



Managerial Issues for Telecommuting

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EXECUTIVE SUMMARY

In this paper the issues faced by firms in today's telecommunications environment are compared and contrasted with an actual telecommuting case study of Trade Reporting and Data Exchange, Inc. (T.R.A.D.E.), a software engineering company located in San Mateo, CA. Initial results indicate that telecommuting was successful for T.R.A.D.E because the required technology was widely available (the candidate initiated the idea and had the necessary industry and company experience) the organization could provide the flexible work arrangement while retaining a valuable employee, the employees were able to live in a geographic area of their choice, overall costs could be shared by the company and employees, the job category was an ideal fit, and existing procedures were in place for communicating and managing the geographically detached worker. As telecommunications technology evolves this arrangement will continue to challenge the firm and their employees.

BACKGROUND

Company Background

Trade Reporting and Data Exchange, Inc. (T.R.A.D.E.) is a software engineering company located in San Mateo, CA. The firm was created in 1992 to provide international corporations access to a wide variety of international trade information stored on the T.R.A.D.E.'s massive databases. T.R.A.D.E. gathers data from a variety of sources including U.S. Customs documents, Chinese Customs Administration, Dun and Bradstreet, and numerous other government trade documents. They provide general information and specific trading activities on hundreds of thousands of international buyers, distributors, and suppliers.

This data is consolidated and organized for optimal access by T.R.A.D.E. The company disseminates this information via monthly and quarterly updated CD-ROMs sent directly to the firm's subscribers. Hardcopy reports are also available. In addition, the firm offers customized reporting and monitoring services available on an ad-hoc or event triggered notification basis. The CD-ROM includes sophisticated software querying tools and wizards designed to provide subscribers a user-friendly interface to the information.

Although relatively young, the firm has grown significantly and now employs a professional staff of 50. T.R.A.D.E., Inc. is truly an international organization with offices located in Hong Kong, Taiwan, the United Kingdom, and the corporate headquarters in San Mateo. Additionally, T.R.A.D.E.

utilizes a number of licensed distributors in a number of other countries. T.R.A.D.E., Inc. was recognized as one of the ten fastest growing, private companies, in Silicon Valley in 1996. While the firm is hesitant to reveal exact figures, revenues were in the multi-million dollar range in 1996 and represents T.R.A.D.E.'s significant share in the business intelligence market.

Telecommuter Background

The specific employee we will chronicle is Dave Tucker. Tucker has worked for T.R.A.D.E. for nearly five years as a software engineer, after working for a major hardware manufacturer in Silicon Valley for nearly seven years. His responsibilities at T.R.A.D.E. include developing advanced database queries, creating programs to interface source databases into T.R.A.D.E.'s massive database system, and creating software applications for the CD-ROMs which subscribers receive.

Tucker relocated to Silicon Valley nearly eleven years ago, after he graduated with a computer science degree from a large mid-western university. Tucker and his wife both grew up in central Iowa. Now with two young children (ages 3 and 5), Tucker and his wife desired to return to central Iowa to be closer to family and friends and to provide their young children with childhood experiences similar to their own. In the spring of 1996, Tucker proposed a telecommuting arrangement to T.R.A.D.E.

T.R.A.D.E. decided to pilot test the arrangement. Tucker identified a college professor in Ames, Iowa who was interested in exchanging homes, for the summer, with someone near Silicon Valley. T.R.A.D.E. agreed to allow Tucker to telecommute for the summer and both agreed to evaluate the arrangement at the end of the summer trial. After the summer trial Tucker and T.R.A.D.E. agreed that the telecommuting alternative had substantial merit and decided to enter the arrangement on a permanent basis. What follows is an enumeration of the issues related to telecommuting and a chronicle of how Tucker and T.R.A.D.E. addressed each issue. These issues include telecommuter selection, organizational issues, social aspects, costs, and productivity measurement.

