Since I did not do a follow up survey, there was no way for me to check for non-response. An examination of the overall description of the population sample appeared to be reflective of the sample of respondents.

Finally, with regard to the archival data derived from the company records, the expectation that the demographic records would be highly accurate did not hold. There were a small number of missing data observations. Data on performance records was missing for about 30% of the respondents. However, the data for the remaining 411 employees was accurate and valid. Not having a validation check in entry of the employee IDs led to a lack of match of IDs for 25 employees. Of these 2 employees had duplicate IDs. However, given the topic under study, in retrospect, the advantages of having a shorter survey and hence a better response rate outweighed some missing demographic data.

Implications for Practice and Suggestions for Future Research

This study has important implications particularly for high tech organizations that are on the cutting edge of changing the way we work. This study empirically demonstrates that virtuality does not impact the organizational processes of autonomy and outcome orientation as hypothesized. My study focused solely on a high technology firm, which have typically been more accepting of non-traditional forms of working. This could be an explanation of the lack of significance of results regarding the hypotheses on virtuality. Perhaps replication of this study in more traditional organizations may well lead to different findings. Despite non-significant results, I believe that this has led to a greater understanding and awareness of the impact of virtuality. Identifying and understanding the critical variables related to

virtuality in the workplace will help organizational specialists and HR managers in designing and adapting jobs in the emerging high tech information age.

From the point of view of organizations, this study demonstrates the criticality of leadership in motivating employees and in playing a role in increasing employee attachment to the organization. With greater instability of markets and economic turbulence, lifetime employment has become a thing of the past, even in countries like Japan, which have traditionally strongly upheld this practice. Under such conditions, it becomes critical for leadership in organizations to create the bonds that employees have with their organizations.

From the point of view of future research directions, since the questions of virtuality explored in this dissertation are in the realm of exploratory research and treading new ground, there are a host of environmental and interactional elements that can be researched in this field of research. Also, virtuality is a highly complex and multifaceted construct. In this study I have tried to define it as a two-dimensional construct. However, there may be other spatial and temporal dimensions that could be developed further. Researchers are grappling with the definition and dimensions of virtuality at different levels of analyses, and there is tremendous potential for research in this area that would help in bringing greater clarity and syntheses.

With increasing improvements in communication technology and globalization, virtuality is only projected to increase. Pearlson and Saunders (2001) noted some paradoxes of virtuality. The first was the subject of study for this dissertation. However, they had also proposed in their second paradox that increased virtuality would simultaneously lead to greater individuality and more teamwork. This is because virtual work tends have a better fit with jobs that are performed in isolation, yet, most virtual workers are part of virtual teams that are temporally and spatially dispersed. It would be interesting to examine these empirically to see if data would lend support to these propositions.

Another potential area of research with respect to virtuality is the impact of leadership on virtuality. Type of leadership can have a significant impact on enhancing or restricting the use of virtual work in organizations. For instance, an organizational level study examining the impact of leader attitudes on virtual work arrangements can throw light on adoption patterns for virtual work. We could potentially predict which organizations would be more willing to adopt virtual work, based on an analysis of the leadership styles most prevalent in that organization.

Another interesting avenue for future research would be to examine the impact of post-layoff workload. Results of the study have indicated that in troubled situations, enhancement of workload may be perceived as positive. This is because, enhancing workload could lead to feelings of indispensability that would in turn, alleviate anxieties related to future job loss. An interesting study would involve examining the processes involved in such self-imposed enhancement of workload and its impact on stress and work life balance.

To conclude, there are several opportunities for future research in this stream of research. This dissertation examined some organizational processes in leadership and virtual work in an interesting high tech environment. However, the work paradigm is changing every day with new and improved technology and virtuality is only projected to increase. Under such conditions, the issues addressed in this dissertation are only a starting point of research on the topic of virtual work, which will be a rich and fertile ground for understanding implications and nuances of workplace environments.

APPENDIX A

MEASUREMENT INSTRUMENT

"Working From a Distance"

Fellow Employees:

In conjunction with the University of Texas at Arlington, (company name) is conducting a survey to measure the current level of virtual work arrangements and work-life balance within the company.

We encourage you to take the time to participate, as the survey will give us a baseline and general assessment of these programs. Note the survey will take less than 20 minutes.

All survey participants will be eligible for a raffle drawing for 1 of 5 mag-lites. Survey results will be reported in upcoming updates to Voices, Newsbreak and other communication vehicles.

Your response is important to the completion of this project. By completing this survey you are giving your informed consent for the survey.

If you have questions about the survey in general, contact Meghna Virick. For technical questions and troubleshooting, contact (company representative).

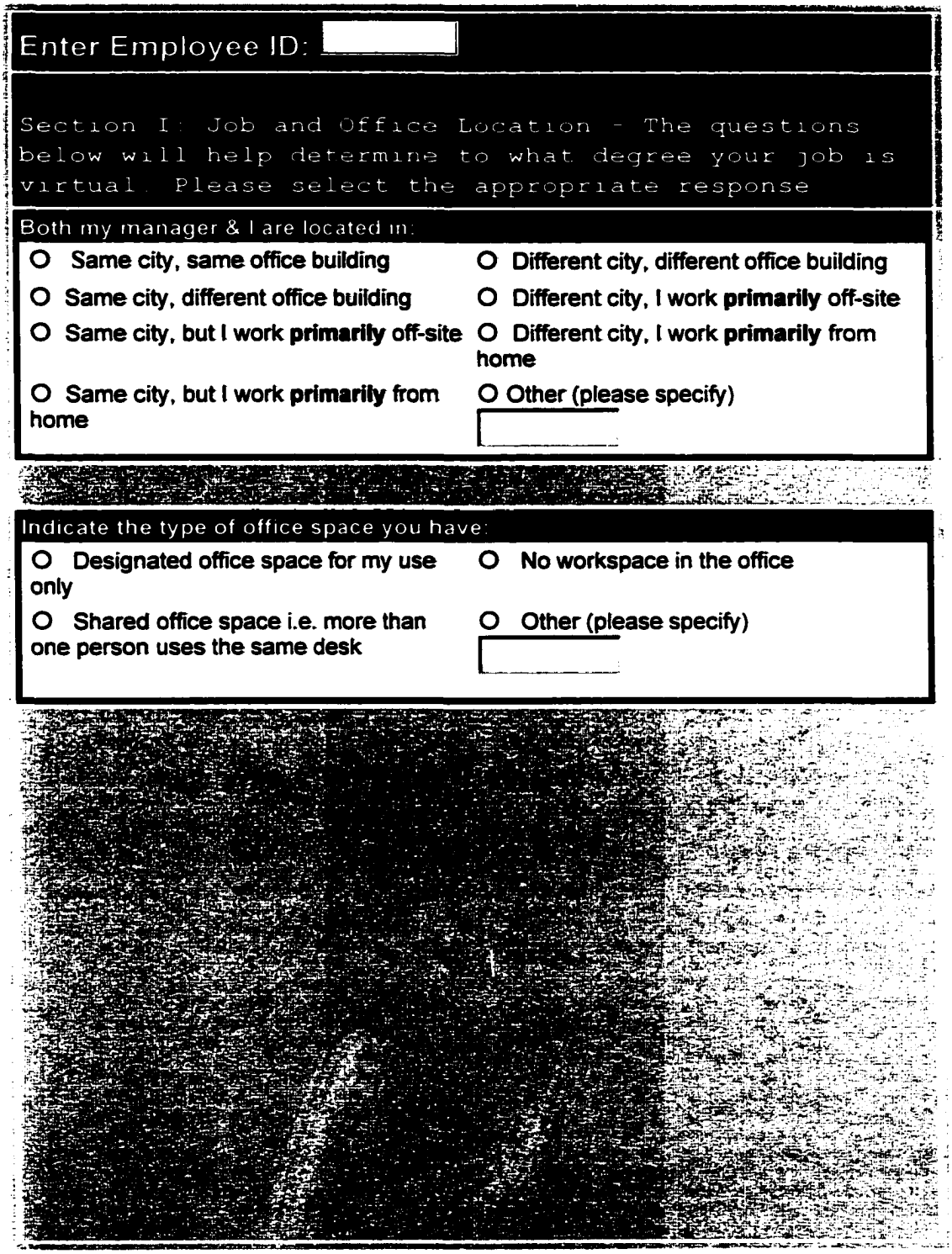
Thank you for taking the time to complete the questionnaire, which can be accessed at the following URL:
http://aww.usa.companyname.com/dept/hr/cei/virtualwp/confidentiality.htm

Regards,
Company representative
Director Corporate Employee Initiatives

"Confidentiality"

Please be assured that your responses to the questionnaire are completely confidential and will not be shared with anyone. The survey will be analyzed by researchers from the University of Texas at Arlington's Center for Research and Excellence, who will send (co. name) only summarized results.

Click here to access the survey.



