

AD-A147 221

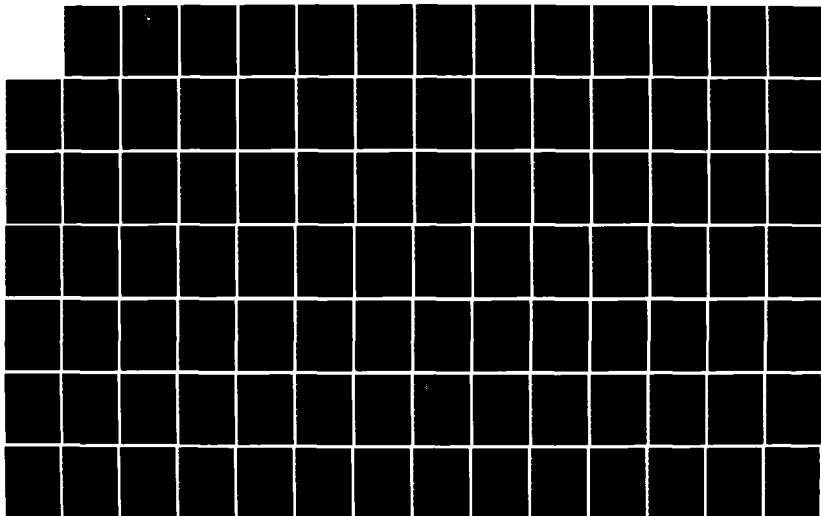
TELECOMMUTING: AN ALTERED WORK PATTERN(U) AIR FORCE
INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF SYSTEMS
AND LOGISTICS C H SMITH SEP 84 AFIT/GLM/LSM/845-59

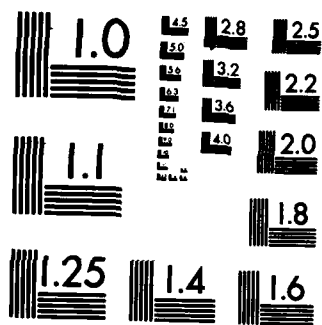
1/2

UNCLASSIFIED

F/G 17/2

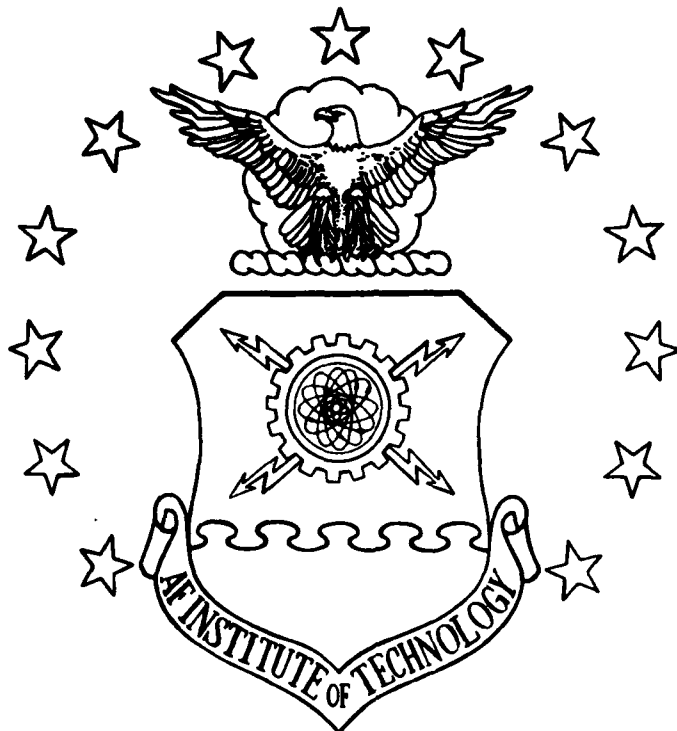
NL





2

AD-A147 221



TELECOMMUTING :