SETTING THE STAGE

Telecommuting presents organizations and their employees with a number of opportunities and a number of potential problems. Generally speaking, the benefits of telecommuting include more hours worked per day, more work accomplished per hour, and less employee stress due to commuting and/or work/personal conflicts (such as a sick child) (Curran and Williams, 1997; Race, 1993; Schellenbarger, 1993; Townsend, DeMarie, and Hendrickson, 1998). The organization must cope with employee work schedules being more flexible, in that many telecommuters may or may not keep traditional work hours. Additionally, immediate access to employee skills and services is somewhat diminished.

As shown in Figure 1, successful telecommuting requires special attention be given to: enabling technology, selecting the right job category and the right individual for the arrangement, organiza-



Figure 1. Telecommuting Issues

tional incentives, social impacts of dispersed workers, management of overall costs, and productivity measurement of geographically dispersed work teams. Each of these issues will be examined and compared to the specific T.R.A.D.E. example. While the specific facts encountered by Tucker represent his personal experiences with telecommuting, the issues examined apply to any telecommuting arrangement. Individuals will undoubtedly have varying degrees of problems and success with any given issue depending upon their personal background, skill level and motivations, but the categories of concern should be universal to all telecommuters and their organizations.

Enabling Technology

A number of hardware, software and telecommunication technologies are needed to support telecommuting in the software engineering industry given its requirements for distributed software development and intraorganizational communication. The specifications of the components located with Tucker, as well as some components that Tucker utilizes that are located at T.R.A.D.E.'s headquarters, are described throughout this section. Each of the items was integrated into a complete information infrastructure that supported their telecommuting needs. The components are grouped into four categories including telecommuter hardware and software located at Tucker's home office that support Web application development and intraorganizational communication, Web and database servers located at T.R.A.D.E., and the telecommunications components used for communication between Tucker and T.R.A.D.E. These components are described in Table 1.

Telecommuting Information Infrastructure Component Category	
1. Telecommuter Hardware	<p><i>Desktop PC</i></p> <ul style="list-style-type: none"> • Gateway 2000 P6-200, 96MB RAM, 5GB hard drive • modem with voice capabilities, Soundblaster card • SCSI DAT tape backup, 8X CD drive • UPS power supply • running Windows NT 4.0 workstation, 10MB Ethernet <p><i>Laptop PC</i></p> <ul style="list-style-type: none"> • Gateway 2000 Solo 2200 P5-166, 32MB RAM, 2GB hard drive, 12X CD drive • running Windows 95, 10MB Ethernet PCMCIA <p><i>ISDN router</i></p> <ul style="list-style-type: none"> • Webram Entre, 2 POTS lines, 4 Ethernet ports <p><i>Test Server</i></p> <ul style="list-style-type: none"> • Gateway 2000 P5-133, 32MB RAM, 2GB hard drive • running Windows NT 4.0 Server and Web services
2. Telecommuter Software	<p><i>Web Browser</i></p> <ul style="list-style-type: none"> • Internet Explorer 4.0 <p><i>Web Application Development Software</i></p> <ul style="list-style-type: none"> • Microsoft Visual Interdev, Frontpage 97, Visual C++, and Visual Basic <p><i>Programming Languages</i></p> <ul style="list-style-type: none"> • C++, HTML, VBScript, JavaScript, and Active Server Pages
3. Corporate Servers	<p><i>Database Server</i></p> <ul style="list-style-type: none"> • 512MB memory, 80+GB disk drive • running Oracle 8 on a HP-UX 10.0 server <p><i>Web Server</i></p> <ul style="list-style-type: none"> • IIS 4.0 running on an ALR Revolution Quad 4 (4 P6-200 CPUs), 256MB memory, 16MB disk drive
4. Telecommunications	<ul style="list-style-type: none"> • ISDN line with two voice lines (one of which was used for fax) • Hotfax MessageCenter was used to provide voice mail, fax, and dial in capabilities • US Robotics Sportser Voice 33.6K internal modem • NetINS RemoteLAN ISDN service (provided a remote LAN with five static IP addresses) • NetMeeting was used for some voice over the Internet • No video conferencing products were used.

