

**REMOTE OFFICE WORK: CHANGING WORK  
PATTERNS IN SPACE AND TIME**

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# REMOTE OFFICE WORK: CHANGING WORK PATTERNS IN SPACE AND TIME

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## INTRODUCTION

*Remote work* generally refers to organizational work performed outside of the normal organizational confines of space and time. Although many self-employed professionals, artists, writers, and craftspeople work at home and set their own schedules, most employees work nine-to-five at a specified organizational location.

*Office automation*, the use of computer and communications technology to support office functions, provides the potential to alter the locational and temporal definition of a large number of office jobs. The term *telecommuting* [11] refers to the substitution of communications capabilities for travel to a central work location. Office automation technology permits many office workers to be potential telecommuters in that their work can be performed remotely with computer and communications support.

This paper examines some behavioral, organizational, and social issues surrounding remote work. Several kinds of remote work options are presented; the emphasis throughout is on work-at-home. Based on exploratory research by the author, some preliminary conclusions about the types of jobs that can be performed remotely and the types of individuals that are suited for work-at-home are presented. Some questions regarding the effect of remote work, particularly work-at-home, on the individual's relationship to work and nonwork are discussed, with emphasis on the need for research.

## TECHNOLOGICAL AND SOCIAL TRENDS

Developments in computer and communications technology are facilitating the trend to remote work. The dramatic decreases in the costs of this technology have increased its availability to large numbers of people. Electronic communications services such as electronic mail and teleconferencing facilitate communications without requiring both parties to participate simultaneously and face-to-face. Most significantly, the general trend to office automation will see the development of *professional workstations*—microcomputer-based systems tailored to a particular professional, manager, or secretary. In the long run, the individual will not need the equipment, paper files, or supplies provided in the office because they will be built into a workstation.

Technology itself will not bring about changes in organizational structure and climate. Companies are facing

**ABSTRACT:** *Remote work refers to organizational work that is performed outside of the normal organizational confines of space and time. The term telecommuting refers to the substitution of communications capabilities for travel to a central work location. Office automation technology permits many office workers to be potential telecommuters in that their work can be performed remotely with computer and communications support. This paper examines some behavioral, organizational, and social issues surrounding remote work, particularly work at home.*

*An exploratory study was conducted of 32 organizational employees who were working at home. Important characteristics of jobs that can be performed at home were: minimum physical requirements, individual control over work pace, defined deliverables, a need for concentration, and a relatively low need for communication. The individuals who worked at home successfully were found to be highly self-motivated and self-disciplined and to have skills which provided them with bargaining power. They also made the arrangement either because of family requirements or because they preferred few social contacts beyond family.*

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economic and societal changes that are having a negative impact on organizational effectiveness. For some of these problems, technology provides unique solutions.

Over the last decade, considerable research has been undertaken to predict the effect of increased communications capabilities on transportation needs [8, 9, 11]. If computer and communications capabilities were substituted for certain types of travel, transportation and energy needs would be reduced. Based on extrapolations from current energy and transportation needs, one report estimates that if 20 percent of all business travel (including both air travel and business travel by auto) were eliminated through the substitution of teleconferencing, an energy savings of 130,000 barrels of gasoline daily (at 1974 levels) would result. Since 25 percent of all mileage and 27 percent of all gasoline consumption is spent commuting, the resulting savings from reduced commuting would be even more dramatic. The report estimates that if 50 percent of all office workers worked in or near their homes six out of every seven working days, the savings in fuel consumption from reduced commuting would be about 240,000 barrels of gasoline daily in 1985 [6, p. I111].

The increasing size and complexity of today's business organization is leading to increased specialization of the white-collar work force and a trend to increased contract work [5]. The composition of the work force is also changing. Women have been entering (or reentering) the work force at an unprecedented rate, particularly women with young children; a recent study showed that in 1978 over 35 percent of all American households required supplementary day care [4]. New demands are placed on families, organizations, and society in order to allow work and family to be combined more easily [3]. Because of dual-career couples and strong individual lifestyle preferences, companies have less control over individual career decisions than in the past. With the rising costs of office space and business travel, companies are motivated to search for alternatives.

