

TELECOMMUTING FOR INDIVIDUALS AND ORGANIZATIONS¹

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Abstract

Changes in the work process, the nature of the workforce, and advances in communications technology have led to increased use of telecommuting by workers, entrepreneurs, and executives. This paper examines the feasibility of telecommuting, drawing upon a project involving several private firms and public organizations in the New York metropolitan region. The paper highlights the benefits and challenges that telecommunications offers as a way to retain workers, meet environmental regulations, and heighten worker morale.

Introduction

Public and private organizations are increasingly considering telecommuting as a way to address issues related to worker retention, employee morale, environmental regulations, and the cost of office space. Fundamental changes in organization of work, in the character of the workforce, and advances in communication technology have made telecommuting an increasingly viable option for individuals and firms. The widespread use of information systems in the service sector has made it possible for workers to be electronically accessible without being physically in an office setting. In addition, the increased presence of women in the workforce and the need for flexible hours has reinforced the potential of telecommuting from home. Finally, the diffusion of the personal computer and facsimile machine has made it possible for small businesses to be based in the home, and therefore to allow telecommuting to be a way to start-up new business ventures.

This paper analyzes the feasibility of telecommuting by examining data from a telecommuting project in the New York metropolitan region. Telecommuting has attracted much attention, most recently after the January 1994 earthquake in southern California, when telecommuting was widely used by workers after there was a massive breakdown in the freeway system. The telecommunications infrastructure was the least disrupted infrastructure, and even where service was interrupted, the telecommunications system was the first to recover. In fact, telecommuting was an essential part of the effort to establish normal working conditions soon after the earthquake.

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Historical Perspective

For more than a century, individuals, especially crafts people and professionals, have conducted all or part of their work at home. Operating a business from home, full or part time, is increasingly feasible with advanced telecommunications systems. Many people work at home on an informal basis: reading reports, preparing for meetings, grading exams. This is not generally considered to be telecommuting. A telecommuter is someone who relies on communications technology to do much of his or her work at home, from the car, airplane, or even a hotel room. The distinguishing characteristic is that the work process involves the use of telephone lines and related communications equipment from the home or a nontraditional worksite.

Telecommuting offers the potential to solve a number of immediate, practical problems. For example, some research has indicated that telecommuting can help companies meet the requirements of clean air legislation by reducing the number of employees who commute to work in a car (Boghani et. al., 1991). It is described as a way to help reduce traffic congestion at peak periods (Hodson, 1992). And, many argue that it provides a viable use for an information highway to the home, thereby supporting the construction of an advanced telecommunications infrastructure in metropolitan areas (Malech and Grodsky, 1991). Some studies have also indicated that telecommuting can increase productivity in an organization (Bowman and Davis, 1990), improve employee morale (Arizona, 1991), reduce the stress associated with commuting (Boghani et. al., 1991), help companies recruit better employees (Nolan and Shirazi, 1991), and help to develop a more competitive workforce (Malech and Grodsky, 1991).

Several obstacles to telecommuting have also surfaced. Some concerns have been raised about the social isolation of people who work at home alone (Argyle, 1990). There are many unsettled insurance and liability issues associated with working at home (Bowman and Davis, 1990). Resentment by fellow workers has occurred in some cases (Bowman and Davis, 1990), and some unions have objected to telecommuting (Page and Brain, 1992).

To study these issues, New York Telephone Company, in conjunction with the New York City Department of Telecommunications and Energy, New York City Department of Transportation, and New York Metropolitan Transportation Council, conducted a 10 month study of telecommuting from March 1992 through January 1993. In the project, selected employees from three private organizations (Banker's Trust Company, Merrill Lynch, and New York Telephone) and one city agency (New York City Department of Transportation) worked one or more days per month from their homes. They used telecommunications rather than transportation to get to work and communicate with fellow workers.

The purpose of the study was to understand the feasibility, potential benefits, and obstacles to telecommuting. In addition, the study addressed the potential impact of telecommuting on transportation, energy consumption, pollution, and telecommunications infrastructure in a large metropolitan area.

The study was based upon 57 telecommuters and 46 supervisors. The research for the study consisted of an initial survey that gathered baseline data, such as how much workers spend on commuting to work and how they feel about telecommuting, as well as demographic data. A few months into the project, selected telecommuters were invited to a focus group meeting in which

they discussed their experiences. At the end of the 10-month period, a follow-up survey was administered to the telecommuters and their supervisors.

