December 1995

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Bruce Rollier
University of Baltimore

Yiwah Liou
University of Baltimore

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STRATEGIC IMPLICATIONS OF WORK FORCE MOBILITY

Bruce Rollier
University of Baltimore

Yihwa Irene Liou
University of Baltimore

Rapid improvements in technologies have created opportunities for performing work while physically distant from one's office. Most telework research has focused on telecommuting, and the primary emphasis has been on convenience to individual employees. The strategic and competitive advantages of telework for business firms have only recently been recognized. Increasing the mobility of the work force can result in improvements in customer service, higher employee productivity, and savings in office and travel costs. We discuss the issues involved in setting up a program for a mobile work force. Work force mobility is seen as part of a larger development in which all employees, including those physically remaining in offices, are being given more power and control by the same technology that makes telework possible.

1 Introduction

In recent years a small but rapidly growing number of organizations have recognized the strategic advantages of work force flexibility. For some positions in some industries, employees can fulfill the requirements of their jobs from remote locations. Data entry and programming can be performed for organizations in one country for organizations in another. The Irish government upgraded their telecommunications infrastructure and redesigned their entire education system to prepare for opportunities such as remote software development (Trauth 1993). A number of large organizations have developed systems which enable employees to spend a higher proportion of their time in the field providing service to customers rather than on paperwork in the office.

Our discussion will focus on telework that provides a competitive advantage for the organization: lower costs, increased productivity, or improved customer service. We note that the same technology used for telework can also be used to facilitate collaboration between workers who are separated from each other but who remain in their own offices. We suggest that business firms, particularly global organizations, should consider the establishment of an infrastructure that will facilitate the development of a flexible and mobile work force: employees who can, with the aid of information technology (IT), operate from any location and from widely separated locations.

2 Rationale for Work Force Mobility

Ansoff (1979) argues that the global business environment has become progressively more turbulent during the twentieth century, as the result of several ongoing trends: (1) the novelty of change is increasing, disconnecting organizations from the experiences of the past; (2) strategic intensity is increasing, as organizations are increasingly linked to each other; (3) the rate of change is becoming more rapid, and (4) complexity of the environment is increasing, with higher levels of uncertainty. Formal strategic planning methods become less practical; planning must be based on contingencies rather than on actions to be taken at specific times. When an organization does take an action, the consequences are less predictable.

As the rate of environmental change increases and the novelty of the changes grows, the time available to the firm for an appropriate response is correspondingly shortened. This often makes it necessary to respond with inadequate or minimal information, and with little time for analysis. Under conditions of great uncertainty and rapid change, flexibility is an extremely valuable characteristic for an organization. The organizational structure may need to be fluid enough to adapt itself to changing situations.

Emerging organizational forms with a smaller central core of employees and the increasing degree of outsourcing enable firms to quickly expand customer services on demand, and to contract them during slow periods. Mass production jobs and other routine tasks have been drastically reduced in many industries. Multi-disciplinary teams have become very popular.

Changes are also occurring in the nature of offices (Gray, Hodson, and Gordon, 1993). "Virtual offices", consisting of a laptop computer plugged into a phone jack wherever the employee happens to be on a given day, are no longer unusual. At IBM, most customer sales representatives no longer have assigned offices (Hammond 1994), enabling them to spend a high proportion of their working day in direct contact with customers. IT enables firms to maintain flexible workers with the tools to quickly adapt to the needs of changing marketplace requirements.

There are three principal ways in which IT can contribute to organizational flexibility (Lucas and Olson, 1994): (1) by removing restrictions on the time and place of work; (2) by collecting and processing information faster, and (3) by enabling a quick response to changing situations. The common denominator in this list is *time*, a new basis of competition. Another critical factor is *coordination*, which is particularly important in a global marketing environment with vast geographic distances and time zone differences.

In the past, most knowledge work jobs were carried out in offices, but today the office is no longer a necessity for many of these occupations if the employees are provided with portable computers and modems. Workers engaged in the transporting of goods or passengers, such as truck

drivers or railroad engineers, can experience large productivity gains with the installation of satellite receiving capabilities in truck fleets or train engines. An increasing number of workers are subcontractors as firms decide to outsource their non-core operations. These workers, as well as the sales representatives, maintenance technicians, and others who remain as employees of the firm but perform their principal job functions at customer locations, will require access to software tools and information sources. The capabilities required are similar to those of a telecommuting employee.

3 Implementation of a Flexible Infrastructure

The technology already exists to provide a high degree of work force flexibility and mobility, and costs are coming down steadily while performance improves rapidly. The spread of fiber optics and satellite transmission has greatly reduced the bandwidth constraints of coaxial cable and twisted wire pairs. However, the most difficult task may be to persuade business executives to relinquish traditional methods of organization and control of employees (Lyons, et al, 1993). In most firms, it will probably be necessary to take an incremental, evolutionary approach.