Table 1. Telecommuting Information Infrastructure Components

The router is a unique item because it will handle both static and dynamic IP addresses. It was used to set up a remote LAN so that Tucker could have static IP addresses so that a firewall could be configured in California to allow his IP addresses through. The router also handles dynamic IP addresses given by ISPs each time a connection is made while allowing routing from multiple machines on the local LAN through the dynamic IP. The remaining items are widely available from a number of hardware and software providers.

Most of Tucker's work involved software engineering, system testing, and general troubleshooting tasks related to the development and support of software applications used in the firm's products and services. Thus, a variety of telecommunications technology was utilized to facilitate Tucker's collaborative efforts with others at T.R.A.D.E. Specifically, Hotfax Message Center was used for electronic mail, fax, dial-in capabilities and some limited voice transmissions. Most of the voice interaction was accomplished over an ISDN connection which provided two voice channels, one of which was occasionally used for fax. In some instances it was necessary to utilize both ISDN channels at once in order to provide adequate bandwidth for some collaborative troubleshooting. In those instances, NetMeeting was also used for voice over the Internet via a dial-up connection.

T.R.A.D.E. and Tucker found NetMeeting to be very useful in these circumstances. The telecommuting arrangement did not have any video conferencing applications. Neither T.R.A.D.E. nor Tucker found this problematic since most of the interactions Tucker had were with associates whom he had previously met and had some ongoing working relationship. This is an important point since these voice connections do not provide visual support for collaborative interaction. Body language, eye contact, and physical mannerisms are filtered from the interaction with only voice connectivity (Townsend, DeMarie, and Hendrickson, 1998).

Upon reflection, Tucker expressed the need to integrate more collaborative tools and video conferencing into his telecommuting toolset. Several products were under consideration. The Internet products, such as CU-See-ME are inexpensive and provide some basic level of video interaction. Additionally, these products are relatively easy to install and are cost effective to install in a wide group of users. However, bandwidth limitations can make this solution inadequate.

Intel's Proshare units were an option that appeared very appealing. This product not only integrates the hardware (video camera) and software into one package, but the product provides a very sophisticated collaboration tool. Virtually any personal computer application can be shared between users with this product. The major drawback of this product, however, is price. Each unit is more than \$1,000, and the system is proprietary. Thus each person wishing to interact with the telecommuter must also have this system. Due to the fact that Tucker supported a wide range of developers, with little or no ability to anticipate who might need to interact with Tucker on any given day, T.R.A.D.E. felt the investment in this technology to provide video connection with one telecommuter was too expensive. However, since the success of this arrangement was encouraging for future telecommuting arrangements, the firm did not rule out the possibility of this technology for developers in the future.

Similarly, collaborative technologies such as Lotus Notes was considered. This package is popular in the support of geographically dispersed collaborative teams. Notes provides collaborative tools beyond simple e-mail. Applications and documents can be shared and maintained by groups instead of individuals. Many organizations are using Notes to connect their entire professional staffs (Townsend, DeMarie, and Hendrickson, 1998). Again, the firm saw some benefit to this software, but the expense in terms of economic resources, training, and time could not be justified to support a limited number of telecommuters.

Obviously, there are an infinite number of combinations of hardware, software and telecommunication components available, but this case does identify one set of information technologies that enabled successful telecommuting. It is apparent that information technology and telecommunications services are widely available which allow telecommuting to be a feasible work arrangement for software engineering companies. But the technology is a necessary, but insufficient, condition for success. The remaining issues we discuss move beyond information technology issues to the more complex managerial and organizational behavior issues.