AN ALTERED WORK PATTERN

THESIS

Carole H. Smith
GS-12

AFIT/GLM/LSM/84S-59

DTIC FILE COPY

DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY

AIR FORCE INSTITUTE OF TECHNOLOGY

Wright-Patterson Air Force Base, Ohio

REPRODUCED AT GOVERNMENT EXPENSE

84 10 00 9

AFIT/GLM/LSM/84

2

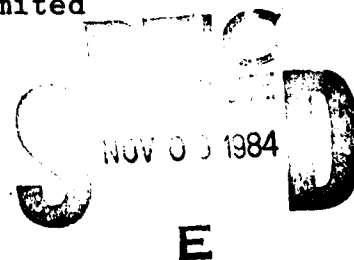
TELECOMMUTING:
AN ALTERED WORK PATTERN

THESIS

Carole H. Smith
GS-12

AFIT/GLM/LSM/84S-59

Approved for public release; distribution unlimited



The contents of the document are technically accurate, and no sensitive items, detrimental ideas, or deleterious information are contained therein. Furthermore, the views expressed in the document are those of the authors and do not necessarily reflect the views of the School of Systems and Logistics, the Air University, the United States Air Force, or the Department of Defense.

Accession For	
DTIC	☒
DTIC TAB	☐
Unannounced	☐
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	



AFIT/GLM/LSM/84S-59

TELECOMMUTING: AN ALTERED WORK PATTERN

THESIS

Presented to the Faculty of the School of Systems
and Logistics of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Acquisition Logistics

Carole H. Smith, B.M.

GS-12

September 1984

Approved for public release; distribution unlimited

Acknowledgments

There are many people to whom I am indebted for their assistance and encouragement throughout various stages of this research effort. I wish to express my sincere appreciation to my faculty advisor, Dr. Robert P. Steel, for his support, patience, and assistance. My special thanks are offered to Dr. John W. Demidovich who initially encouraged me to pursue this futuristic topic.

I also wish to thank Marcia Kelly and Tom Miller of Electronic Services Unlimited, a New York based telecommuting consultant company. They introduced me to telecommuting concepts in the private sector, provided a forum for exchange of information, and reviewed my survey instrument. Their insights, comments, and suggestions were invaluable.

A special word of appreciation is offered to those 586 military officers and civil service employees at Wright-Patterson AFB, Oh who freely gave of their time to respond to the survey. Without their interest, cooperation, and participation, this research effort would not have been possible.

Finally, I wish to thank my husband, Tom, for his understanding and support throughout this entire thesis effort.

Carole H. Smith

Table of Contents

	Page
Acknowledgments	11
List of Tables	v
Abstract	vi
I. Introduction	1
Problem Statement	1
Historical Perspective	1
Private Sector Views	3
Trade and Labor Union Views	5
Legal Considerations	5
Importance of Research	6
Scope	6
Objectives	7
Research Questions	7
Organization	8
II. Literature Review	9
Definition of Terms	9
Socio-Economic Conditions	10
Classification of AWP's	11
Part-Time: Job Sharing	12
Compressed Workweek (CWW): 4/40 CWW	16
Flexible Working Hours: Flexitime	22
Telesubstitution: Telecommuting	26
Conclusions	31
III. Method	34
Overview	34
Setting	34
Sample Population	35
Measures	37
Procedure	41
IV. Results	45
Introduction	45
Research Question 1	45
Research Question 2	53
Research Question 3	56

	Page
V. Conclusions and Recommendations	58
Introduction	58
Conclusions	58
Future Research Efforts	62
Recommendations	62
Study Limitations	64
Appendix A: USAF/MPC Approval Letter	66
Appendix B: Military Survey Package	68
Appendix C: Civilian Survey Package	77
Appendix D: Part I and II Frequency Distributions	86
Appendix E: Frequency Distributions for Measures of Acceptability	93
Appendix F: Frequency Distributions for Measures of Productivity	97
Bibliography	99
Vita	102

List of Tables

Table	Page
1. A Typical 4/40 CWW Arrangement	18
2. Flexitime Schedules	23
3. Survey Return Rate	43
4. Comparison of Group Means for Measures of Acceptability	46
5. Results of Military Group Stepwise Regression Analysis for Predictors of Preference for Telecommuting	48
6. Results of Civilian Group Stepwise Regression Analysis for Predictors of Preference for Telecommuting	48
7. Comparison of Group Means for Measures of Productivity	53
8. Sources of Anticipated Hindrances	57

Abstract

Rising energy prices, high costs for office construction and maintenance, traffic and parking congestion, increased pollution, and concern with the quality of work life are contributing factors to pressing social, economic, and productivity problems. With limited resources and spending priority conflicts, Department of Defense (DOD) managers seek solutions offering reduced costs, improved productivity, and increased employee job satisfaction. Based on new developments in the electronics and communications fields, a new altered work pattern called telecommuting appears to offer a partial solution to social, economic, and productivity problems.