Enter Employee ID:

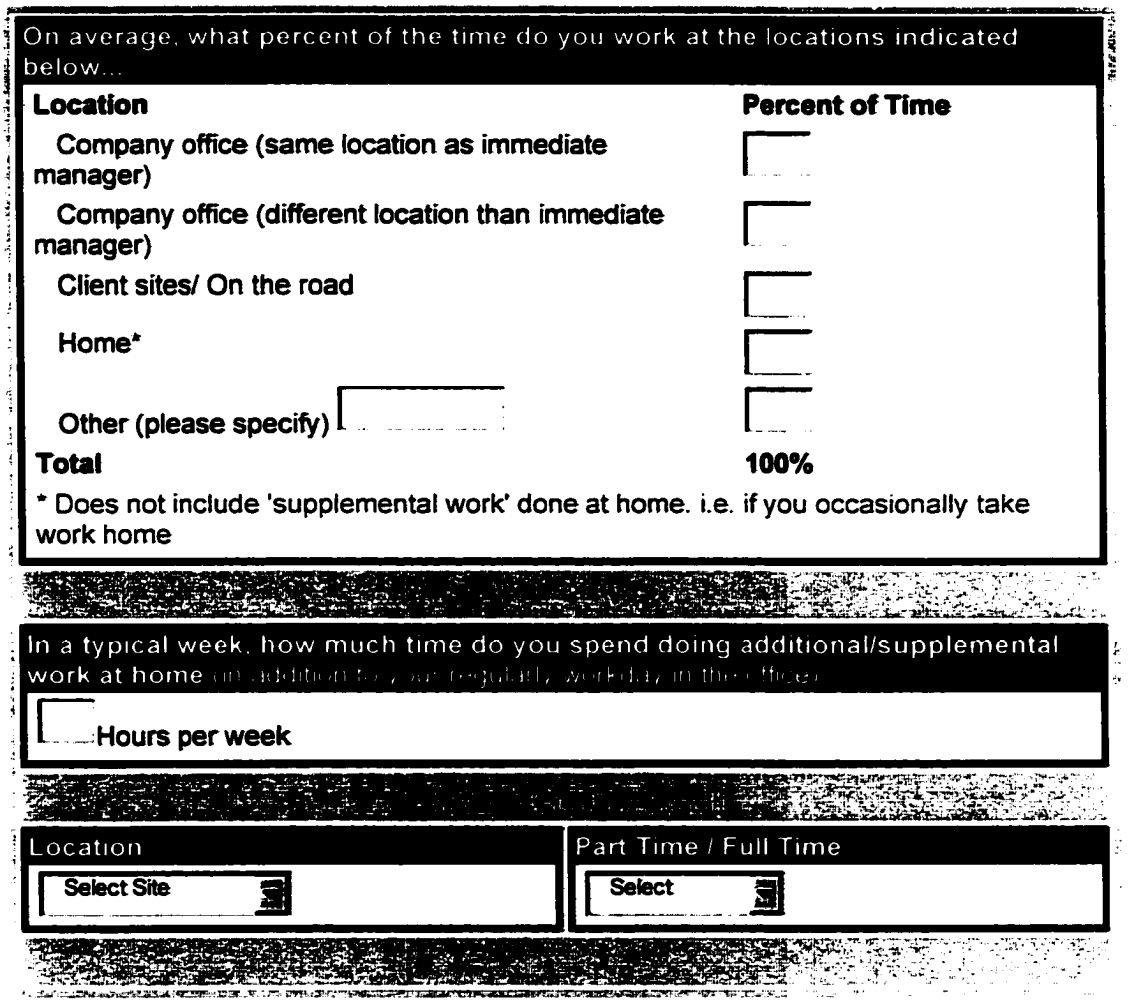
Section I: Job and Office Location - The questions below will help determine to what degree your job is virtual. Please select the appropriate response

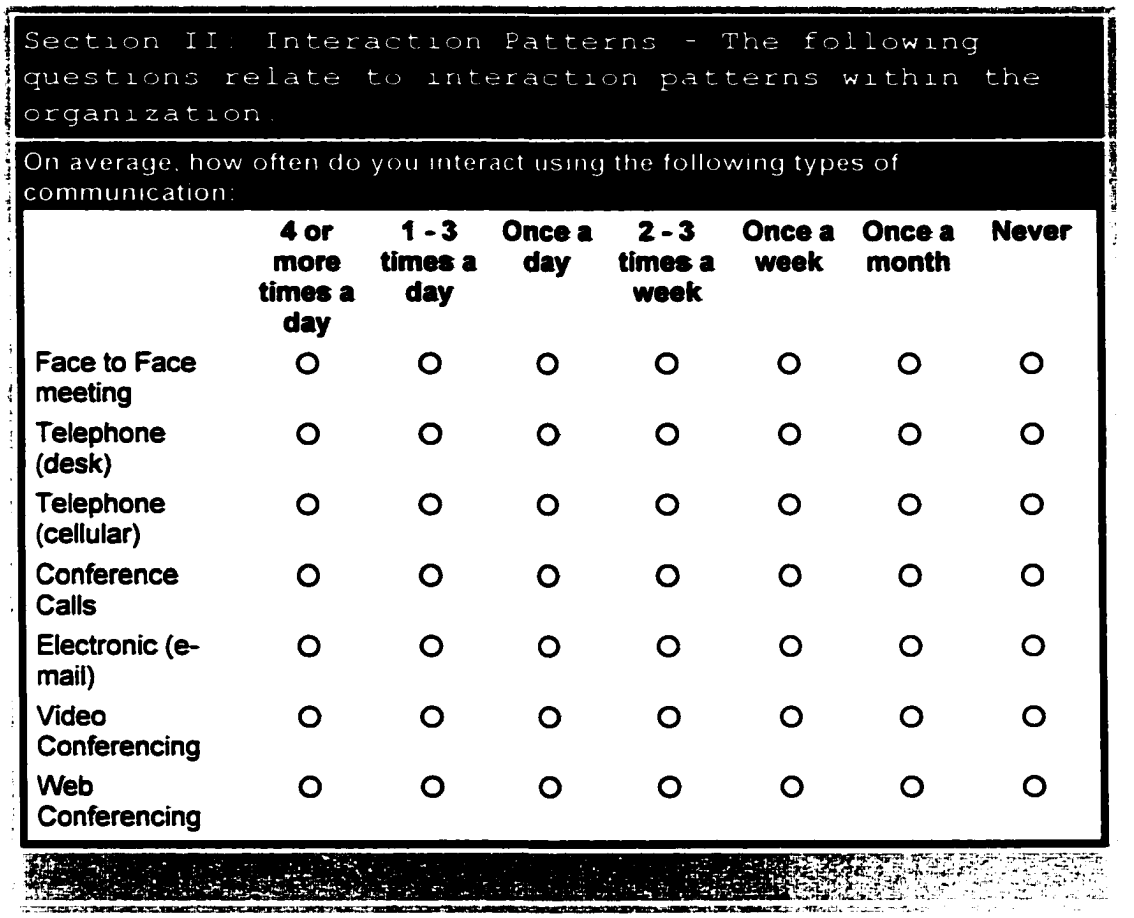
Both my manager & I are located in:

- O Same city, same office building
- O Same city, different office building
- O Same city, but I work **primarily** off-site
- O Same city, but I work **primarily** from home
- O Different city, different office building
- O Different city, I work **primarily** off-site
- O Different city, I work **primarily** from home
- O Other (please specify)

Indicate the type of office space you have:

- O Designated office space for my use only
- O Shared office space i.e. more than one person uses the same desk
- O No workspace in the office
- O Other (please specify)





Section II: Interaction Patterns - The following questions relate to interaction patterns within the organization.

On average, how often do you interact using the following types of communication:

	4 or more times a day	1 - 3 times a day	Once a day	2 - 3 times a week	Once a week	Once a month	Never
Face to Face meeting	O	O	O	O	O	O	O
Telephone (desk)	O	O	O	O	O	O	O
Telephone (cellular)	O	O	O	O	O	O	O
Conference Calls	O	O	O	O	O	O	O
Electronic (e-mail)	O	O	O	O	O	O	O
Video Conferencing	O	O	O	O	O	O	O
Web Conferencing	O	O	O	O	O	O	O

Section III: Job Characteristics

The next few questions are aimed at understanding the degree to which your job is performed virtually or remotely. Please indicate your response below.

	Strongly Agree	Agree	Somewhat Agree	Neither	Somewhat Disagree	Disagree	Strongly Disagree	Not Applicable
1. I do a large part of my job away from the office where my manager is located	O	O	O	O	O	O	O	O
2. I would be unable to do my job without remote access to the company network from anywhere	O	O	O	O	O	O	O	O
3. Usually my manager is able to physically observe me at work	O	O	O	O	O	O	O	O
4. My manager and I work in the same office building most of the time	O	O	O	O	O	O	O	O
5. I remotely access my company network on a very frequent basis	O	O	O	O	O	O	O	O
6. My manager and I frequently have face-to-face meetings	O	O	O	O	O	O	O	O
7. I make most of my work-related phone calls from the road or from home	O	O	O	O	O	O	O	O

The next few questions are aimed at assessing specific characteristics relating to job autonomy and flexibility. Please select the appropriate response

	Strongly Agree	Agree	Somewhat Agree	Neither	Somewhat Disagree	Disagree	Strongly Disagree	Not Applicable
1. I am able to choose the way to go about my job (procedures)	O	O	O	O	O	O	O	O
2. I have control over when I can take a few hours off work	O	O	O	O	O	O	O	O
3. I have control over the scheduling of my work	O	O	O	O	O	O	O	O
4. I can determine the sequencing of my work activities	O	O	O	O	O	O	O	O
5. I have flexibility over when I begin and end each work day	O	O	O	O	O	O	O	O
6. I am free to select the methods to use in carrying out my work	O	O	O	O	O	O	O	O

The next few questions relate to how you interact with your coworkers. Please select the most appropriate response:

	Strongly Agree	Agree	Somewhat Agree	Neither	Somewhat Disagree	Disagree	Strongly Disagree	Not Applicable
1. To do my job I am very much dependent on my co-workers to do their job too	O	O	O	O	O	O	O	O
2. My job requires that I work closely with others	O	O	O	O	O	O	O	O
3. My job requires me to consult with other co-workers	O	O	O	O	O	O	O	O

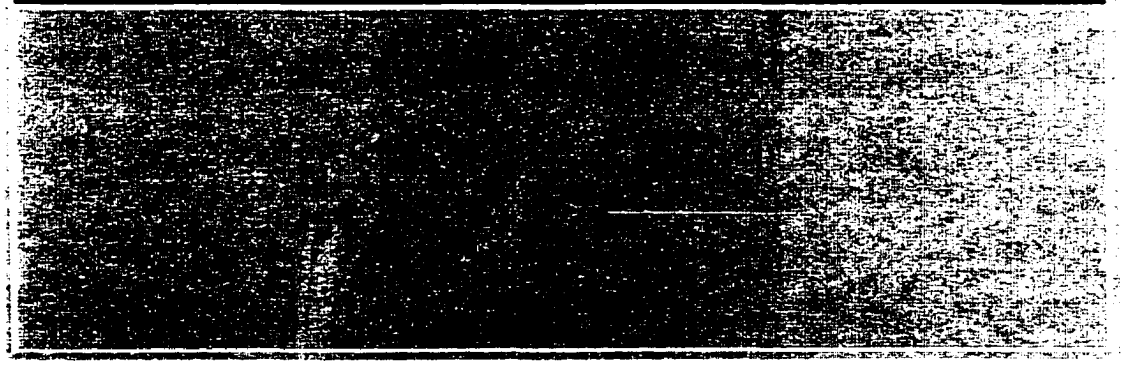
The next few questions are aimed at gauging the manner in which performance management is accomplished.