#### REMOTE WORK OPTIONS

There are a number of feasible alternative work arrangements that provide some flexibility in the locational and temporal definition of work. They differ in scope and structure; some require a major reorganization of a number of jobs and people. Others are guidelines for general action, while still others such as work-at-home can be implemented on an individual basis depending on the situation. Four such options are discussed in this section.

##### Satellite Work Centers

The idea of a satellite work center is that a relatively self-contained organizational division be physically relocated. The emphasis is on the geographical location of the division being within convenient commuting distance of the greatest number of employees. The optimum number of employees to relocate is determined by benefits from economies of scale of equipment and services. The logic is that the critical mass of employees will also provide the necessary social interaction and a sufficiently deep hierarchical structure to provide adequate management on site. The optimum number is debatable; if multiple levels of management on site are desired, it may be as many as several hundred employees.

One other critical issue in the organization of a satellite work center is what segment of the central work force can be relocated. In order to benefit from economies of

scale it may be optimum to relocate an entire function such as accounting or data processing. On the other hand, if the primary motivation is to reduce employees' commuting time and expense, the appropriate employees to relocate are those who live nearest the satellite work site. This raises potential problems of remote supervision and social isolation from professional peers.

##### Neighborhood Work Centers

Another structural option, similar to satellite work centers, only more complex to implement, is the concept of a neighborhood work center. Under this option, remote supervision of employees is assumed to be effective. Therefore, a critical mass of employees in one location is not necessary; however, economies of scale of equipment and certain services, such as facsimile transmission, hardcopy printing, teleconferencing facilities, etc., are desirable. Employees from different organizations would share space and equipment in the work center closest to their homes. Thus any densely populated area could have neighborhood work centers financially supported by all of the organizations whose employees use them.

This option obviously relies heavily on the use of telecommunications networks for coordination and supervision. Such a concept is complex to implement on a large scale because it requires a great deal of cooperation among different organizations.

##### Flexible Work Arrangements

This option represents a general organizational objective to provide employees with flexibility in the scheduling and location of work. It is based on management's recognition that it is important and/or necessary to provide mechanisms for personal/family as well as work responsibilities to be accommodated. Many companies are now actively promoting arrangements such as flex-time and job-sharing. Provision of child care by the company or the government is an alternative that has had more widespread acceptance in Europe than in the United States. An extreme of this option is that employees can take a long period of time on leave from the company to raise a child, for instance, or to complete an education.

A more common general trend in the United States is recognition of the need for occasional alternative work arrangements, especially for professional and managerial employees. Many companies encourage people to stay at home to write a critical report, for instance, away from the distractions of the office. The proliferation of portable computer terminals in many companies is another sign of increased flexibility; employees are encouraged to take terminals home with them at night or on weekends to do critical work at nonpeak computer hours, or so that they do not have to make an extra trip to the office to do necessary overtime work.

##### Work-at-Home

The extreme case of individual work options is to have employees work at home on a regular basis. This may mean from one day a week to virtually full time. This option is heavily dependent on remote supervision. It does not provide the social interaction that a satellite or neighborhood work center would theoretically provide. On the other hand, work-at-home can provide employees with extreme flexibility in schedule and life style; theoretically they can work when and where they want in a more casual atmosphere. Child care can be accommo-

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dated much more easily; for many people with primary child care responsibility, work-at-home may be their only employment option. It also offers employment opportunities to the elderly and handicapped. Work-at-home can easily be utilized as an option on an individual basis to accommodate a particular situation or need either temporarily or permanently.

### AN EXPLORATORY STUDY OF WORK-AT-HOME

From management's point of view, the feasibility of remote work, particularly work-at-home, raises three significant questions.

- What kinds of jobs can be performed remotely, i.e., at home?
- What kinds of individuals can work at home?
- How are remote workers best monitored and controlled?

The strategy for answering the last question is at least partially dependent on the appropriate choice of both jobs and individuals. However, to some extent, it also entails an adjustment in management style.

In an exploratory study on work-at-home [1], the author interviewed 32 employees who worked at home and their managers, in an effort to derive a tentative set of answers to the above questions. The results of this exploratory study are summarized in this section.