There was a broad age range among the telecommuters, along with good ethnic and racial representations. Women represented 60 percent of the telecommuting group; most of the telecommuters were married (76 percent); and 54 percent had dependents in their households. Education levels among the telecommuting group were high: 80 percent had at least a college degree. Household income was higher than the general population: 61 percent of households earned \$50,000 per year or more. A typical telecommuter in the study was a married woman with children at home. She and her husband both worked. The typical telecommuter was a mid-level manager who had been with her organization for 10 years. Her motivations to become a telecommuter were to reduce the hassle of commuting, free-up some time to be with her children, and provide flexibility to attend school in the evening or deal with other everyday life chores.

Slightly more than half of the telecommuters (52 percent) used a car to commute to work. Among the telecommuters who used a car to commute, 97 percent drove alone and 3 percent participated in a car pool. They also reported that half of the drive to work (45 percent) was in congested traffic. They reported spending \$11.08 per week for gasoline used in commuting.

| | |
|-------------------------------------|-----------------|
| Average Total Distance for Trip | 21.7 miles |
| Average Total Travel Time For Trip | 59 min. 19 sec. |
| Average Total Cost Per Trip | \$5.93 |
| Average Total Waiting Time Per Trip | 6 min. 33 sec. |
| Average Number of Travel Modes | 2.6 |

Several months into the study, a series of focus group meetings were held with Banker's Trust, New York Telephone, and the New York City Department of Transportation employees who participated in the telecommuting project. The overall reactions by the telecommuters ranged from positive to very positive. No one expressed a negative attitude about their telecommuting experience. However, a number of problems and disadvantages were mentioned.

Among the advantages mentioned, the most frequently cited issue was increased productivity. Focus group participants were nearly unanimous in their assessment that they got more work done at home compared to the office. The second most frequently mentioned issue was child care. Women indicated that they could better manage child care when they are telecommuting. For example, they do not have to drop off a child as early on a telecommuting day and can pick up the child earlier. Further, a few women mentioned that they were able to return to work earlier from a maternity leave because of telecommuting.

In addition, many participants said that telecommuting leads to a better organization of work, and more accuracy in their work. Also, they feel that telecommuting leads workers to be more disciplined. Other participants indicated that there are fewer interruptions at home. There is less demand to attend meetings, answer phone calls, and engage in office social interaction. Other advantages mentioned included saving money, e.g., reduced costs for travel, lunch, and dry

cleaning. Participants also indicated that with telecommuting, a worker has more free time. With a more concentrated work day, there is more time for household chores and parental duties.

Among the disadvantages mentioned was some resentment by other staff members. There was a feeling by many participants that some fellow staff members thought they were getting away with something. The level of resentment was described as moderate, not high. Nonetheless, it was mentioned by many of the focus group participants. Other disadvantages mentioned included loss of money on monthly commutation tickets and increased air conditioning bills in summer months. Some participants also mentioned that their telephone bills went up. A few participants said that they missed the comradeship of the office, though most felt that this was not a problem as long as telecommuting was one or two days a week. There was also some concern that they would not be as visible as other workers, and might in the long run not gain promotions as quickly as others.

When asked "who is suited to telecommuting," focus group participants indicated that many workers are suited but not all. They said that telecommuters need to be disciplined and to believe in the concept of telecommuting. People whose jobs require being in the office (e.g., a receptionist) could not telecommute, and people who are dependent on the social interactions in offices would probably not be suitable.

When discussing company policies about telecommuting, there was general agreement that companies and government agencies need to certify telecommuting by developing policies that explicitly support telecommuting activities. Second, many participants spoke about the positive messages that companies can send to workers if they develop telecommuting policies. Telecommuting, they feel, indicates that a company or public agency is progressive and that it supports workers who can benefit from telecommuting, e.g., women who have been out on maternity leave and want to return early to work. Also, they feel that a positive telecommuting policy will help attract better workers and retain highly talented workers.

Survey Findings A survey at the end of the 10 month study provided findings about the impact of telecommuting on transportation patterns, energy and telecommunications usage, work patterns, and attitudes of both telecommuters and their supervisors.

Transportation

Telecommuting reduced the number of vehicle miles traveled by workers. The average telecommuter traveled 189 fewer miles per month due to telecommuting. This includes all forms of transportation - subway, bus, and car. The reduction in vehicle miles traveled (VMT) is based upon the average number of miles traveled to and from work on a regular work day, minus the average number of miles traveled on a telecommuting day during an average month with 3.7 telecommuting days. Among those who used a car to travel to work, there was an average reduction of 70 car miles per month. It appears that telecommuting can help to reduce the strain on highways and other forms of transportation during rush hours.