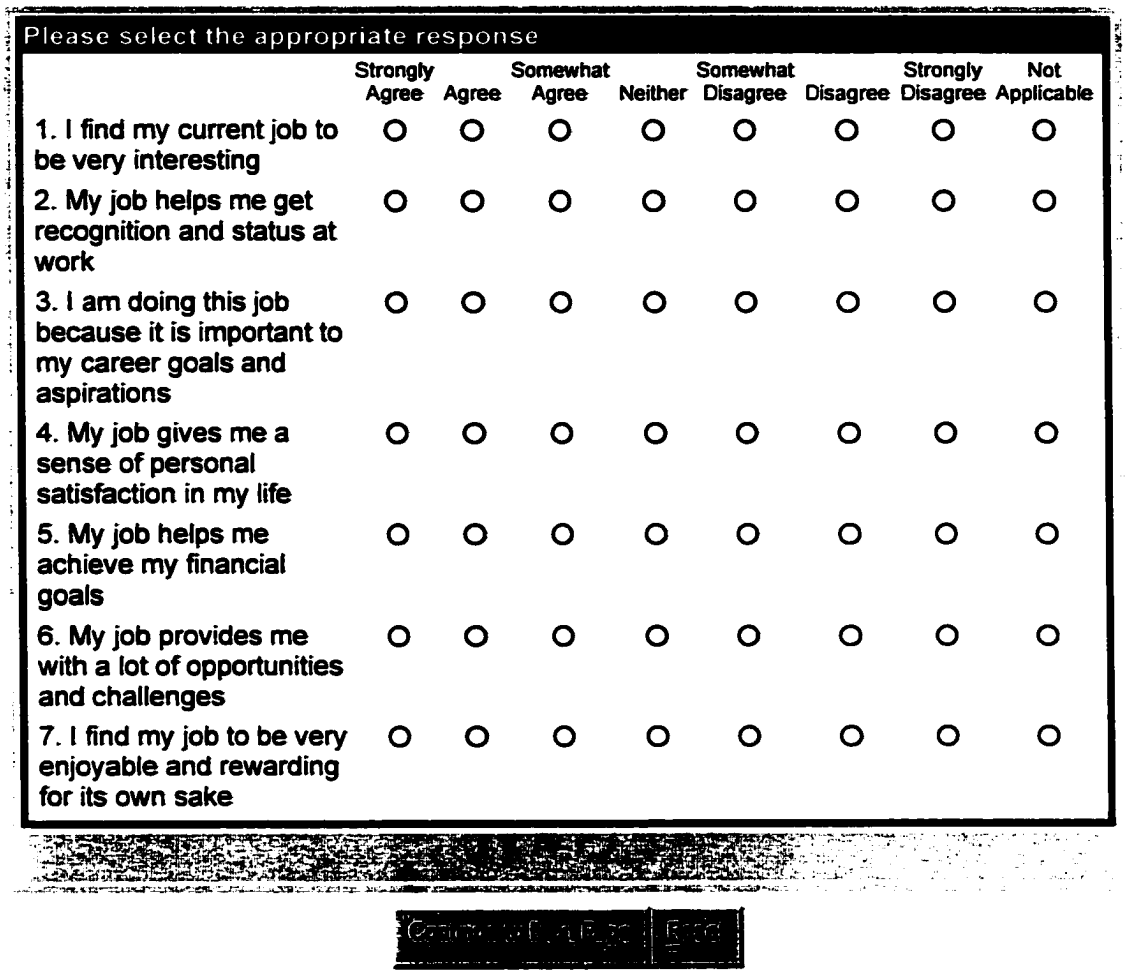
	Strongly Agree	Agree	Somewhat Agree	Neither	Somewhat Disagree	Disagree	Strongly Disagree	Not Applicable
1. Objective criteria (e.g. goals, measurable targets) are used to evaluate my performance outcomes	O	O	O	O	O	O	O	O
2. Goal setting and assessments are used to measure my effectiveness	O	O	O	O	O	O	O	O
3. Written records are used to evaluate my overall work output	O	O	O	O	O	O	O	O
4. I am aware of the level of achievement expected in my job	O	O	O	O	O	O	O	O
5. There are standards by which my performance is evaluated	O	O	O	O	O	O	O	O
6. My manager and I jointly set my performance objectives	O	O	O	O	O	O	O	O
7. I am involved in setting my performance goals	O	O	O	O	O	O	O	O
8. My manager sets my performance goals for me	O	O	O	O	O	O	O	O

Section IV: Attitudes and Beliefs - The following questions are designed to understand personal traits

Please select the appropriate response

	Strongly Agree	Agree	Somewhat Agree	Neither	Somewhat Disagree	Disagree	Strongly Disagree	Not Applicable
1. I believe that difficult situations can be overcome	O	O	O	O	O	O	O	O
2. On some tasks I can work effectively without other people	O	O	O	O	O	O	O	O
3. I feel secure in my ability to meet work's challenges	O	O	O	O	O	O	O	O
4. I often find myself thinking about work even when I want to get away from it for a while (eg. vacation, off duty)	O	O	O	O	O	O	O	O
5. I often feel there's something inside me that drives me to work hard	O	O	O	O	O	O	O	O
6. I lose track of time when I'm engaged on a project	O	O	O	O	O	O	O	O
7. Sometimes I enjoy my work so much I have a hard time stopping	O	O	O	O	O	O	O	O
8. I feel guilty when I take time off work	O	O	O	O	O	O	O	O
9. My job is so interesting that it often doesn't seem like work	O	O	O	O	O	O	O	O





Please select the appropriate response

	Strongly Agree	Agree	Somewhat Agree	Neither	Somewhat Disagree	Disagree	Strongly Disagree	Not Applicable
1. I find my current job to be very interesting	O	O	O	O	O	O	O	O
2. My job helps me get recognition and status at work	O	O	O	O	O	O	O	O
3. I am doing this job because it is important to my career goals and aspirations	O	O	O	O	O	O	O	O
4. My job gives me a sense of personal satisfaction in my life	O	O	O	O	O	O	O	O
5. My job helps me achieve my financial goals	O	O	O	O	O	O	O	O
6. My job provides me with a lot of opportunities and challenges	O	O	O	O	O	O	O	O
7. I find my job to be very enjoyable and rewarding for its own sake	O	O	O	O	O	O	O	O

Section V: Manager - The next few questions relate to your manager's leadership style.

Please select the appropriate response

My Manager:	Strongly Agree	Agree	Somewhat Agree	Neither	Somewhat Disagree	Disagree	Strongly Disagree	Not Applicable
1. Suggests new ways of looking at how we do our jobs	O	O	O	O	O	O	O	O
2. Gives all members of the group individualized attention as it relates to their work	O	O	O	O	O	O	O	O
3. Treats each subordinate as an individual	O	O	O	O	O	O	O	O
4. Helps me to rethink some of my ideas, which I had never questioned before	O	O	O	O	O	O	O	O
5. Enables me to think of old problems in new ways	O	O	O	O	O	O	O	O