Telecommuting can be defined as an altered work environment where employees work at home with electronically transferred information using a personal computer or a remote terminal with a telephone. It is a decentralized work concept which furnishes information to employees at home rather than a centralized work concept where large numbers of employees commute daily to information based locations. Several test programs have been generated by the private work sector. With many jobs in the private sector being similar to those performed in the federal sector, telecom-

muting may be applicable as an alternative work setting for some DOD organizations.

This study investigates attitudes held by Air Force military officers and comparable civil service employees assigned to Air Force Logistics Command, Wright-Patterson AFB, Ohio, concerning the potential acceptance of telecommuting, effects on productivity, and perceived advantages/disadvantages of telecommuting. A mail survey of 221 military and 365 civilians was conducted. Survey data analysis indicated that civilians favored telecommuting more than military. However, both groups believed that a test program would be desirable and that productivity would tend to increase. Neither group thought telecommuting would affect their personal lives. The military group, however, tended to believe that household chores might affect job performance while the civilian group did not.

TELECOMMUTING: AN ALTERED WORK PATTERN

I. Introduction

Problem Statement

Today's defense environment combines spending priority conflicts with increasing costs for weapon systems, personnel, operations, energy, and facility construction. With limited resources, Department of Defense (DOD) managers seek solutions offering reduced costs, improved productivity, and increased employee job satisfaction. Within this context, interest in altered work patterns (AWPs) as a partial solution has increased rapidly (Nollen & Martin, 1978).

In the 1980s, a new AWP, called telecommuting, is currently under study by several private sector companies that are engaged in pilot telecommuting programs. This thesis investigates the attitudes held by military officers and civil service employees regarding the use of telecommuting as an AWP in a DOD environment.

Historical Perspective

Rising energy prices, high costs for office construction and maintenance, increased pollution, traffic and parking problems, and concern with the quality of work life are contributing factors to pressing social, economic, and productivity difficulties for employees and employers. New

work forms that may alleviate these problems are welcome additions in the current unstable work environment. As a result, interest in normal and altered work scheduling concepts is likely to continue in the future.

A normal or standard work environment consists of an eight or nine-to-five daily time period with employees commuting five days a week to office or production locations (Nollen & Martin, 1978; Newstrom & Pierce, 1979). Any working situation differing in time or location can be considered an altered work form. Flexitime is probably the most familiar and widely used AWP (Newstrom & Pierce, 1979). In the late 1970s and early 1980s, advances in computer technology and new developments in the fields of electronics and communications created another new altered work form called telecommuting.

Telecommuting, a term created by John Nilles of the University of Southern California, can be defined as an altered work environment where employees work at home with electronically transferred information using a personal computer or remote terminal with a telephone. This AWP is sometimes referred to as tele-work, work at home, or flexi-place. It is a decentralized work concept which furnishes information to employees at home rather than a centralized work concept where large numbers of employees commute daily to information based locations. With this concept, an employee may telecommute from one to five days a week depend-

ing on organizational and employee needs.

Just as flexitime, the compressed workweek, and job sharing have been described as partial solutions to social, economic, and productivity problems, telecommuting has been suggested as an aid in alleviating some of these same problems.

Private Sector Views

Perhaps the leading user of telecommuting is a British software computer corporation called F International Ltd. Established in 1962 on a home work concept and employing approximately 600 people, almost all employees work at home with about 50% using computer terminals ("A company that," 1981). This 22-year-old consulting firm contracts work to highly skilled and qualified computer specialists and continues to use telecommuting as its primary work form ("Telecommuting: The State," 1984).