CASE DESCRIPTION

Telecommuter Selection

The ultimate success of telecommuting may well depend upon the initial selection of appropriate candidates for this alternative. Generally, individuals who have significant experience in a job, individuals who are above average performers, and persons with a broad range of job assignments will adjust better to a telecommuting arrangement than their less experienced, lower performing counterparts (Boyett and Conn, 1992; Fish, et. al., 1992; Kraut, 1988; Mokhtarian and Salomon, 1994; Townsend, DeMarie, and Hendrickson, 1998). More specifically, successful telecommuting candidates will have worked for the organization long enough to acquire some affinity for the corporate culture and nature of expectations in this specific work environment. Additionally, workers who have demonstrated superior technical skills (especially with remote working tools, such as a computer, modems, fax, and videoconferencing) will be more successful (Fish, et. al., 1992; Kraut, 1988; Mokhtarian and Salomon, 1994). Finally, some consideration for the individual's suitability for telecommuting may depend upon his/her personality profile and acceptance of a more ambiguous work setting.

In our example case, the firm did not initiate the telecommuting arrangement but Tucker's skills and experience are insightful. Tucker had significant experience in both the software development industry and with T.R.A.D.E. specifically. He had spent 11 years as a software engineer, four of those years with T.R.A.D.E. Thus, he had a firm understanding of his job tasks and the specific policies and goals of T.R.A.D.E. Additionally, Tucker was an extremely high achiever. When Tucker first proposed the telecommuting arrangement, T.R.A.D.E. management stated that they would have never considered such an arrangement had Tucker not been an exemplary employee whose services they wished to maintain, even if it meant altering the firm's standard operating practices. Finally, with respect to technical skills, Tucker pointed out that he felt the relationship functioned well due to his experience with the technology and his ability to provide his own technical support.

Organizational Incentives

For the organization the benefits of telecommuting are numerous. Incorporating remote workers into the organization can provide the catalyst for organization flexibility, allowing the firm to expand and contract to adjust to market conditions. As demand increases the organization can expand without the corresponding increases in physical facilities. Thus, telecommuting offers the organization the opportunity to expand with limited cost increases, or in some cases to reduce overhead by eliminating office facilities (furniture, electricity, and environmental conditioning) and space requirements (Mokhtarian, 1988; Mokhtarian 1991a; Nijkamp and Salomon, 1989; U.S. Department of Transportation, 1993).

As highly skilled human capital becomes a scarce commodity in the brain power industries of the 21st century, telecommuting offers the organization a means of attracting and retaining these limited resources (Thurow, 1996). Telecommuting may provide access to skilled employees who do not desire to reside in a particular geographic area, or who are limited due to other personal commitments (such as elderly or childcare responsibilities). Telecommuting also allows organizations to utilize workers in disadvantaged rural or urban areas, as well as incorporate the skills of workers who have left the workforce temporarily due to illness or to spend time with small children (Curran and Williams, 1997).

Although the advantages of telecommuting are numerous, there are some drawbacks to this alternative. Generally, managers are not trained to deal with remote workers, especially in terms of how to manage their activities and how to motivate them. Many managers are uncomfortable with the perceived loss of control created by telecommuting. However, most of the problems are more perceived than manifest. Good management skills in terms of delegation and performance measurement can alleviate most of the disadvantages (Katz and Kahn, 1979; Katz and Tushman, 1978).

Many of these issues were considered by T.R.A.D.E. in dealing with Tucker's request to telecommute. The firm was aware that the task of replacing Tucker may be daunting. Not only would

they need to identify an individual with similar skills, but in all probability, they would face a significant task in attracting the candidate away from their present employer. Additionally, a large amount of time and resources would be spent bringing the new employee up to speed in terms of corporate culture and client expectations. Thus, given Tucker's desire to relocate, yet remain as an employee, the situation presented an opportunity for T.R.A.D.E. to retain the skills they require and provide a valued employee the flexibility he sought. Although T.R.A.D.E. would recapture Tucker's physical space, they didn't realize any significant cost savings related to physical facilities since this telecommuting arrangement was not an organization-wide arrangement. Managerial problems were not considered as crucial, primarily due to Tucker's solid history with the firm and the firm's confidence in his personal integrity and ability.

