REMOTE OFFICE WORK: CHANGING WORK PATERNS 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-tofive 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-athome 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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cconomic 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 [6, 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 selfcontained 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 Arrangments

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 accommodated 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-athome 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
Clerical	
Data Entry Clerks	4
Professional	
Software Engineers/Programmers	7
Course Development Analysts	5
Loss Control Consultants	6
Staff Interviewers	2
Managerial	
Technical Managers	2
Staff Managers	
Project Managers	4

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

	Technical	Nontechnical
Clerical		4
Professional	8	12
Managerial	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:

- 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

Center for Digital Economy Research Stern School of Business Working Paper IS-81-56 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:

- 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-athome 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 nonwork (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 exploratory study is cited as evidence of the importance of the questions.

The research questions represent three general areas of concern. The first two areas deal with workers as organization members. Remote supervision focuses on the short term consequences of managing employees who are not colocated. These questions are relevant whether the "remote" employees are working down the street from their managers, in a different part of the country, or at home. The second area of concern is the long term relationship of the employee to the organization; these issues are also relevant for all remote employees but particularly for those who work at home. The last area of concern, the relationship between nonwork and work-related activities, applies to any individual who works at home and, to some extent, those who work near home, e.g., in a neighborhood work center. The research questions of work versus nonwork are relevant whether the worker is an organizational employee or self-employed.

Remote Supervision

As has already been noted, the most immediate questions in proposals of remote work experiments deal with management of remote employees. Although some suggestions for identifying likely jobs and individuals for remote work have been given here, further research along these lines is necessary. In addition, a formal evaluation mechanism for determining the economic, technical, and operational feasibility of any particular remote work program is critically needed.

In the long term, several other research questions regarding remote supervision arise.

What is the role of telecommunications (i.e., electronic mail) in remote supervision?

Although most of the jobs examined in the exploratory study were project-oriented and did not require frequent monitoring, those individuals with access to electronic mail communicated with their supervisors much more frequently (daily) than those who did not. While telecommunications is apparently not a requirement for remote work, it may facilitate remote supervision and permit more jobs to be eligible candidates.

What is the effect of payment by output (i.e., piece rates or fixed price contract work) on control, motivation, and economic rewards of salaried employees?

There is a prevailing feeling that payment by output is the only appropriate mechanism for controlling remote work; however, most of the situations described here involved salaried employees. It has been argued that permitting work at home on piece rates provides the opportunity for exploitation of office workers [2, 7, 14].

The Relationship of the Individual to the Organization Although difficulties with remote supervision are frequently cited as a major hurdle to successful remote work programs, other long term issues regarding the individual's relationship to his or her work and how it may be altered have not been given adequate attention.

How does remote work affect individual motivation, productivity, and job satisfaction?

Preliminary evidence from the exploratory study shows that individuals can be as or more productive when working at home. However, some of the individuals interviewed cited problems with motivation and numerous distractions at home that made concentration difficult. The definitions of job satisfaction assume a distinct separation of work and nonwork activities. With greater integration of work and nonwork, problems or distractions with one area of life activity may more distinctly affect the other areas; thus the concept itself requires some redefinition.

How does remote work affect individual stress, both job-related and otherwise?

Those interviewed often cited reduced commuting as a major benefit of work at home; in many cases they attributed reduced stress directly to the lack of necessity to commute. They felt that they were also more productive and more motivated since they did not have to experience the ordeal of commuting. Others cited job-related stresses such as pressure from co-workers as being reduced. On the other hand, several of those interviewed who also had primary family care responsibilities indicated that coping with both work and family was highly stressful. Their baseline, however, was the choice between working and not working rather than working at home versus in an office; for those that felt working at home was more stressful than not working at all, the benefits of working still outweighed the costs.

How does remote work affect the employee's relationship to professional peers?

It is often assumed that social isolation is a problem. Satellite work centers are assumed to provide the necessary social contact and are therefore often seen as more feasible than work-at-home. However, based on the exploratory study, the author strongly suspects that contact with professional peers is critical to professional development, and this contact is not necessarily provided through satellite work centers. The importance of this contact and social isolation in general need to be critically examined.