### Research Method

The author participated in an exploratory study sponsored by the Diebold Automated Office Program [1]. Companies experimenting with pilot work-at-home programs were contacted and asked to provide the names of employees working at home. Each potential participant was then contacted directly and interviewed on a voluntary basis at his or her convenience.

Semi-structured interviews were conducted over the telephone; each interview lasted about 30 minutes. (Copies of the interview schedules are available directly from the author.) The managers of the participants (8) were also interviewed by telephone; these interviews averaged one hour in duration.

The sample was also limited by the following constraints:

- All participants worked for companies rather than being independent. Eight interviewees served as subcontractors to a software contract firm; the others were participants in experimental or pilot work-at-home programs.
- All participants performed work normally performed in offices, at least that part of their work done at home.
- All participants worked at home on a regular basis, rather than an occasional day or overtime. The number of days spent in the office varied from two days a week to once or twice a year; the schedule was relatively fixed in all cases.

Table I presents the job titles of the 32 people working at home who were interviewed. Table II gives a further breakdown by technical (computer-related) versus nontechnical skills.

The need for computer and communications equipment for the jobs listed in Table I varied a great deal. The data entry operators utilized portable terminals with limited storage. Most of the software engineers and programmers had their own equipment but a few used pencil and paper

Table I. The Research Sample. People Who Work-at-Home.

|                                | Number |
|--------------------------------|--------|
| <i>Clerical</i>                |        |
| Data Entry Clerks              | 4      |
| <i>Professional</i>            |        |
| Software Engineers/Programmers | 7      |
| Course Development Analysts    | 5      |
| Loss Control Consultants       | 6      |
| Staff Interviewers             | 2      |
| <i>Managerial</i>              |        |
| Technical Managers             | 2      |
| Staff Managers                 |        |
| Project Managers               | 4      |

Table II. The Research Sample by Organizational and Technical Level.

|                     | Technical | Nontechnical |
|---------------------|-----------|--------------|
| <i>Clerical</i>     |           | 4            |
| <i>Professional</i> | 8         | 12           |
| <i>Managerial</i>   | 6         | 2            |
| 20 women            |           |              |
| 12 men              |           |              |

at home and terminals only in the office. The course development analysts used pencil and paper, while the primary tool of the staff interviewers was the telephone. The loss control consultants, who spent 50 percent of their time in the field and the rest at home, used pencil and paper and dictation equipment to prepare their reports at home.

### Job Characteristics

Based on the interviews, certain common job characteristics across all jobs became apparent. These traits are relatively independent from the technology employed or the job level. They are:

1. **Minimum physical requirements.** In all cases the physical requirements of the job in terms of equipment and space were minimal. The maximum requirement was for a terminal and telephone hookup in the home; 14 out of the 32 had terminals.
2. **Individual control over work pace.** None of the jobs in the sample were driven externally by short term deadlines. Except for the data entry job, all were project-oriented with long term completion dates.
3. **Defined deliverables.** All jobs were controllable by output in terms of well-defined deliverables. Eight people were paid by output; the data entry clerks were paid on a per transaction basis; some of the contract programmers worked on fixed price contracts for a delivered system or per completed program.
4. **Need for concentration.** All participants except the data entry clerks characterized their jobs as requiring a significant degree of concentration for at least some period of time.
5. **Defined milestones.** All of those participants who worked on long term projects also indicated that their jobs had well-defined milestones—intermediate deadlines that were easily definable or measurable.
6. **Relatively low need for communications.** The type and degree of communication required varied by job. The data entry operators had a low need for communication with anyone in the organization. For most of the jobs, the significant characteristic of the need for communications is that it can be partitioned. The employee can work for relatively long periods of

time with little or no communication with the central office. What communication is required can be "batched" during the time the employee is in the office or handled easily by telephone.

Those with management responsibilities had a relatively high need for communications. Generally they utilized the telephone heavily. However, two of the managers utilized electronic mail extensively to communicate both with subordinates (some of whom also worked at home) and clients in the office; they were very satisfied with the results.