American companies, however, did not become seriously interested in telecommuting until the early 1980s when a large increase in home computer sales occurred. In 1981, the U.S. firm of Control Data Corporation began a voluntary pilot telecommuting program termed "work station" with approximately 60 professional and managerial personnel ("The potential for," 1981). This program is viewed as the best U.S. example of professional telecommuting ("Telecommuting: The State," 1984). During the same time period, companies such as Mountain States Telephone and Telegraph, Walgreens,

and McDonalds began pilot telecommuting programs for their handicapped employees ("The potential for," 1981). Today, approximately 200 U.S. companies have initiated some form of telecommuting with more than 30 firms engaged in some form of formal telecommuting program ("It's Rush Hour," 1984). Some major companies currently experimenting with telecommuting or participating in research studies include: New York Telephone Co.; Aetna Life and Casualty Co.; Investors Diversified Services, Inc.; Blue Cross & Blue Shield of South Carolina; American Express; Best Western Hotels in Phoenix; Digital Equipment; Xerox; AT&T; Control Data Corporation; Citibank; Equitable Life; J.C. Penny; and, Southern New England Telephone ("It's Rush Hour," 1984; Zippo, 1982).

Businesses cite the potential of new labor markets, increased productivity, retention of experienced personnel, and office cost reductions as major advantages of telecommuting ("Telecommuting: The State," 1984; "The potential for," 1981; Zippo, 1982). Some experts predict that between 10-15 million employees will be telecommuting by the mid 1990s ("A job with," 1983; "If home is," 1984; "No Workplace Like," 1984; "The potential for," 1981; Zippo, 1982). Other factors that may contribute to continued interest and growth in the telecommuting work form are rising energy costs, changing lifestyles, dual career families, rising costs of real estate for office space, and increased use of elec-

tronic office equipment ("Tele-Work-At," 1983).

Trade and Labor Union Views

While some firms view telecommuting as a potentially positive altered work form, opposition from the AFL-CIO, the National Association of Working Women, and the Services Employee International Union have already been voiced. All three view telecommuting as a threat to employee gains won by unions, fear worker exploitation, and seek to ban telecommuting as a work alternative ("A job with," 1983; "No Workplace Like," 1984). On the other hand, the National Federation of Federal Employees Local 1763 fully supported a small telecommuting pilot program conducted by the Automated Logistics Management Systems Activity (ALMSA), U.S. Army Material Development and Readiness Command (ALMSA Report, 1983). In addition, Glenn E. Watts, president of the Communications Workers of America, indicated in 1982 that perhaps "Telecommuters could even hook up to union meetings" ("If home is," 1982).

With diverse views being expressed, the issue of trade and labor union support or rejection of telecommuting remains an unsettled issue.

Legal Considerations

Possible legal difficulties with telecommuting also exist. Zoning laws dealing with the self-employed working at home, the Fair Labor Standards Act of 1938, worker com-

pensation statutes, income tax laws, security of information, and liability for equipment provided by an employer are all potential problem areas ("No Workplace Like," 1984; "Telecommuting: The State," 1984). While these legal problems are not insurmountable, any company or governmental agency interested in conducting a test telecommuting program would be wise to address these issues and develop established operating procedures prior to implementation.

Importance of Research

Each year the DOD is allocated 25-33 percent of the national budget. For FY85, the President requested approximately \$307 billion for DOD organizations. With DOD managers caught between scarce resources, increasing weapon systems costs, and spending priority conflicts, telecommuting may offer potentially large cost savings in the areas of construction, energy, and facilities maintenance. Many jobs in the private sector are similar to those performed by DOD personnel. An AWP that might contribute to significant cost reductions and increased productivity merits serious consideration. Research study in this area is needed prior to any organizational decision to implement telecommuting as an acceptable altered work schedule.

Scope

Air Force Logistic Command (AFLC), the third largest Air Force Command in terms of personnel employed, is not

new to studying and implementing innovative work forms. In the 1970s, Headquarters AFLC along with many private sector companies considered various AWP's such as flexitime, the compressed workweek, and job sharing. Of these, flexitime and job sharing were implemented in varying degrees for employees at Wright-Patterson AFB, OH. Employee experience with AWP's combined with the convenience of a large sample population were contributing factors in limiting this study to AFLC military officers and comparable civil service employees located at Wright-Patterson AFB, OH.

Objectives

The specific objectives of this thesis were:

1. To assess the potential acceptance of telecommuting in the AFLC work environment.
2. To identify the perceived effects of telecommuting on employee productivity.
3. To ascertain the perceived advantages and disadvantages of telecommuting as viewed by AFLC employees.

Research Questions

The following questions were used to attain the objectives of this study:

1. What are the opinions and perceptions of military officers and civil service employees concerning telecommuting as an acceptable altered workstyle in the AFLC workplace?