What is the effect of remote work on long term career paths and promotability?

Even if a manager accepts remote supervision as feasible and permits remote work, there is no assurance that the lack of visibility of the remote employee does not affect his or her long term career path in an environment where visibility is key to promotability. It is the author's opinion that dramatic changes in definition and perceptions of career paths are required in order to accommodate changing life style trends. Such changes are likely to be necessary before remote work can be guaranteed not to be disadvantageous for an individual's long term career potential.

What is the effect of remote work on organizational commitment versus individual autonomy?

In the long run the relationship of the individual who works remotely to organizational identification may be altered. Preliminary evidence shows that remote work, particularly work-at-home, fosters individual autonomy rather than organizational commitment. In the exploratory study it was found that some companies emphasized organizational loyalty in other ways and only selected individuals to participate who had already demonstrated their dedication to organizational goals. Even so, there were cases of individuals subcontracting their skills to other organizations "on the side." On a more subtle note, several individuals indicated that if they did not have this work arrangement they would have left the company; life style considerations apparently played a more significant role than organizational commitment.

The Relationship of Work and Nonwork Activities The option to work at home affects the individual's relationship to nonwork activities (i.e., leisure and maintenance activities [8, 12]) as well as his or her relationship to work. In the long run, it is expected that work and nonwork will become more integrated, not separated as they are today for any employee of an organization.

What is the effect of work at home on family relationships and family discipline?

Several of those interviewed had difficulties with their families accepting that they were working when at home and were not available to take care of family needs; in some cases this led to termination of the work-at-home arrangement. In the short run, some training of the family is needed to prepare for a work-at-home arrangement. In the long run, work-at-home may facilitate alternatives for family care, such as shared responsibility, that are often not practically feasible today.

What are the effects of living and working in the same environment on the individual's feelings of social isolation and stress? How does it affect the individual's physical habits?

The single person who lives alone may at first appear to be an ideal candidate for work-at-home because of few distractions or other responsibilities in the home environment. On the other hand, this person may benefit the most from social contacts at work and would be extremely isolated socially if deprived of that contact. As mentioned already, some individuals interviewed experienced increased stress because of conflicting work and nonwork responsibilities. Nearly half of those interviewed felt they had problems with physical habits working at home: they ate more, drank more coffee, smoked more.

What is the effect of work-at-home on the individual's relationship to the community?

Since more individuals would live and work in the same community, it is expected that a widespread trend toward work-at-home would lead to an economic resurgence of small, relatively remote communities, a dramatic change from urban and suburban development. In the short run, it has been predicted that those who work at home will spend more of their leisure time in communityrelated activities. Although this trend was not apparent in the activities of those interviewed, it warrants further investigation.

If it is accepted that remote work, particularly work-athome, will become a widespread trend, the traditional definitions of work versus nonwork may need to be altered. The trend will be toward integration of work and nonwork activities; this integration is currently not welldefined, nor are its implications well-understood. In a broader sense, the implications of accepting locational and temporal flexibility into the definition of work activities and organizational membership need to be examined closely.

CONCLUSIONS

Some of the issues regarding remote work and its feasibility have been examined. Clearly, more research is required before such an alteration of the definition of work becomes commonplace. Interviews with those who work at home are at best pointers to the critical problem areas. The author suggests that at this point controlled experiments with pilot remote work programs are required. Longitudinal studies of the progress of pilot programs and the attitudes of their participants are critical.

In practical terms, the feasibility of remote work today comes down to individual choices: guidelines for selecting individuals and jobs and monitoring them should be clearly stated. More important, management should have a clear idea of both the problems and opportunities and have realistic expectations about the potential for success.

In the long run, the author feels that remote work will only become successful when the concept is institutionalized. Organizations will need to realize that they need to give employees more options in space and time in order to ensure increased motivation and productivity. In addition, changes in expectations of individual career paths and organizational responsibility for employee well-being will be required.

In the future, organizational expectations should reflect a broader view of all aspects of individual needs-work, family, leisure, etc.—and the mechanisms to accommodate those needs. The challenge to researchers is to evaluate organizational options such as remote work in order to determine whether they are feasible alternatives to meet the changing needs of organizations and individuals in the future.

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