Social Aspects

The personal social benefits are the main attractiveness to most employees. Telecommuters are often unconstrained by traditional office schedules and work environments. They typically have the freedom to set more flexible work schedules to coincide with personal activities such as child, elderly, or disabled care responsibilities. The inherent lack of commuting lowers the stress, time, and financial cost of this activity. Remote workers recapture valuable time spent in daily commutes, along with reducing or eliminating the need for transportation (bus, auto, fuel, etc.) to commute (Mokhtarian, 1988; Mokhtarian, 1990; Mokhtarian 1991a; Nijkamp and Salomon, 1989; U.S. Department of Transportation, 1993).

The benefits are not without real, and potentially substantial, disadvantages (Egido, 1990). Because telecommuters typically work out of their home environments, many develop feelings of isolation. They often feel out of touch with their co-workers and feel that they miss out on informal social interactions that occur naturally in the work environment (Curran and Williams, 1997; Kraut, Egido, and Galegher, 1990; Kraut and Streeter, 1994). The lack of interaction often extends beyond co-worker interaction. Many telecommuters feel disassociated with other business professionals. Relationships that occurred and developed naturally in traditional business settings now must be recreated, often with substantial effort, in the telecommuting environment.

Working at home can cause other problems. Some telecommuters experience a sort of cabin fever due to the lack of external interaction on a routine basis. Additionally, working at home can cause strain on marital and family relationships. The homogeneity of the work and home environment offers limited stimulus variety, and can ultimately be counterproductive. The yearning for peace and quiet in order to accomplish work tasks may soon be perceived as too peaceful and quiet (Curran and Williams, 1997; Race, 1993; Shellenbarger, 1993).

Some telecommuters develop a sense of disconnect between themselves and their organizations. They may feel their skills are being underutilized and that they are out of the loop in terms of office politics and organizational gossip. While the elimination or minimization of office politics is usually cited as a productive benefit of remote work by employers and employees alike, the reality is that humans are social creatures who require some minimum level of social interaction. Sometimes, negative interaction is better than no interaction. The loss of social interaction can be mitigated if special attention is given to substituting the negative interactions with positive reinforcement of the employee's role in the organization (Hiltz, 1993; Katz and Kahn, 1979; Katz and Tushman, 1978).

Tucker experienced more of this than he initially thought possible. While T.R.A.D.E. viewed Tucker's absence as somewhat negative, Tucker initially thought the telecommuting arrangement was ideal. Tucker's superiors (Vice President of Engineering, President, and CEO) all expressed reservations with the arrangement due to Tucker's more limited interaction in informal decision making. When in the office, his superiors readily would seek out his input and advice on a myriad of business issues. Now that Tucker was not readily available (in person, although he was always accessible at his remote location), his superiors felt they were not utilizing all of his skills.

Tucker often saw this as time consuming and detrimental to his specific task agenda. However, as time passed, Tucker began to feel his political power and informal influence began to wane. He often found himself less informed on critical corporate issues and felt he was not contributing as much

to the organization as he had previously. Tucker admits that he now feels somewhat less connected to T.R.A.D.E. His personal identity now revolves less around his role at T.R.A.D.E. and more around his generic software engineering skills. In an effort to recreate some of the social interactions, Tucker has joined a number of professional and business organizations, such as the Lions Club, and the local Chamber of Commerce. The success of this substitution is yet unknown, but Tucker is skeptical concerning his ability to fully recreate the same interpersonal/professional sociology he once enjoyed.