Energy And Other Cost Savings Or Increases

Telecommuters saved an average of \$11.92 per day or \$44.10 per month (based upon an average of 3.7 telecommuting days per month) due to lower costs for food, gasoline, subway fares, dry

cleaning, and other daily costs associated with work. However, these savings were offset to some degree by increased costs for energy. The average telecommuter in the study indicated that the cost of air conditioning and lighting in summer months raised their electric bill by \$11.00 per month; the cost of daytime heating and lighting in winter months raised their utility bill by \$7.95; and, extra use of the telephone on telecommuting days raised their phone bill by \$9.35 per month.

Table 2 - Cost Savings on Telecommuting Days

| <u>Item</u> | <u>Number of Telecommuters with Increase or decrease</u> | <u>Average Change</u> |
|--|--|-----------------------|
| Gasoline | 17 | -\$1.74 |
| Tolls | 6 | -5.20 |
| Food | 35 | -5.13 |
| Dry Cleaning | 16 | -2.37 |
| Parking | 7 | -9.57 |
| Day Care | 6 | -28.67 |
| Train | 8 | -2.75 |
| Subway/Bus | 37 | -3.70 |
| Average Net Savings Per Day For All Telecommuters: | | \$11.92 |
| Average Net Savings Per Month For All Telecommuters: | | \$44.10 |

Telecommunications

Virtually all of the telecommuters relied on the telephone to conduct work and stay in touch with fellow workers. Further, many used fax machines, modems, and other telecommunications equipment to support their work from home. In addition, 88 percent of the telecommuters believe that additional household telecommunications capacity in the form of a second telephone line is essential or very helpful to support telecommuting. At the same time, some telecommuters indicated that they needed some technical assistance with the extra equipment and software they used for telecommuting. This suggests that telecommuting is a strong potential application for an advanced telecommunications highway to the home, but many workers will need assistance in setting up equipment to run on the highway.

Table 3 - Importance of a Second Telephone Line

How Important is a Second Telephone line for You to Do Telecommuting Work? (N=57)

| | <u>Percentage of Commuters</u> |
|--------------------------|--------------------------------|
| Essential | 63% |
| Helpful But Not Required | 25% |
| Not Needed | 9% |
| Not Applicable | 4% |

Work Patterns

Telecommuters indicated that they were able to keep work and home obligations separate when telecommuting. At the same time, there were a few noteworthy patterns about the days and hours when people do telecommuting. Most telecommuting occurred during mid weekdays, not on Monday or Friday. Equally important, many telecommuters indicated that they were not able or preferred not to have a designated telecommuting day - the day of the week for telecommuting changed week-by-week or month-by-month. This suggests that flexibility is important for a telecommuting schedule.

While many worked the same schedule at home as in the office, others indicated that they started their work day earlier and ended it earlier compared to a regular work day. Presumably, this frees up time in late afternoon to spend with children, attend school, or do household chores.

| <u>Normal Telecommuting Day</u> | <u>Percentage of Commuters</u> |
|---------------------------------|--------------------------------|
| Monday | 2% |
| Tuesday | 12% |
| Wednesday | 28% |
| Thursday | 25% |
| Friday | 5% |
| No Set Day | 28% |

Effects And Attitudes

There is a strong perception by telecommuters that they are more productive in working at home. Many supervisors of the telecommuters also saw improvements in productivity, although their perceptions were not as strong the telecommuters' were. Telecommuters also indicated that telecommuting helped them to better manage their time and work at personal peak times (e.g., some people work best in early morning). Telecommuting also improved morale, attitudes about their job, and attitudes about DOT. In addition, 98 percent reported a favorable or very favorable attitude about telecommuting after 10 months of experience as a telecommuter, and 96 percent would like to continue as a telecommuter. The principal obstacle or problem associated with telecommuting as reported by telecommuters is the need for more equipment in homes.

| | <u>Score On A Five Point Scale</u> <u>(1=Strongly Agree; 5=Strongly Disagree)</u> |
|--|--|
| Better Manage Time | 1.7 |
| Be More Productive | 1.5 |
| Work At More Convenient Hours | 1.8 |
| Better Coordinate Work and Family Activities | 2.1 |
| Work At Personal Peak Time | 1.9 |

| Table 6 - Telecommuter Attitudes About Telecommuting | |
|---|------------------------------------|
| <u>Overall Attitude About Telecommuting After 10 or More Months of Experience</u> | <u>Percentage of Telecommuters</u> |
| Very Favorable | 72% |
| Favorable | 26% |
| Neutral/Unsure | 2% |
| Unfavorable | 0% |
| Very Unfavorable | 0% |

| Table 7- Benefits of Telecommuting | |
|---|--|
| <u>Perceived Benefits of Telecommuting*</u> | <u>Percentage of Telecommuters</u> |
| Flexible Work Schedule | 75% |
| Less Commuting Time | 68% |
| Less Aggravation Of Commuting | 47% |
| Save Money | 30% |
| Spend More Time With Family | 18% |
| More Productivity | 14% |
| Assist In Child Care | 9% |
| More Time For Household Chores | 7% |
| *multiple answers permitted | |