2. What are the opinions and perceptions of both groups regarding the effects of telecommuting on productivity?
3. What do both groups perceive as advantages and disadvantages of telecommuting?

Organization

This section has provided a general problem statement, a historical perspective of telecommuting, private sector views, trade and labor union views, legal considerations, the importance of the research to DOD, scope, objectives, and research questions posed.

Section II presents a literature review of altered work patterns. Specifically examined are the advantages and disadvantages of several representative altered work forms and actual applications in the private and federal work areas.

Section III describes the setting, sample population, measures, and procedures.

Section IV provides results of statistical tests applied to the survey data and relates findings to the research questions guiding this study.

Section V describes the implications of significant results, suggests directions for future research efforts, and offers recommendations for USAF users of telecommuting.

II. Literature Review

Definition of Terms

Standard Workweek. Americans generally describe a normal or standard workweek as any daily eight hour period for five days a week (Newstrom & Pierce, 1979). This definition includes shift work as a standard work form. However, a more precise definition of a standard workweek is a work environment consisting of an eight or nine-to-five daily time period for five consecutive days (Nollen & Martin, 1978) with employees commuting daily to office or production locations.

Altered Work Patterns (AWPs). An altered work pattern (AWP) is any work form that deviates from the standard workweek in time or location. With over 100 variations in use, the most well known and frequently used AWP is some form of flexitime (Newstrom & Pierce, 1979).

Part-Time. Part-time is any permanent or temporary work schedule where employees work 20 hours or less a week.

Compressed Workweek. A compressed workweek is a permanent full time work form that varies in hours, days, or a combination of both.

Flexible Working Hours. Flexible working hours is a work schedule where employees may vary their beginning and ending times within limits set by their organization.

Telesubstitution. Telesubstitution is the use of telecommunications for any work requiring travel.

Socio-Economic Conditions

Rising energy prices, high costs for office construction and maintenance, and increased pollution, traffic, and parking problems are contributing factors to pressing social, economic, and productivity difficulties for employees and employers. With limited resources, DOD managers seek solutions offering reduced costs, improved productivity, and increased employee satisfaction. Within this context, interest in AWP has increased rapidly (Nollen & Martin, 1978).

Work in America Institute, Inc. (1981) reported that over one fifth of American employees were working under some form of AWP. The rising interest, accelerated experimentation, and increased use of AWP can be attributed to many of the following socio-economic factors (McCarthy & Rosenberg, 1981; Olmsted, 1983; Rosow & Zager, 1983):

1. Increase of women in the workforce, particularly those with children.
2. Higher employee educational levels.
3. Aging of the workforce.
4. Inflation resulting in dual career families.
5. High unemployment.
6. Interest in "quality of work life" including leisure time, educational pursuits, and employee work expectations.
7. Pressure to increase productivity.
8. Advances in technology, particularly in the fields of electronics and communications.

Given these conditions, it is reasonable to assume that high interest in AWP's will continue in the future. For example, even with high unemployment, Rosow & Zager (1983) maintain that leisure time is continuing to grow in employee importance. Supporting this view is the continued growth of demand for part-time jobs (Olmsted, 1979) and a 1978 Louis Harris poll that indicated that between 30 and 40 million full-time employed individuals would favor a prorated decrease in the number of hours worked for a corresponding prorated reduction in earnings up to a maximum of 10 percent for hours and wages (Best, 1980). Contradictory situations, then, is an apt description of today's work environment. Out of these contradictions and as a result of socio-economic changes, a myriad of AWP's are available for implementation.

Classification of AWP's

AWP's can be divided into four general classifications based on work form definitions.

Part-Time. Major subcategories include job sharing, job splitting, phased retirement, optional leaves, work-year contract, short hours, work sharing, and rotation layoff.

Compressed Workweek. Major subcategories include 8 days/40 hours, 5 days/36 hours, 4 and $\frac{1}{2}$ days/40 hours, 4 days/40 hours, 4 days/36 hours, 4 days/32 hours, and 2 days/12 hours (work weekend).

Flexible Working Hours. Major subcategories include flexiweek, flexitour, task contracting, and flexitime.

Telesubstitution. Major subcategories include telecommuting, teleconferencing, teleshopping, and telerecreation.