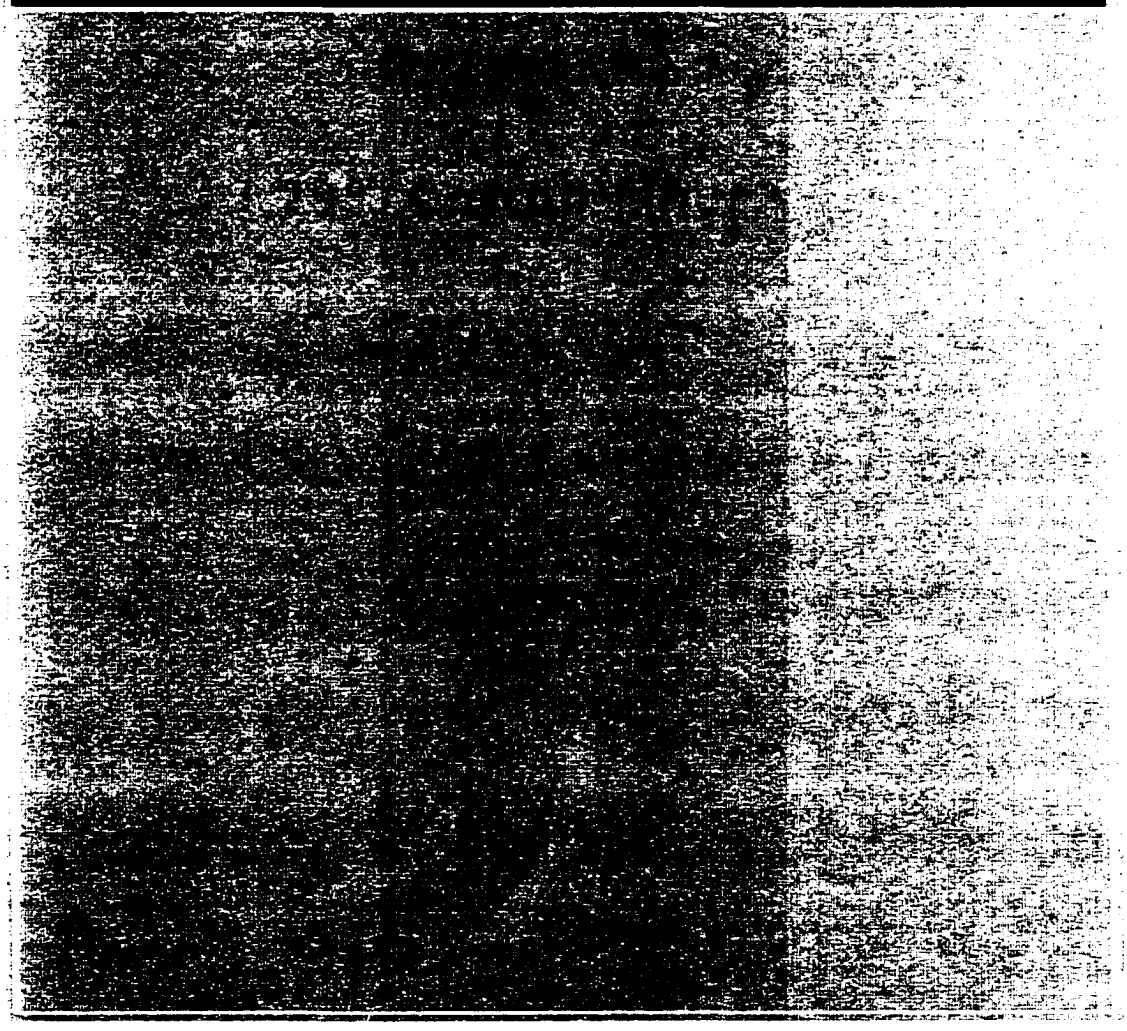
Section VI: Work Life Issues

The following questions will help determine a baseline measure of the degree of work-life balance at (co. name)

	Strongly Agree	Agree	Somewhat Agree	Neither	Somewhat Disagree	Disagree	Strongly Disagree	Not Applicable
1. Managers at (co. name) are supportive of employees who want to switch to less demanding jobs for family reasons	O	O	O	O	O	O	O	O
2. Employees who participate in work-family programs (e.g. telecommuting, flextime) at (co. name) are seen as less serious about their careers	O	O	O	O	O	O	O	O
3. Senior management at (co. name) encourage supervisors to be sensitive to employees' family and personal concerns	O	O	O	O	O	O	O	O
4. To turn down a promotion or transfer for family-related reasons will hurt one's career progress at (co. name)	O	O	O	O	O	O	O	O
5. To get ahead, employees are expected to work more than 40 hours a week	O	O	O	O	O	O	O	O
6. Employees often take work home at night and/or on weekends	O	O	O	O	O	O	O	O
7. In general, my manager is quite accommodating of family-related needs	O	O	O	O	O	O	O	O

The next three questions are aimed at determining a measure of your current workload

	Strongly Agree	Agree	Somewhat Agree	Neither	Somewhat Disagree	Disagree	Strongly Disagree	Not Applicable
1. I have more to do than I can comfortably handle	O	O	O	O	O	O	O	O
2. I feel I have to rush to get everything done each day	O	O	O	O	O	O	O	O
3. I feel I don't have enough time for myself	O	O	O	O	O	O	O	O



The questions below are aimed specifically at assessing work- life balance

	Strongly Agree	Agree	Somewhat Agree	Neither	Somewhat Disagree	Disagree	Strongly Disagree	Not Applicable
1. It is very easy for me to balance the demands of my work and personal/family life	O	O	O	O	O	O	O	O
2. I feel drained at the end of the day because of work pressures and problems	O	O	O	O	O	O	O	O
3. I have sufficient time away from my job to maintain adequate work and personal/family life balance	O	O	O	O	O	O	O	O
4. When I take a vacation I am able to separate myself from work and enjoy myself	O	O	O	O	O	O	O	O
5. All in all, I feel successful in balancing work and family life	O	O	O	O	O	O	O	O
6. My family/friends dislike how often I am preoccupied with my work while I am at home	O	O	O	O	O	O	O	O
7. These days a person in my job is expected to produce more than a year ago	O	O	O	O	O	O	O	O
8. Currently a person in a job like mine is devoting more hours to the work than one year ago	O	O	O	O	O	O	O	O
9. Compared to a year ago, someone in a position like mine has greater resource support to do the job	O	O	O	O	O	O	O	O

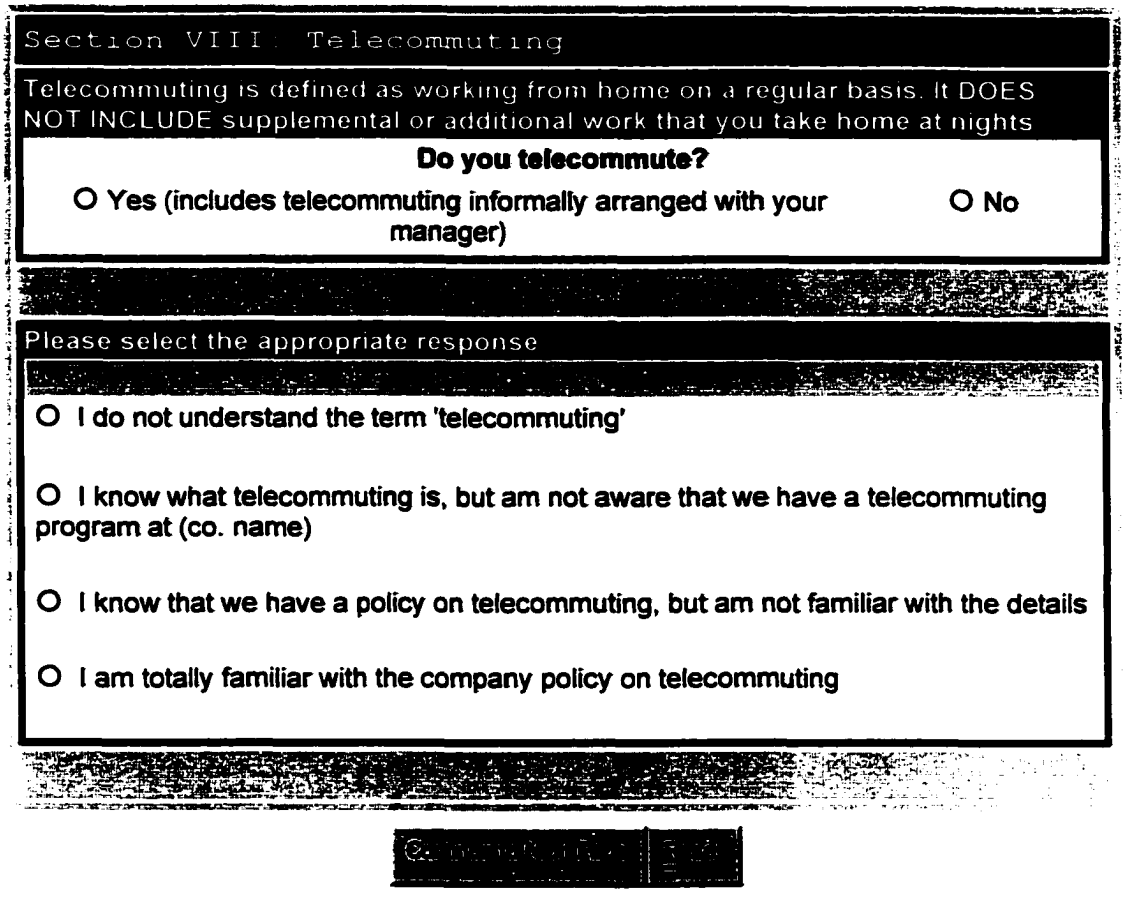
Section VII: Satisfaction with the Job and Career

The next few questions are designed to measure overall satisfaction and commitment in the organization. Please select the appropriate response

	Strongly Agree	Agree	Somewhat Agree	Neither	Somewhat Disagree	Disagree	Strongly Disagree
1. In general I like my job	O	O	O	O	O	O	O
2. In general I like working at (co. name)	O	O	O	O	O	O	O
3. All in all, I am satisfied with my job	O	O	O	O	O	O	O
4. When I talk about (co. name), I usually say 'we' rather than 'they'	O	O	O	O	O	O	O
5. (co. name) successes are my successes	O	O	O	O	O	O	O
6. I am very interested in what others think about (co. name)	O	O	O	O	O	O	O
7. When someone praises (co. name), it feels like a personal compliment	O	O	O	O	O	O	O
8. If a story in the media criticized (co. name), I would feel bad	O	O	O	O	O	O	O

The following questions ask about the quality of your life in general

	Strongly Agree	Agree	Somewhat Agree	Neither	Somewhat Disagree	Disagree	Strongly Disagree	Not Applicable
1. In most ways my life is close to ideal	O	O	O	O	O	O	O	O
2. So far I have gotten the important things I want in life	O	O	O	O	O	O	O	O
3. I am satisfied with my life	O	O	O	O	O	O	O	O
4. If I could change my life over, I would change almost nothing	O	O	O	O	O	O	O	O



Section VIII: Telecommuting

What kind of telecommuting arrangement do you have?

- O Formal
- O Informally arranged with my manager

How many days do you telecommute per week?

- O 5 days a week
- O 4 days a week
- O 3 days a week
- O 2 days a week
- O Once a week
- O Less than once a week

How long have you been telecommuting?

_____ Years _____ Months

Which of the following resources have been provided to you to telecommute from home?

- O Yes O No - Desktop Computer
- O Yes O No - Laptop
- O Yes O No - Additional Telephone Line
- O Yes O No - Token
- O Yes O No - Printer
- O Yes O No - DSL/ISDN Line
- O Yes O No - Fax
- O Yes O No - Cell Phone
- O Yes O No - Calling card or other service package
- O Yes O No - Other (Indicate)

_____

Describe the ROUNDTRIP commute to and from work.