Management of Costs

The tangible costs and benefits of telecommuting are fairly straightforward and easy to address. For the organization, the costs include installation and monthly charges for long distance services to facilitate remote access to the employee which may include voice, data, and video communication. If periodic travel is required, then the cost of this travel will also need to be factored into the equation. Travel costs will not only include transportation costs but hotel and living expenses incurred during stays at the organization's site. These costs will be offset by savings from reduced costs of space (office and parking), furniture, and facilities (heating, air conditioning, and other space related benefits) (Mokhtarian, 1988; Mokhtarian 1991a; Nijkamp and Salomon, 1989; U.S. Department of Energy, 1994; U.S. Department of Transportation, 1993).

For the individual, the tangible benefits include reduced costs of transportation and the potential for reduced expenditures from unreimbursed activities such as some business lunches. Depending upon the telecommuting arrangement and personal responsibilities, there may be some potential elderly or childcare savings due to the remote worker's presence in the home environment.

In the arrangement between Tucker and T.R.A.D.E., Tucker originally proposed that he would pay the expenses of the arrangement out of his pocket. Thus, he pays for the Integrated Services Digital Network (ISDN) telecommunications lines into his home, the special software that enables him to emulate a users personal computer desktop environment on his personal computer in his home, and the associated travel expenses for the two to three day trips he makes to San Mateo every six weeks. An interesting aspect of this arrangement is that Tucker's superiors at T.R.A.D.E. expressed dissatisfaction with this unilateral arrangement. Since Tucker was incurring the costs, his T.R.A.D.E. superiors did not feel comfortable asking him to return to San Mateo for special projects outside of the normal six-week visits. With a year of experience with this arrangement, the costs are fairly well established. Thus, in the future the firm and Tucker will likely share the costs in some manner.

Productivity Measurement

But, how do we know what you are doing? is a sentiment often expressed by managers to proposals of telecommuting from employees. Metrics of productivity and performance are critical regardless of the work environment. However, less than optimal performance evaluation can be masked in traditional work environments, but vague and ambiguous management approaches fail miserably in telecommuting environments. As discussed in the telecommuter selection section, telecommuting is not for everyone and every job function. Some jobs simply require too much interaction to allow for efficient and effective skill utilization from a remote site.

This problem notwithstanding, many job functions and individuals can readily adapt to a telecommuting arrangement if good management techniques are practiced. Overall in a telecommuting environment, the emphasis shifts from control of processes to control of results. Work tasks must be planned well, delegated specifically, and be accompanied with timetables and deadlines. It is also important to provide a mechanism to periodically assess progress and issue performance feedback (Curran and Williams, 1997). Obviously, these practices are easier to accomplish with job functions that lend themselves to segmented, specific tasks, but these techniques represent superior management practices regardless of the work environment. In traditional work environments, many of these activities can be accomplished informally. With the employee and supervisor both present, progress assessment and performance feedback is relatively easy and often very informal. Planning is often overlooked since managers can easily modify employee assignments during task execution.

Tucker and T.R.A.D.E. found this area to be the least problematic to operationalize. This may be attributable to Tucker's job function. As Curran and Williams (1997) point out, the five job categories most suitable to remote working are professionals, professional support, field workers, IT specialists, and clerical support. Depending on the specific definition, Tucker's job could be considered in any one of three of the five: professional, professional support, and IT specialist. Already a well managed organization, T.R.A.D.E. incorporated most of these management techniques in its operations prior to Tucker's proposal for telecommuting.

CURRENT CHALLENGES/PROBLEMS FACING THE ORGANIZATION

Telecommuting offers substantial benefits for organizations today and into the 21st century. As the demand and competition for high-quality knowledge workers increases, this alternative will allow firms to attract and retain employees with scarce resources. At the same time, workers are demanding more flexibility as alternatives to traditional work relationships. The case study presented throughout this paper is an example of successful telecommuting. It was successful because each of the six sets of issues: enabling technology, telecommuter selection, organizational advantages/disadvantages, social aspects, costs, and productivity measurement, were addressed by both Tucker and T.R.A.D.E.