Because of the diversity of organizational and employee needs, combinations of these four classifications and their subcategories are numerous and continue to expand. With so many work options available, clear delineation of classes is not always possible. In addition, definitions of specific AWP's vary widely. For example, McCarthy and Rosenberg (1981) classify the compressed workweek as a shorter workweek which is, in their classification system, a subcategory of permanent reductions in work hours. On the other hand, Schroeer (1981) classifies the compressed workweek as a separate category, but also classifies permanent part-time, defined as more the 20 hours per week but less the 40 hours per week, as a separate category.

The complexity of available altered work forms and pertinent literature on each form is far too extensive to be addressed here. Therefore, one type of AWP from each major category is reviewed in depth.

Part-Time: Job Sharing

Expanded Definition. Job sharing can be further defined as a permanent part-time AWP where one full time position is divided in time, duties, responsibilities, salary, and benefits between two volunteer employees (Meier, 1979;

Olmsted, 1979, 1983; Schroeer, 1983). It is more than just a permanent job evenly split between two individuals. This is termed as job splitting. Under job sharing, both employees are responsible for the totality of the job even though they only work part-time (Cohen & Gaden, 1978).

Characteristics. Because this work schedule emphasizes cooperation, coordination, and skill enhancement, it is important to note that participation must be on a voluntary basis among individuals who want to work part-time. Employees who job share are often viewed as a unit or team (Olmsted, 1979, 1983; Rosow & Zager, 1983). Team formations include individuals with similar abilities, with complementary skills, with varying degrees of experience (a form of apprenticeship), or any combination acceptable to the organization and the employees (Olmsted, 1979). In dividing tasks, responsibilities, and hours worked, the job requirements and employee needs and experience must be key considerations (Cohen & Gaden, 1979; Olmsted, 1979, 1983). Endless possibilities exist for the division of hours worked. Examples cited by Olmsted (1979) include: each employee works a half day five days a week with or without overlapping time periods; each works two and a half days a week; first week one works two days while the other works three days with the process reversed the next week; and/or each works alternating weeks. Finally, job sharing can be found in engineering, clerical, financial, staff executive, and

other managerial fields (Newstrom & Pierce, 1979; Olmsted, 1983).

Evaluation. In a review of several private sector firms, Olmsted (1983) found that employers reported benefits of increased productivity due to reductions in absenteeism and turnover rates, retention of experienced workers, continuity of job performance, reduced burnout in high stress jobs, more work schedule flexibility, transition for aging workers, recruitment from a larger labor pool, and decreased layoffs in economically difficult times. The firms studied included the Rolscreen Company, New York Life Insurance Company, United Airlines, and Pan American Airways. All reports were anecdotal in nature. For the Rolscreen Company, a manufacturer, job sharing began in 1976 when the company granted a female production worker's request for a decrease in working hours. At that time, it was reported that her rate of absenteeism was 14 percent. After a year of participating in job sharing, her rate reportedly had dropped to 2 percent. Five additional requests for job sharing were authorized. In 1978, Rolscreen offered job sharing as an alternative to employees in some work activities. Job sharing employees at Rolscreen have increased since 1978 to 100 out of approximately 2000 total employees. In the case of New York Life Insurance Company, job sharing was implemented in 1970 as a recruitment device for a specific sector of the labor market. By 1980, 240 em-

ployees were involved in job sharing. The annual turnover rate was reported to be 10 percent lower for job sharers than for similarly employed full-time workers.

The two airlines used job sharing with their flight attendants to reduce the number of layoffs. The United Airlines program involved 508 employees and continued until 1982 when it was cancelled due to costs. Approximately 365 jobs were estimated as having been saved using job sharing. Pan American Airways, on the other hand, introduced job sharing in 1980 for a six month trial period. The test program consisted of 116 flight attendants and ended in May 1981. Job sharing as an option was subsequently included in the 1983 annual contract. During the test period, 58 jobs were reported as having been saved. Olmsted (1983) states that "As of April 1983, 174 flight attendants were sharing jobs" (p. 484).

McCarthy and Rosenberg (1981) compiled case studies involving the State of Wisconsin, the State of California, Madison Wisconsin Public Library, Hewlett-Packard, and TRW Vidar. In each case study, reported benefits included lower turnover rates, reduced absenteeism, and retention of experienced workers. TRW Vidar reported additional benefits as increased efficiency due to less job burnout and successful recruitment from a larger labor market, while Hewlett-Packard cited reductions in layoffs as a major benefit.