_____ Miles _____ Minutes

Indicate how supportive of telecommuting the following people are:

	Highly Supportive			Neutral			Not at all Supportive
1. Co-workers	O	O	O	O	O	O	O
2. Immediate manager	O	O	O	O	O	O	O
3. Senior management	O	O	O	O	O	O	O
4. Your Family	O	O	O	O	O	O	O
5. Customers	O	O	O	O	O	O	O

What is the primary motivation for you to telecommute?

What has been your personal experience with the following potential advantages of telecommuting?

	Strongly Agree	Agree	Somewhat Agree	Neither	Somewhat Disagree	Disagree	Strongly Disagree	Not Applicable
1. Fewer distractions at home	O	O	O	O	O	O	O	O
2. More comfortable work environment	O	O	O	O	O	O	O	O
3. Greater flexibility in work	O	O	O	O	O	O	O	O
4. Better work family balance	O	O	O	O	O	O	O	O
5. Greater interaction with customers	O	O	O	O	O	O	O	O
6. Higher productivity	O	O	O	O	O	O	O	O
7. Any other (please specify)	O	O	O	O	O	O	O	O

What has been your personal experience with the following potential downsides of telecommuting?

	Strongly Agree	Agree	Somewhat Agree	Neither	Somewhat Disagree	Disagree	Strongly Disagree	Not Applicable
1. Reduced professional interaction	O	O	O	O	O	O	O	O
2. Less social interaction with coworkers	O	O	O	O	O	O	O	O
3. Lowered chances of career progression	O	O	O	O	O	O	O	O
4. Fewer opportunities for learning through interaction	O	O	O	O	O	O	O	O
5. Less chances for participation in important projects	O	O	O	O	O	O	O	O
6. Greater demands and interference from family	O	O	O	O	O	O	O	O
7. Any other (please specify) _____	O	O	O	O	O	O	O	O

How many employees telecommute in your immediate work group?

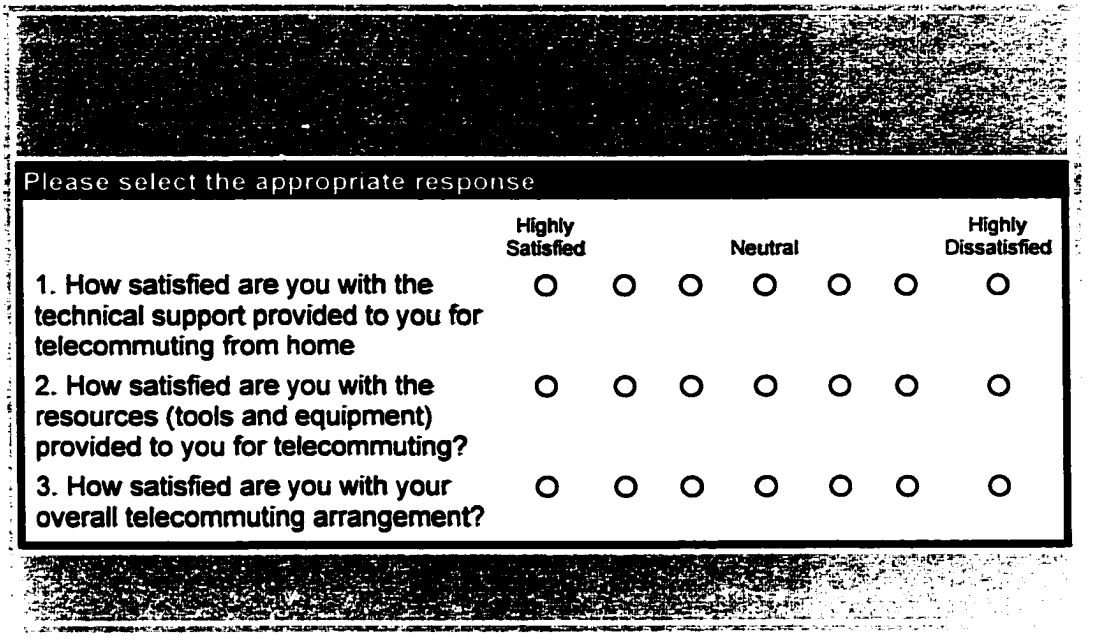
____employees

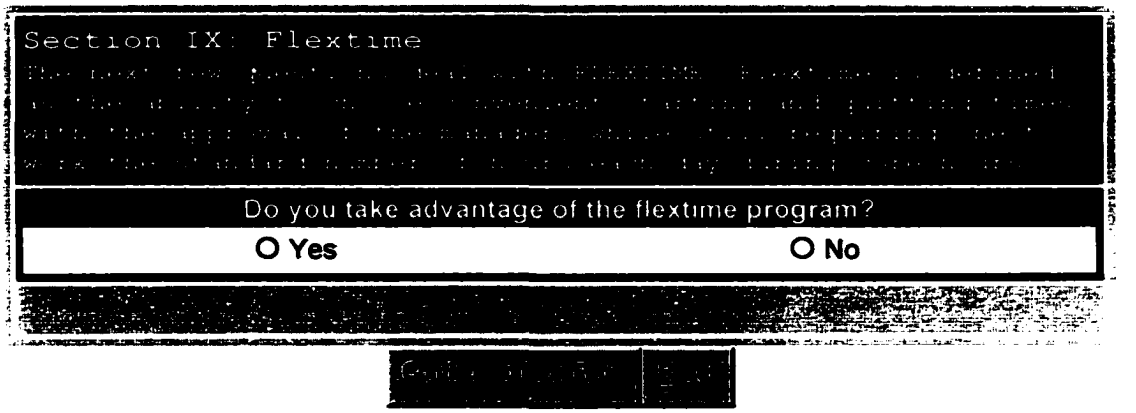
Approximately how many employees are there in your immediate work group?

____employees

Would you consider changing jobs if telecommuting were not available at (company name)?

Definitely Yes			Not a Factor			Definitely No
O	O	O	O	O	O	O





Section IX: Flextime

In your flextime arrangement what is the pattern of your work:

- O Fixed hours everyday
- O Mostly fixed hours
- O Hours of work vary a lot

How many days in a week do you work flextime ?

- O 5 days a week
- O 4 days a week
- O 3 days a week
- O 2 days a week
- O Once a week
- O Less than once a week

How many years have you been using flextime?

☐ Years ☐ Months

Indicate how supportive of flextime the following people are:

	Highly Supportive			Neutral			Not at all Supportive
1. Co-workers	O	O	O	O	O	O	O
2. Immediate manager	O	O	O	O	O	O	O
3. Senior management	O	O	O	O	O	O	O
4. Your Family	O	O	O	O	O	O	O
5. Customers	O	O	O	O	O	O	O

What is the primary motivation for you to use flextime?

The following are potential advantages of flextime for me:

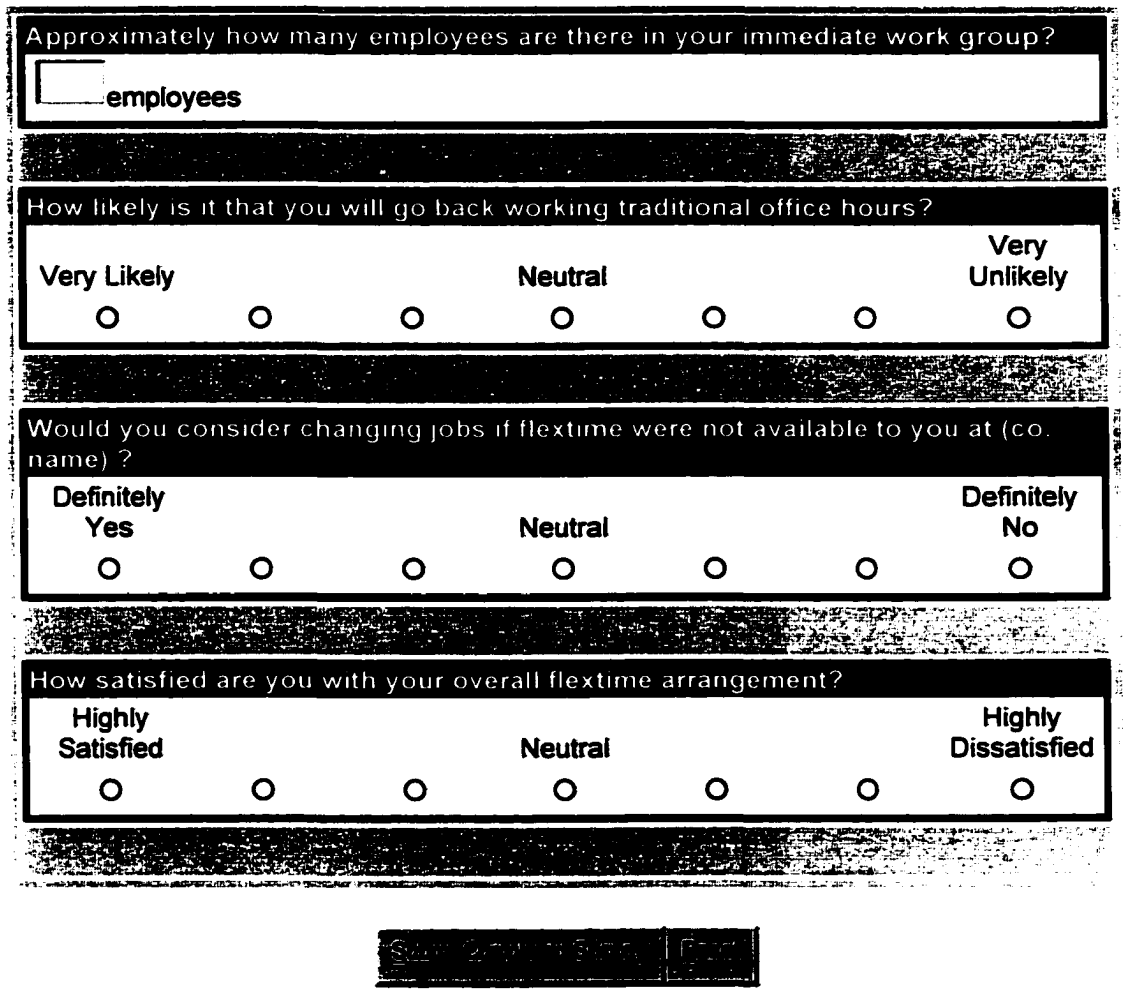
	Strongly Agree	Agree	Somewhat Agree	Neither	Somewhat Disagree	Disagree	Strongly Disagree	Not Applicable
1. I work better early in the morning	O	O	O	O	O	O	O	O
2. I work better late at night	O	O	O	O	O	O	O	O
3. I can co-ordinate activities related to my children	O	O	O	O	O	O	O	O
4. I can take care of other family responsibilities	O	O	O	O	O	O	O	O
5. I can avoid rush hour traffic	O	O	O	O	O	O	O	O