#### Individual Characteristics

The individuals who were interviewed had two reasons for choosing this work arrangement: either personal preference or lack of ability to work any other way because of responsibilities or constraints. The latter category would include the elderly and the handicapped (although none were interviewed in this study) and those with primary child care responsibility. One would expect different personality types to be found in each of these categories.

Several individual characteristics common to the entire sample of home workers were ascertained. It is proposed that all workers should have this set of characteristics regardless of their reason for wanting to work at home; otherwise work-at-home may not be successful regardless of the lack of alternatives. These characteristics are:

1. **Self-motivation, self-discipline.** The workers interviewed were primarily professionals who would be expected to have a high degree of both of these characteristics; professional employees are in general the most likely candidates for work-at-home. Employees demonstrated self-discipline by tending to work in a very strict routine; they worked in the same place every day and tended to have relatively structured hours.
2. **Skills provide bargaining power.** 23 out of the 32 people interviewed felt that they had some bargaining power with their employers, either because of their specialized skills or because of their proven loyalty to the company. Several of those who had specialized technical skills indicated that they would leave the company if they could no longer work at home.
3. **Family requirements.** 12 of those interviewed indicated that their family situation was the primary reason for them to choose the work-at-home arrangement. Many of those interviewed felt that relations with their family were a problem. The discipline of the family as well as the individual was seen as critical. Concentration did not seem to be affected by family requirements; it was no greater a problem for those with family than for those without it.
4. **Few social contacts beyond work and family.** This was not a universal characteristic, but some of those interviewed participated only in family or solitary activities beyond work. These same employees had fewer problems with social isolation or concentration than the rest of the group. The data suggest that a person who likes to be alone could work at home successfully with relatively few adjustments.

#### Remote Supervision

Interviews with managers of those who work at home gave some indication of methods of monitoring and controlling remote work. The mechanisms for doing this not

only depend on the level of the job (i.e., professional versus clerical), but may also require a management style with which many managers would not feel comfortable.

The managers interviewed relied heavily on mutual trust and respect in their relations with their employees. They stressed that at all times the employees must know they were being treated equitably and their work was recognized. Having measurable results and, if possible, milestones built into the job made remote management much easier. Those employees who had access to electronic mail had daily contact with and daily monitoring by their supervisors. The availability of open communications at all times was seen as critical; remote workers needed to be *easy to reach* within a reasonable amount of time. On the other hand, managers needed to accept that they may call an employee in the middle of the afternoon, for instance, and get no answer. An asynchronous response mechanism such as electronic mail or a telephone message recording system may make a significant difference in ease of management control.

One critical issue expressed by the managers was that remote work should be voluntary. Even more important was the attitude of the person who directly supervised remote workers. If the requirements for management of remote work made a manager uncomfortable for *any reason*, it was generally acknowledged that remote work would not be successful.

#### Long Term Considerations

The long term implications of remote work, for both the individual and the organization, have not been adequately considered to date. One major concern is the long-term career potential of an employee in an environment where visibility is still critical to promotability. Some form of management by objectives, either informal or formal, generally needs to replace "over the shoulder" supervision, in spirit as well as in fact.

Another long term concern is the company's public image. Several public utilities experimenting with work-at-home were particularly sensitive to this issue: What do a person's neighbors think when they know he or she commands a regular salary but stays at home?

Salary, benefits, and insurance were not a major problem for pilot work-at-home projects but could become a major issue if the trend toward remote work continues. Most of those interviewed received full salary and benefits, while a few worked part-time and received no benefits. Although some concerns have been expressed over how to establish piece rates for word processing or other clerical tasks, this does not appear to be a problem for professional workers.

The exploratory study raised more questions about critical issues than it answered. In the next section, some specific research questions requiring further investigation before remote work becomes widely accepted will be proposed.

#### RESEARCH ISSUES

Remote work, whether it involves work-at-home, satellite work centers, or other options, raises important issues about the relationship of the individual to his or her work and to the organization. Work-at-home represents the extreme case where the relationship between work and non-work (i.e., leisure) is also affected. In this section a number of research questions are raised. They are not presented as formal hypotheses but as vehicles for discussion of research requirements. Preliminary evidence from the

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