The primary problem with job sharing appeared to be

cost efficiency (McCarthy & Rosenberg, 1981; Olmsted, 1983, Rosow & Zager, 1983). Cost studies revealed that cost factors for job sharing varied between different companies (Olmsted & Smith, 1981). What may be cost effective for one firm may not be cost effective for a different firm. An associated problem was reported by Hewlett-Packard in the accounting field where personnel ceilings were based on head count rather than full time equivalent jobs (McCarthy & Rosenberg, 1981). In addition, entrenched beliefs of management that rigid work plans are necessary for efficiency, concern with task responsibility and accountability, and fear of sudden growth in the number of part-time employees were also listed as potential problems (Olmsted, 1983; Rosow & Zager, 1983).

Anecdotal reports from employees indicated that job sharing advantages included more leisure time, reduced fatigue, and improved morale. However, disadvantages included limited access to career advancement and some loss of identity (McCarthy & Rosenberg, 1981; Olmsted, 1979, 1983).

Compressed Workweek (CWW): 4/40 CWW

Expanded Definition. A compressed workweek (CWW) can be further defined as a permanent full-time schedule that varies in the number of hours or days worked per week. Included in this definition is any work pattern that reduces the total number of hours to less than 40 hours weekly, but requires more than 20 hours weekly. A workweek of 20 hours

or less is classified as part-time employment and is not considered a CWW form. It is important to note that the CWW designates the required working hours for employees. It is not necessarily an expression of an organization's hours of operation with its surroundings.

Characteristics. The number of days worked per week are decreased by either extending daily work hours or reducing the total number of hours worked per week resulting in longer weekends for employees. Through manipulation of hours worked per day and subsequent reduction in the number of days worked per week, numerous CWW variations are possible. For example, a CWW could include a 4½ day workweek composed of four 9 hour days and one 4 hour day or a 4 day workweek with either 10, 9, or 8 hour days (Cohen & Gaden, 1978; McCarthy & Rosenberg, 1981; Rosow & Zager, 1983). The most frequently used variation, however, is the 4 day workweek with 10 hour days, commonly called the 4/40 CWW (Cohen & Gadon, 1978; Nollen & Martin, 1978, Ronen & Primps, 1981).

Depending on the organizational environment, the 4/40 CWW is normally used in either of two ways (Cohen & Gadon, 1978): all personnel work the same four days with the organization operating only four days a week or personnel are divided into two groups - Monday thru Thursday and Tuesday thru Friday - with the organization operating five days a week. Table 1 illustrates the latter arrangement.

Table 1

A Typical 4/40 CWW Arrangement

Employee	Days				
	M	T	W	T	F
1	x	x	x	x	
2	x	x	x	x	
3		x	x	x	x
4		x	x	x	x

(Cohen & Gadon, 1978)

This arrangement provides the organization with full work-force coverage Tuesday thru Thursday with all employees receiving an extended weekend. McCarthy and Rosenberg (1981) found that a variation of this form was very successful for the United Services Automobile Association (USAA). In 1971, USAA became interested in the feasibility of the 4/40 CWW as a means to increase employee morale and productivity while sustaining high levels of service to its membership. After extensive research and planning which included a booklet for employees explaining the CWW and its effects on benefits, holidays, schedules, overtime, and sick/annual leave and a survey requesting employees to indicate preferred working schedules, USAA instituted a 90 day test program in late 1971. During this period, 93 percent of employees worked a Monday thru Thursday schedule with 7 percent working a Tuesday thru Friday schedule. Only employees in computer operations, security and maintenance,

and the Mutual Fund and Investment Department were excluded from the test. These three sections already worked a six day schedule or were required by law to be operational every day the stock exchange was open. An evaluation of the test program was conducted through employee questionnaires and collection of other data. Based on this evaluation, USAA implemented the 4/40 CWW in 1972 throughout the company. Over time, the working schedules were gradually adjusted to 70 percent working Monday thru Thursday with the remaining 30 percent working Tuesday thru Friday. With approximately 5,000 employees, USAA is the largest U.S. firm to successfully switch to the CWW (McCarthy & Rosenberg, 1981).