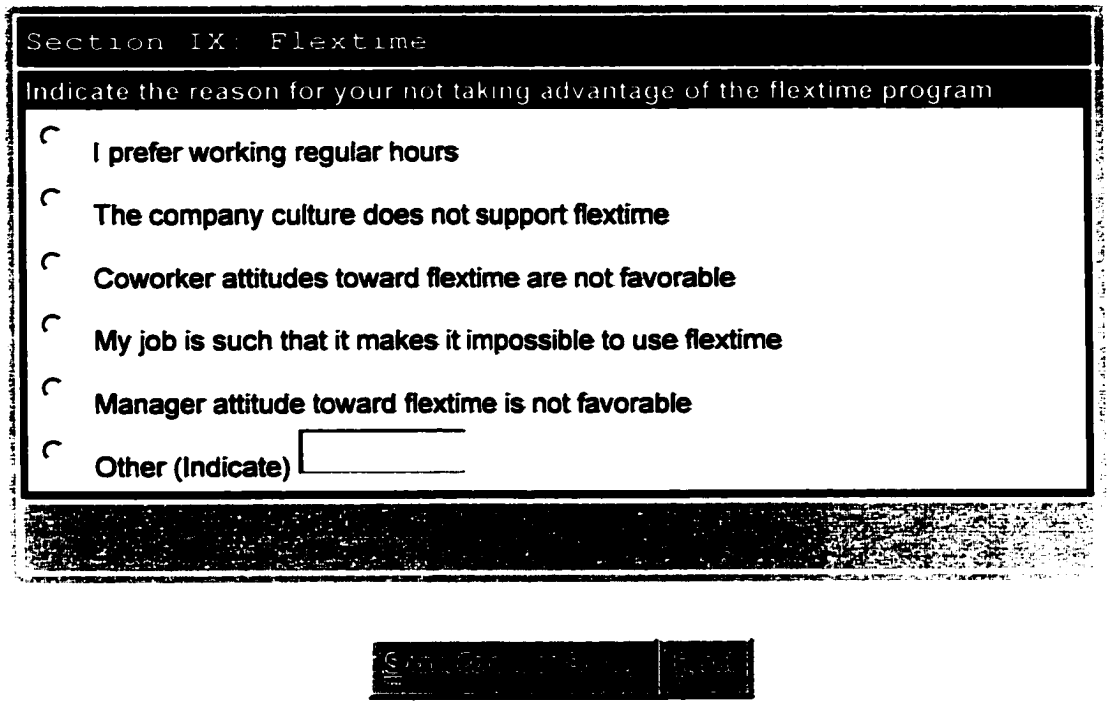
The following are potential disadvantages of flextime for me:

	Strongly Agree	Agree	Somewhat Agree	Neither	Somewhat Disagree	Disagree	Strongly Disagree	Not Applicable
1. Coworkers think I am goofing off	O	O	O	O	O	O	O	O
2. My career prospects are impacted negatively	O	O	O	O	O	O	O	O
3. Decisions are made in my absence that affect me	O	O	O	O	O	O	O	O
4. I am seen as not working as hard as others	O	O	O	O	O	O	O	O
5. I feel I have less job security than someone not on flextime	O	O	O	O	O	O	O	O

How many employees in your immediate work group use flextime?

[ ]___employees





APPENDIX B

COVER LETTER FOR PILOT

12/14/2001

Dear Participant,

You have been selected to participate in the pilot for the study 'Managing a Virtual Workplace' being conducted at (company name), in collaboration with the University of Texas at Arlington.

The study involves a survey questionnaire to be sent to employees at (company name). Prior to sending out the actual survey, a pilot study is done to obtain feedback on the survey to ensure that all employees who get the survey understand the questions and directions.

A small group of employees, including yourself, has been selected to participate in the pilot study. We would like you to complete the survey as a survey participant. In addition, we would appreciate any comments you may have on the following aspects of the survey:

1. **Instructions:** Are the instructions clear and unambiguous?
2. **Questions:** Are the questions easy to understand?
3. **Time:** How much time did it take you to complete the survey?
4. **Other Comments:** Any there any other comments that you have?

You will be provided an opportunity at the end of the survey to complete the feedback form

Also, if you complete the survey as a participant of the pilot study, you will not be required to complete the survey again when it is launched to all the other employees in January.

By completing the survey, you are giving your informed consent for the survey. Upon completion of the study, a drawing will be conducted to randomly select prizes. As a participant of the pilot, you will also be automatically entered in the drawing for the prizes.

We appreciate your participation and involvement in the study

APPENDIX C

SURVEY FEEDBACK FORM FOR PILOT

SURVEY FEEDBACK FORM

1. How much time did it take you to complete the survey

_____minutes

2. Not everyone was required to complete the section on Telecommuting & Flextime

a. Did you complete the section on Telecommuting?

☐ Yes
☐ No

b. Did you complete the section on Flextime?

☐ Yes
☐ No

3. Were the instructions on the survey clear and easy to understand?

☐ Yes
☐ No

4. Were the questions easy to understand?

☐ Yes
☐ No

5. If no, which specific questions were difficult to understand?

OTHER COMMENTS

APPENDIX D

RESEARCH SERVICES AGREEMENT

RESEARCH SERVICES AGREEMENT

This RESEARCH SERVICES AGREEMENT (this "Agreement") is made and entered into as of December 14, 2001 by and between (company name)a limited partnership organized under the laws of the State of Texas ("co. name"), and The University of Texas at Arlington, a State Institution of Higher Education established under the laws of the State of Texas as a component of The University of Texas System ("the university").

WITNESSETH:

WHEREAS, the University's primary mission is education and advancement of knowledge; and

WHEREAS, (co. name) desires to engage the University to perform from time to time certain research and other services designed to enable the University to carry out its mission, and the University desires to accept such engagement, upon the terms and subject to the conditions set forth in this Agreement;

NOW, THEREFORE, in consideration of the premises and the mutual promises set forth below, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged,(co.name)and the University hereby agree as follows:

1. Services. (a) During the term of this Agreement, upon the terms and subject to the conditions set forth in this Agreement, the University shall from time to time perform such research and other services, and provide to (co.name)such reports and other deliverables, as may be set forth in a Statement of Work (a "SOW") delivered by (co.name)to the University, and accepted in writing by the University (collectively, the "Services") and ultimately attached hereto as an Attachment. In connection with the performance of any Services, the University shall use its good faith efforts to achieve the specific results set forth in the related SOW; provided, however, that if the University has failed to achieve such results and has otherwise complied with its obligations under this Agreement with respect to such Services, then the University shall have no further liability or obligation to(co.name) with respect to such Services resulting from, or arising out of, such failure. The University shall cause any Services to be performed in coordination with, and under the general supervision of, the employees or agents of (co.name)identified in the related SOW. (Co.name) and the University may agree that any Services be performed in collaboration with any employees or agents of (co. name).

(b)The University shall cause any Services to be performed primarily by the employees or agents of the University designated in the related SOW and otherwise by

qualified employees or agents of the University who are experienced and skilled in practice areas related to such SOW.

(c) The University shall have no authority to obligate (co. name) in any manner, and shall not enter into any contract on behalf of (co. name), without the prior consent of (co. name).

(d) Notwithstanding any other provision of this Agreement to the contrary, nothing in this Agreement is intended, or shall be construed, to limit or restrict the University's right to perform for itself or third parties research and other services similar or identical to the Services if (i) such research and other services are performed by employees or agents of the University other than those who perform the Services, and (ii) such research and other services are performed without the disclosure or use of any Confidential Information (as hereinafter defined).

2. Payment. (a) In full consideration for the performance of any Services, for the delivery to (co. name) pursuant to the related SOW of any materials, documents or information in connection with the performance of such Services and for the grant to (co. name) pursuant to this Agreement of any rights arising from the performance of such Services, (co. name) shall (i) pay to the University the fee set forth in such SOW in accordance with the payment schedule set forth in such SOW and (ii) reimburse the University for the direct and indirect costs or expenses set forth in such SOW incurred by the University in connection with the performance of such Services in accordance with the reimbursement schedule set forth in such SOW. Notwithstanding any other provision of this Agreement to the contrary, (co. name) shall have no obligation to pay to the University any other amount in connection with this Agreement, except as provided in Section 7 hereof or any SOW.

(b) Unless otherwise provided in any SOW, prior to the payment by (co. name) of any amount pursuant to Section 2(a) hereof with respect to such SOW, the University shall deliver to (co. name), at such address as (co. name) may designate from time to time, a written invoice setting forth the following information:

(i) The amount to be paid in accordance with such SOW;

(ii) A description of the Services for which payment is then requested;

(iii) The names of the employees or agents of the University who performed the Services for which payment is then requested; and

(iv) Copies of receipts, invoices or other appropriate documentation for any costs or expenses for which reimbursement is then requested.