Conclusions and Policy Implications

Telecommuting will be increasingly used in business activities, but it will not eliminate the role of the office. The attitudes of the telecommuters were particularly note-worthy. They liked telecommuting and wanted to continue as telecommuters. Further, it boosted their morale and improved their outlook about their job and their employer. From an employer's point of view, it appears that telecommuting had a positive impact on productivity and that it can help companies as well as government agencies to meet the requirements of clean air legislation by reducing the number of autos during peak periods. Several policy recommendations follow from these findings:

Transportation and Clean Air Policies

The findings in this study suggest that telecommuting can contribute to a reduction in vehicle miles traveled generally and car traffic specifically:

- Companies and public agencies should be encouraged to adopt telecommuting programs as a way to help meet the requirements of clean air legislation.
- Telecommuting should be incorporated into general transportation policies as one means to help manage the strain on the transportation infrastructure during peak travel periods

- There is a need for a broad education program to inform public and private organizations about the benefits of telecommuting, as well as how to successfully implement telecommuting programs

Telecommunications Policy

There has been much discussion about the need to build an advanced telecommunications infrastructure or information highway linking homes, businesses, schools, and public agencies. An advanced telecommunications infrastructure is linked in policy discussions to the creation of new jobs, better social services, and new forms of entertainment. The study reported here indicates that telecommuting is a strong potential application for an advanced telecommunications infrastructure. Telecommuters rely heavily on telecommunications to do their work. Further, they expressed a need for services that could be provided through a new telecommunications infrastructure, e.g., replace the physical shipment of large volumes of documents between office and home with electronic transfer of documents, or allow workers at home to fully participate in meetings at the office through a video link between home and office. Some recommendations that follow from this general policy position include:

- Encourage telephone companies and other groups to develop an advanced telecommunications infrastructure.
- Encourage public and private agencies to experiment with new services that utilize existing telecommunications networks, as well as new networks as they become available.

Investigate and encourage new tariffs that promote enhanced use of existing telecommunications networks, as well as new networks as they come on-line. This might include ways that companies can pay directly for telephone lines and other telecommunications services in telecommuter homes. It might also include new interactive video services that link telecommuter homes and business offices.

Energy Policy

The study indicated that there is a trade-off between potential savings as a telecommuter for items such as gasoline, and increased utility costs associated with air conditioning in the summer and daytime heating in the winter, as well as additional use of house lights. It was not clear whether there might be any saving in energy costs for organizations due to fewer personnel in offices. One indicator - reduced demand for office space - was negative. That is, supervisors did not generally feel that there was a reduced demand for office space as a result of telecommuting. While there was no apparent reduction in energy costs, there was a shift in energy use, i.e., a reduction in gasoline consumption and a modest increase in electricity and natural gas consumption. Further research will be required to gain a more comprehensive assessment of the potential effects of telecommuting on energy consumption. Based upon this limited study, it appears that any effects are likely to be small.

Company or Organizational Policies About Telecommuting

The study provided positive findings about the benefits of telecommuting for organizations and their employees. In addition, it suggested that telecommuting can help organizations meet

requirements of clean air legislation through a reduction in the use of cars by employees commuting to work. Based upon this study, the following general guidelines are provided:

- A reasonable way to approach telecommuting within an organization is through a pilot project. By starting on a small scale, an organization can learn what types of workers are most suited to telecommuting, what management adjustments are necessary to support telecommuting, and other requirements for a successful telecommuting effort
- Careful attention should be paid to scheduling issues such as, what day(s) of the week are designated as telecommuting days, and the apparent need for flexibility in scheduling. In addition, it is important that company policies support telecommuting and that an effort is undertaken to win the support of nontelecommuting coworkers
- There is still a great deal to be learned about telecommuting. Therefore, evaluation of a telecommuting project is essential. By starting small, implementing a telecommuting program in phases, and evaluating efforts at each stage, a company can modify the program at the end of each phase - building on what works and changing to overcome problems or obstacles

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