A well-designed infrastructure (Weill 1993) provides the tools for collecting and organizing information, analyzing it, and disseminating it as required. It would also include facilities for communicating, sharing ideas, and collaborating on projects from a distance. These tools and facilities are available to the entire firm and, if correctly designed, provide a means for quickly responding to changed conditions in the environment or changed customer requirements.

In the near future, rapid improvements in the technologies for wireless computing (cellular, wireless LAN, and satellites) will accelerate the trend toward work force mobility and telework and will make information accessible from virtually any place at any time (Imielinski and Badrinath, 1994). However, a number of complex data management problems must be solved before wireless can reach its full potential: (1) Tracking workers' locations as they move from an area monitored by one host computer into another. (2) Coping with short cycles of activity and long periods of dormancy to accommodate battery operation of the portable units. Battery lifetimes are expected to increase only about 20% over the next ten years. (3) Limited bandwidth, and an increasing number of users requiring smaller and smaller cells. (4) Heterogeneity of hardware and software.

Some of the issues of developing an infrastructure for a mobile work force capability are listed below. Some of the items in the list are not applicable to every situation. It is assumed here that there will be field workers operating from customer sites, operations in different countries at a distance from each other, employees and subcontractors working from their homes, and groups of employees at different locations collaborating with each other.

- A good DBMS is a key component and should be capable of rapid reorganization and for access to the data from widely separated locations.

- Workers operating from home or from field locations will need effective remote access. Executive concerns must be addressed to lower their resistance to remote access. Dial-up capability, modem and communications software compatibility, user training, supervisory issues, and the adequacy of security measures must all be given attention.

- The type of network to be set up depends on many factors. Rapid response times are vital in most cases. Wireless networks are not yet practical for most situations but will eventually predominate for this environment. For a good discussion of the issues, see Valigra (1994) and Lyons, et al (1993).

- When workers are given more autonomy, they will also have more responsibility for making decisions. Mobile workers also tend to have more customer contact than those who spend most of their working time in the office. These factors have implications for selection and for training. In an in-depth study of telecommuters, Olson (1983) found that those most successful were highly self-motivated and self-disciplined. Other desirable characteristics include good judgement in making decisions that affect the company, adaptability, and resourcefulness.

- The skills required for knowledge and service workers are increasing, and our educational and training systems have not been effective at developing the necessary qualifications for mobile work. Industry and academia must work together to develop more appropriate educational curricula and teaching techniques if we are to have enough qualified workers to staff these jobs.

- Developing an environment which facilitates the performance of work which does not require travel to a central office and then designing a training program which does require such travel is inconsistent if the workers are widely dispersed geographically. Distance education techniques should be explored which minimize travel. Training should be thought of as on-going, with updates at periodic times or whenever the system is changed.

- Managers must be carefully chosen; some otherwise effective managers may not function well in the mobile work environment. There must be an emphasis on measuring outputs rather than attempting to control how workers operate. The manager's function is to monitor the system, to make certain the correct outputs are being produced (which may be such factors as customer satisfaction), to provide information as necessary, and to ensure that the workers have whatever they need to do their jobs.

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4 Conclusions

The trend to increasing numbers of employees operating as mobile workers, spending most of their working hours away from a central office, or performing their jobs at distant sites is consistent with other trends that have been occurring for a number of years (Hesse and Grantham, 1991). This has coincided with the dramatic growth in microcomputer use and the trend toward greater user self-sufficiency. Open standards for hardware and software, relational database management systems, and object-oriented systems have contributed to a more accessible and flexible environment. IT has made it possible for organizations to be more centralized, while at the same time having more control over results than when they were centralized. This has enabled firms to be more responsive to customer needs, as they empower lower level employees to make decisions intelligently.

The trend to mobile work forces, making IT available to more and more employees and making it portable, so that information is accessible wherever they are, may thus be seen as part of these other general trends. The perfection of wireless networks, the spread of fiber optics, the improvement of multimedia capabilities, and other developments will accelerate this movement. Globalization of the marketplace will further accentuate the need for flexibility and mobility.

In our view, the important implication of all this is not that there is a small but growing classification of employees and subcontractors called teleworkers who have jobs that are uniquely suited to mobile work. We would argue instead that, as technologies improve and technology costs decline, an increasing number of jobs will be feasible to be performed, effectively and economically, at a wide variety of locations.

One final caveat, however, is in order. We would not go so far as some futurists do in predicting the demise of all company headquarters, with most jobs being performed from employee's homes, from the beach, or wherever they happen to be. Where people are will still matter, and personal contact of employees with each other and with their managers will still be necessary. The trends noted above will likely continue for years, with increasing numbers of employees working more closely with coworkers in some distant country than with those in nearby offices. Nevertheless there will always be many jobs for which close physical contact will be necessary and desirable, and workers who do not have the right temperament or skills to function well in a mobile environment. For many of those jobs and workers, the same technologies that facilitate mobile workers may also be useful in making employees who stay in the office more effective. Organizations should strive for flexible working arrangements, for environments in which those jobs which are most suitable for telework will have the tools, networks, and databases for effective mobile operations. At the same time, they would be well advised to keep their planning flexible and adaptable as well.

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