The technology needed to enable distributed software development and intraorganizational communication is widely available. Hardware, software and telecommunications capabilities continue to improve while their cost continues to decline. At the same time, telecommunication capabilities continue to evolve and these capabilities alter the way in which employees can experience the world. This continues to challenge T.R.A.D.E. and Tucker alike. However, it is apparent that technology is a necessary but insufficient condition for telecommuting success. Most issues do not involve technology implementation, but instead involve more complex managerial and organizational behavior issues.

Tucker initiated the arrangement which showed that he saw telecommuting as beneficial to him, while he also was an ideal candidate for telecommuting because he had significant experience in software development, significant experience with his company, was an exemplary employee, and had experience in doing his own technical support. The organization saw that the advantages of telecommuting for Tucker outweighed the disadvantages. Any inconveniences the arrangement may cause are outweighed by the costs that would be incurred to replace Tucker's skills with a new employee from a tight job market.

Tucker and T.R.A.D.E. saw some disadvantages arise from the lack of direct interaction with co-workers, but the ability to live in a geographic area that better matched his families needs outweighed these problems. Cost sharing arrangements can be adjusted as the telecommuting arrangement between Tucker and T.R.A.D.E. evolves. And finally, there was a fit between Tucker's job category, one of professional, professional support, and/or IT specialist that enabled his productivity to be easily measured through existing procedures. As these factors evolve, T.R.A.D.E. and Tucker must determine how the telecommuting arrangement will evolve.

While originally somewhat skeptical, the firm's experience with Tucker's telecommuting arrangement has been a positive one. T.R.A.D.E. is now more enthusiastic about entertaining similar work arrangements for other employees and contractors. The disadvantages are predictable and can be minimized. The benefits for the firm in retaining and attracting highly skilled personnel in an extremely competitive job market continues to grow. To date no additional arrangements have been undertaken, but several are being considered.

The overall conclusion of this case is that successful telecommuting can take place in today's IT environment when experienced, self-motivated, employees are involved. There are incentives for the organization to provide this flexibility, and there are procedures in place for communicating and managing remotely instead of in a traditional environment.

In the final analysis, telecommuting alters the existing social pattern of work as we have known it for the last one hundred plus years, i.e., workers leave their homes each day to toil at job sites some distance from their homes, and return each evening to rest and renew the process again. This excerpt

from the U.S. Department of Energys Office of Policy, Planning, and Program Evaluation (1994) best sums up the future of telecommuting.

The social effects of telecommuting will occur and be judged in the larger context of advances in telecommunications as well as other changes that effectively restructure workplace interactions. It may be difficult to distinguish the effects that are specific to telecommuting. Currently, telecommuting is not widespread, and its social effects are relatively localized. Individual telecommuters, their work organizations, their families, and to a lesser extent, their communities currently are affected. If telecommuting becomes a widespread working strategy, the effects both positive and negative will become more varied and their scale will become larger, affecting individuals, the workplace, families, communities, and the Nation.

The following issues may become particularly important: separation between home and work; increasing fractionalization of the workforce and society at large; and changes in neighborhood and community interactions. Telecommuting from home blurs existing boundaries between home and work. Employees' abilities to separate (or escape) from their work and employers abilities to invade their employees' homes may change the nature of home and work lives. Within the workplace, three major classes of personnel may develop: those who voluntarily telecommute and derive the benefits of autonomy, flexibility, and freedom from interruptions; those for whom telecommuting is required and who may not experience the advantages of the privileged class of telecommuters or have access to the benefit packages associated with long-term employment in an office setting; and those for whom telecommuting is not an option. Widespread telecommuting may enhance the safety and spirit of neighborhood and community life, though these effects may not be distributed consistently throughout a region or the country because of varying composition of communities may be associated with different levels of telecommuting. Finally, widespread telecommuting may change patterns of residential and commercial development, in part because of proximity of the workplace to the labor force would diminish in importance.

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