(c) The University shall maintain such books and records as are reasonably necessary to accurately reflect the performance of the Services and the fees, costs and expenses attributable thereto. The University shall permit (co. name) and its directors, officers, employees and agents to have access during normal business hours to such books and records for the purpose of verifying the performance of the Services and the accuracy of the related fees, costs and expenses.

(d) The provisions of this Section 2 shall survive the expiration of the term, or the earlier termination, of this Agreement until any and all payments then due to the University pursuant to this Section 2 have been finally made.

3. License for Performance of Services. (a) (co. name) hereby grants to the University a royalty-free, non-exclusive right and license to use such technical information or data disclosed to the University by (co. name) as may be necessary for the performance by the University of the Services solely for the purpose of permitting the University to perform the Services.

(b) Notwithstanding any other provision of this Agreement to the contrary, nothing in this Agreement is intended or shall be construed to grant to the University any right, title or interest in or to any intellectual property rights of (co. name), except for the rights granted to the University pursuant to this Section 3.

4. Intellectual Property Rights. (a) The University shall own all right, title and interest in and to any and all inventions first conceived during the term of this Agreement, know-how first generated during the term of this Agreement or copyrighted subject matter first authored during the term of this Agreement solely by any employee or agent of the University in connection with the performance of any Services (the "University Inventions"). As promptly as practicable after any University Invention has been first conceived, generated or authored, as the case may be, the University shall disclose to (co. name) such University Invention.

(b) (Co. name) and the University shall jointly own all right, title and interest in and to any and all inventions first conceived during the term of this Agreement, know-how first generated during the term of this Agreement or copyrighted subject matter first authored during the term of this Agreement, jointly by any employee or agent of (co. name) and any employee or agent of the University resulting from the collaboration of such employees or agents in connection with the performance of any Services (the "Joint Inventions"). As promptly as practicable after any Joint Invention has been first conceived, generated or authored, as the case may be, each of (co. name) and the University shall disclose to the other such Joint Invention. Each of (co. name) and the University shall have the

unrestricted right to use, manufacture and sell or license its interest in any and all Joint Inventions for any purpose whatsoever.

(c) If (co. name) desires to obtain from the University a license under any University Invention or an exclusive license of all of the University's right, title and interest in and to any Joint Invention, then (i) within 45 days after the disclosure to (co. name) of such University Invention in accordance with Section 4(a) hereof or such Joint Invention in accordance with Section 4(b) hereof, as the case may be (the "License Notice Period"), (co. name) shall deliver to the University notice to such effect (a "License Notice"), and (ii) (co. name) and the University shall, for a reasonable period (but in no event more than 90 days) after the receipt by the University of such notice (the "License Negotiation Period"), negotiate in good faith the terms and conditions upon which the University would grant to (co. name) such a license. Except as set forth in Section 4(a) hereof or 4(b) hereof, as the case may be, the University shall maintain in confidence each University Invention and Joint Invention, not use such University Invention or Joint Invention for any purpose inconsistent with the purposes of this Agreement and take such precautions as are reasonably necessary to protect such University Invention or Joint Invention from disclosure to, or use by, any third party for any purpose inconsistent with the purposes of this Agreement until (i) the expiration of the related License Notice Period (if (co. name) fails timely to deliver any License Notice with respect to such University Invention or Joint Invention) or (ii) the expiration of the related License Negotiation Period (if (co. name) timely delivers a License Notice with respect to such University Invention or Joint Invention, but (co. name) and the University fail timely to agree upon the terms and conditions upon which the University would grant to (co. name) a license under such University Invention or Joint Invention). If (co. name) and the University fail timely to agree upon the terms and conditions upon which the University would grant to (co. name) a license under any University Invention or Joint Invention, then the University shall have no further obligation to (co. name) with respect to such University Invention or Joint Invention pursuant to this Section 4(c).

(d) The University may, at its own expense, file and prosecute any patent or copyright application covering any University Invention; provided, however, that if the University fails to file any such application within a reasonable period of time or fails diligently to prosecute any such application and if (co. name) timely delivers a License Notice with respect to such University Invention, then (i) (co. name) may, in its own name and at its own expense, file and prosecute a patent or copyright application covering such University Invention, (ii) the University shall fully cooperate with (co. name) to facilitate such filing

and prosecution, and (iii) (co. name) shall reimburse the University for any costs or expenses reasonably incurred by the University in connection with such cooperation. Either (co. name) or the University may, at its own expense, file and prosecute any patent or copyright application covering any Joint Invention.

(e) If the University desires publicly to disclose any University Invention or Joint Invention, then (i) at least 45 days prior to such disclosure, the University shall submit to (co. name) any material incorporating such disclosure, and (ii) as promptly as practicable after the receipt of such material, (co. name) shall deliver to the University such comments as (co. name) reasonably believes to be necessary to avoid any loss of patent or copyright rights relating to such University Invention or Joint Invention resulting from premature public disclosure. After the earlier to occur of the receipt by the University of (co. name)'s comments with respect to any proposed public disclosure of any University Invention or Joint Invention or the expiration of 45 days after the receipt by (co. name) of the material incorporating such disclosure, the University may publicly disclose such University Invention or Joint Invention if (i) such disclosure incorporates (co. name)'s comments, if any, and (ii) such disclosure accurately acknowledges (co. name)'s sponsorship of the performance of the related Services.

(f) Notwithstanding any other provision of this Agreement to the contrary, nothing in this Agreement is intended or shall be construed to grant to (co. name) any right, title or interest in or to any intellectual property rights of the University, except for the rights granted to (co. name) pursuant to this Section 4.

(g) The provisions of this Section 4 shall survive the expiration of the term, or the earlier termination, of this Agreement for an indefinite period after the date of such expiration or termination.

5. Confidentiality. (a) The University shall maintain in confidence any technical or business information or data disclosed to the University by (co. name) in written, graphic or other tangible form clearly marked as proprietary or confidential, or in oral form reduced to writing within 30 days and clearly marked as proprietary or confidential (collectively, the "Confidential Information"), shall not use any Confidential Information for any purpose inconsistent with the purposes of this Agreement, and shall take such precautions as are reasonably necessary to protect the Confidential Information from disclosure to, or use by, any third party for any purpose inconsistent with the purposes of this Agreement, except to the extent that any Confidential Information (i) at the time of such disclosure, was already known to the University and such knowledge was evidenced by written documentation, (ii) at the time of such disclosure, was already known or was generally available to the public, (iii) after the time of such disclosure, becomes known or

generally available to the public other than by reason of disclosure by the University, (iv) after the time of such disclosure, is disclosed to the University by any third party with the apparent right to do so, (v) after the time of such disclosure, is independently developed by the University without the use of such Confidential Information or (vi) is required to be disclosed by applicable law and the University has given (co. name) the reasonable opportunity to seek an appropriate protective order.

(b) Upon the expiration of the term, or the earlier termination, of this Agreement, the University shall return to (co. name) any and all Confidential Information then in the possession of the University, unless otherwise noted on a mutually agreed to SOW attached hereto.

(c) The provisions of this Section 5 shall survive the expiration of the term, or the earlier termination, of this Agreement for a period of five years after the date of such expiration or termination.

6. Indemnification. (a) (co. name) shall indemnify and defend the University and its regents, officers, employees and agents (collectively, the "University Indemnitees") against, and hold the University Indemnitees harmless from, any and all claims, actions, proceedings, liabilities, demands, losses, damages, costs and expenses for personal injury or property damage incurred by any University Indemnitee to the extent resulting from, or arising out of any act or omission or alleged act or omission relating to this Agreement constituting negligence or willful misconduct on the part of (co. name); provided, however, that (co. name) shall have no obligation under this Section 6(a) to the extent that such claims, actions, proceedings, liabilities, demands, losses, damages, costs or expenses result from, or arise out of, any act or omission constituting negligence or willful misconduct on the part of the University or any third party. In the event of any such claim, action or proceeding, (i) the University shall deliver to (co. name) notice of such claim, action or proceeding as promptly as practicable after receipt of notice thereof, (ii) the University shall, and shall cause the other applicable University Indemnitees to, grant to (co. name) the authority to assume the sole defense thereof, through counsel of its choice, and to compromise or settle such claim, action or proceeding to the extent that such compromise or settlement would not prejudice the rights of the University under this Agreement, (iii) the University shall not, and shall not permit any other applicable University Indemnitee to, make any admission that may be prejudicial to such defense, except as otherwise required by law, and (iv) the parties hereto shall cooperate in any such defense.

(b) To the extent authorized under the Constitution and laws of the State of Texas, the University shall indemnify and defend (co. name) and its directors, officers, employees and agents (collectively, the "(co. name) Indemnitees") against, and hold the (co. name) Indemnitees harmless from, any and all claims, actions, proceedings, liabilities, demands, losses, damages, costs and expenses for personal injury or property damage incurred by any (co. name) Indemnitee to the extent resulting from, or arising out of any act or omission or alleged act or omission relating to this Agreement constituting negligence or willful misconduct on the part of the University; provided, however, that the University shall have no obligation under this Section 6(b) to the extent that such claims, actions, proceedings, liabilities, demands, losses, damages, costs or expenses result from, or arise out of, any act or omission constituting negligence or willful misconduct on the part of (co. name) or any third party. In the event of any such claim, action or proceeding, (i) (co. name) shall deliver to the University notice of such claim, action or proceeding as promptly as practicable after receipt of notice thereof, (ii) (co. name) shall, and shall cause the other applicable (co. name) Indemnitees to, grant to the University the authority to assume the sole defense thereof, through counsel of its choice, and to compromise or settle such claim, action or proceeding to the extent that such compromise or settlement would not prejudice the rights of (co. name) under this Agreement, (iii) (co. name) shall not, and shall not permit any other applicable (co. name) Indemnitee to, make any admission that may be prejudicial to such defense, except as otherwise required by law, and (iv) the parties hereto shall cooperate in any such defense.

(c) The provisions of this Section 6 shall survive the expiration of the term, or the earlier termination, of this Agreement for an indefinite period after the date of such expiration or termination.

7. LIMITATION OF LIABILITY. NEITHER PARTY HERETO SHALL BE LIABLE TO THE OTHER PARTY HERETO FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES INCURRED BY SUCH OTHER PARTY RESULTING FROM OR ARISING OUT OF THIS AGREEMENT.

8. Compliance With Laws. (a) Each party hereto shall comply with all applicable laws, rules and regulations relating to the performance of such party's obligations under this Agreement.

(b) The University shall not export or reexport, directly or indirectly, any restricted technical information or data that is not otherwise available to the general public (or any direct product thereof) delivered or disclosed to the University by (co. name) in any form to any destination in Country Group D:1 or E:2, as specified in Supplement No. 1 to Part 740 of the Export Administration Regulations administered by the United States

Department of Commerce, as modified from time to time. or to any destination this is otherwise controlled or embargoed under applicable federal law.

9. Term, Termination and Effect of Termination. (a) The initial term of this Agreement shall commence on the date hereof and expire upon the third anniversary of the date hereof, unless sooner terminated in accordance with Section 9(b) hereof.

(b) This Agreement may be terminated prior to the expiration of its term as follows:

(i) At any time, by the mutual consent of the parties hereto;

(ii) At the expiration of the term of this Agreement, by either party hereto by the delivery of notice to such effect to the other party hereto at least 90 days prior to such expiration;

(iii) At any time, by either party hereto by the delivery of notice to such effect to the other party hereto upon (A) the filing by such other party, or the consent by such other party by answer or otherwise to the filing against such other party of. a petition for relief or reorganization or liquidation (in connection with a bankruptcy or insolvency proceeding) or the taking of advantage by such other party of any bankruptcy or insolvency law of any jurisdiction, (B) the making by such other party of a general assignment for the benefit of its creditors, or the consent by such other party to the appointment of a custodian, receiver, trustee or other officer with similar powers for such other party or for any material part of such other party's properties. (C) the appointment by a court or governmental authority of competent jurisdiction. without the consent of such other party, of a custodian, receiver, trustee or other officer with similar powers with respect to such other party, (D) the entering of an order for relief against such other party in any case or proceeding for liquidation or reorganization or ordering the dissolution, winding-up or liquidation (in connection with a bankruptcy or insolvency proceeding) of such other party or (E) the filing of any petition of any such relief against such other party and the failure to dismiss such petition within 90 days after such filing; or

(iv) At any time, by either party hereto by the delivery of notice to such effect to the other party hereto, if such other party has committed any material breach of any of its obligations under this Agreement, and such breach has not been

cured within 30 days after the receipt by such other party of notice thereof from such party.

(c)Upon the termination of this Agreement pursuant to clause (i) or (ii) of Section 9(b) hereof, no party hereto shall have any rights or obligations under this Agreement, except as provided in Sections 2(d), 4(g), 5(c) and 6(c) hereof. Upon the termination of this Agreement pursuant to clause (iii) or (iv) of Section 9(b) hereof, no party hereto shall have any rights or obligations under this Agreement, except (i) as provided in Sections 2(d), 4(g), 5(c) and 6(c) hereof and (ii) that the terminating party hereto may exercise any and all of the rights and remedies available to it under applicable law.

10. Publicity. Except as set forth in Section 4(d) hereof or as otherwise required by law, neither party hereto shall issue or cause the issuance of any press release or other publication of the existence of this Agreement or the transactions contemplated hereby, without the prior consent of the other party hereto.

11. Notices. Any notices, requests or consents required or permitted under this Agreement shall be in writing and deemed to have been duly given or delivered (a) when personally delivered, (b) when sent by facsimile transmission to a party hereto at the facsimile number set forth below for such party (provided that proof of successful transmission can be reasonably demonstrated), (c) the next day following the day when delivered prepaid to a reputable national overnight courier service, (d) three days after the day when deposited in the U.S. mail, registered or certified, return receipt requested, and postage prepaid; in each case addressed to the party hereto to whom such notice, request or consent is to be given or delivered at the following addresses, or at the most recent address specified by notice given to the other party hereto (provided, however, that any notice of an address change shall not be deemed to have been duly given or delivered until actually received):

(Company Name)
(Address)
Attention: Vice President and General Counsel
Facsimile:

University

The University of Texas at Arlington
Office of Research
P.O. Box 19145
Arlington, Texas 76019-0145
Attention: Dr. Marianne R Woods
Facsimile: (817) 272-5808

12. Successors and Assigns. This Agreement shall be binding upon, and inure to the benefit of, the parties hereto and their respective successors and assigns. Neither party hereto shall assign any rights or delegate any obligations under this Agreement without the prior consent of the other party hereto; provided, however, that the University may delegate any of its obligations to perform any of the Services to any other institution of higher education that is a member of the Texas College and University System, without the consent of (co. name), if such delegation is necessary to perform such obligation.

13. Independent Contractor. The University shall perform the Services as an independent contractor of (co. name). Nothing in this Agreement shall constitute or be deemed to constitute any joint venture, partnership, agency or other similar arrangement between the parties hereto.

14. No Third Party Beneficiaries. Nothing contained in this Agreement is intended or shall be construed to confer upon or give any person or entity other than the parties hereto any rights under or by reason of this Agreement.

15. Modification and Waiver. No supplement, modification, waiver or termination of any provision of this Agreement shall be binding unless executed in writing by the party hereto to be bound thereby. No waiver of any provision of this Agreement shall constitute a continuing waiver of such provision or a waiver of any other provision of this Agreement unless otherwise expressly provided.

16. Entire Agreement. This Agreement, together with each of the SOWs, constitutes the entire agreement among the parties hereto with respect to the subject matter hereof, and supersedes all prior oral or written agreements, representations or warranties among the parties hereto, including without limitation any and all confidentiality or nondisclosure agreements in effect on the date hereof between the parties hereto with respect to the subject matter hereof.

17. Counterparts. The parties hereto may execute any number of counterparts to this Agreement, each of which shall be deemed to be an original, and all of which together shall constitute one and the same agreement.

18. GOVERNING LAW. THIS AGREEMENT SHALL BE GOVERNED BY AND CONSTRUED IN ACCORDANCE WITH THE LAWS OF THE STATE OF TEXAS, WITHOUT GIVING EFFECT TO THE PRINCIPLES OF CONFLICTS OF LAWS THEREOF.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date set forth in the introductory paragraph hereof.

By:
Partner

By:
Name:
Title: Procurement Specialist
Date: December 14, 2001

THE UNIVERSITY OF TEXAS AT ARLINGTON

By:
Name: Dr. Marianne R Woods
Title: Assistant Vice President for Research and Director of Grant and Contract Services
Date: December 14, 2001

By:
Name: Dr. James Campbell Quick
Title: Professor, Department of Management
Date: December 14, 2001

Exhibit B-1

Scope of Services

This Scope of Work ("Sow") is subject to the terms and conditions of the Consulting Services Agreement (the "Agreement") between University of Texas at Arlington ("University") and (company name). To the extent that there is any conflict between the SOW and the Agreement, this SOW shall prevail. Capitalized terms not defined in the SOW shall have the meaning ascribed to them in the Agreement.

1. **Scope of Services**

University will conduct a study on managing a virtual workforce. The research will include the assessment and evaluation of communication patterns, job attributes such as autonomy, interdependence, productivity, and adjustment to virtual work. The research is to help the organization better understand and manage their remote employees. Consulting services will design a survey to be administered to (company name) Employees. University will analyze the raw data and provide a report on the results.

2. **Description of Services/Deliverables**

(Company name) will provide the following deliverables:

- Provide the resources to develop the web-based survey, implement the pilot, survey, and collect the data.
- Provide access to the employee population targeted for the survey.
- Conduct pilot to test the design of the survey questions and web-tool.
- Maintain and provide scorecard.
- To protect the confidentiality of the data, (company name) will maintain the scorecard only for future survey reference for up to three years.

University will provide the following deliverables:

- Conduct the analysis of raw data and provide a survey report of the results.
- Analyze the raw data submitted by (company name) from survey using the scorecard method.
- Provide (company name) with comprehensive results and recommendations derived from the analysis of the raw data.
- Maintain scorecard for possible second survey to conduct in the future.
- To protect the confidentiality of the data and eliminate potential for misuse, University will receive survey data that does not contain any identifying names or employee Ids.

University will not, except with the express permission of the company, mention the name of the organization in any publication, academic or non-academic

3. **Due dates/Timetable**

The following represents the various activities and milestones and tentative completion dates for each.

Activity/Milestone	Target Date
Conduct pilot and survey	December 12th through 18th
Collect raw data from pilot and submit to University for analysis and issuance of results.	December 18th
Submit Pilot results to (co. name) for evaluation and decision on running survey.	January 14th
Identify Pilot issues, correct, and make necessary changes.	January 14th through 18th
Conduct survey to selected population.	January 21st through 31st
Prepare and submit final survey report for (co. name).	February 18th

University will collaborate with (co. name) on future surveys, with the current survey as a baseline, or, failing that, permit usage of survey instrument by the organization for future longitudinal studies.

5. **Acceptance**

IN WITNESS WHEREOF, the parties hereto have caused this Statement of Work to be executed by their respective duly authorized representatives. All copies of this agreement, signed by both parties, shall be deemed originals.

By:
Partner

By: _____

Name:
Title: Procurement Specialist

Date: December 14, 2001

University of Texas at Arlington

By: _____

Name: Dr. Marianne R. Woods
Title: Assistant Vice President for Research and Director of Grant and Contract Services
Date: December 14, 2001

By: _____

Name: Dr. James Campbell Quick
Title: Professor, Department of Management
Date: December 14, 2001

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