Evaluation. Although adopted as early as 1940, the CWW did not generate wide spread interest or experimentation until the early 1970s (Hellriegel, 1972; Newstrom & Pierce, 1979). In 1978, Nollen and Martin reported that approximately 1,270,000 or 2.1 percent of full-time non-farm employees were engaged in some CWW form. They studied 216 CWW uses in 155 different organizations. The majority of the companies surveyed were in manufacturing, finance, and insurance. Size of the firms ranged from less than 500 to more than 1,000 employees. Reported organizational advantages included: increased employee morale; reduced tardiness, absenteeism, and turnover rates; and enhanced recruitment ability. While many of the companies had collected data and conducted company surveys to support

reported advantages and disadvantages of the CWW form, others had not, and managerial judgment appears to have been the basis for reported advantages and disadvantages. When data had been collected, it included quantifiable factors such as "unit labor costs of production, fatigue, difficulty of management job, effects on customers, employee commuting, recruiting, and utilities costs" (p. 47) and difficult to quantify factors such as employee performance, scheduling, and communications.

Other factors could be responsible for the benefits cited. As pointed out by Cohen and Gadon (1978), reported productivity gains and reduced absenteeism, tardiness, and turnover rates could also be due to other uncontrolled and unrecognized variables. For example, as most absenteeism falls on Monday or Friday, the use of the CWW extends the weekend and could confound the problem of determining if absenteeism has really been reduced by the use of the CWW alone or whether it has simply disappeared due to a reluctance by employees to sacrifice a larger portion of earnings for absenteeism (Cohen & Gadon, 1978). In a review of 14 different studies of CWWs occurring between 1973 and 1979, Ronen and Primps (1981) concluded that while a decrease in absenteeism appeared to be supported by strong evidence, decreased absenteeism as an organizational advantage is still open to question as most of the studies reviewed made no distinction between annual leave and sick

leave.

Case studies of Medtronic, Inc., Ideal Industries, and USAA cited constant or increased productivity levels as additional benefits (McCarthy & Rosenberg, 1981). In the case of Medtronic, Inc., in-house productivity reports were used to document the reported increase in productivity, while USAA measured productivity gains in terms of an increase in sales with no additional workforce increase. Ideal Industries reported that while productivity increased initially, it later stabilized at pre-CWW levels. Rosen & Primps (1981), however, contend that the issue of increased productivity is still not resolved. While subjective employee and supervisory reports were favorable, objective productivity measures have yielded less clear-cut support for claims of increased productivity.

Organizational disadvantages cited for CWWs included employee fatigue, work scheduling problems, and some internal and external communication difficulties (Cohen & Gadon, 1978; Nollen & Martin, 1978). The data on employee fatigue as an organizational disadvantage are not conclusive. In their review, Ronen and Primps (1981) found increased fatigue to be a common occurrence. This fatigue did not, however, appear to seriously influence effectiveness. Supporting this view is the USAA case study (McCarthy & Rosenberg, 1981) which stated that, "There were practically no reports of significantly increased fatigue as a result of the length-

ened workday" (p. 101).

Major employee advantages reported for CWW programs are more leisure time and more time for home and family (Cohen & Gadon, 1978; McCarthy & Rosenberg, 1981; Ronen & Primps, 1981; Rosow & Zager, 1983). Lesser advantages included reduced transportation costs and additional part-time work opportunities (Cohen & Gadon, 1979; McCarthy & Rosenberg, 1981; Rosow & Zager, 1983).

Possible employee disadvantages mentioned by these authors included: fatigue, particularly if there were dependents at home (Cross, 1971); adjustment to CWWs for women over thirty (Cohen & Gadon, 1978); and, in some instances, reduced leisure time per day (Mahoney et al., 1975; Ronen & Primps, 1981).

Flexible Working Hours: Flexitime

Expanded Definition. Flexitime can be further defined as a work concept that allows the maximum variability in beginning and ending working hours within established organizational limits (Hicks & Klimoski, 1981; Nollen & Martin, 1978). No longer are start and end times rigidly fixed by the organization. Instead, the day is divided into two types of hours - core hours and flexible hours or bands (Finkle, 1979; Wheat, 1982). During core hours, usually mid morning to mid afternoon, an employee must be present for work. Both types of hours are then added together to obtain a required number of daily work hours (Finkle,

1979). With over 100 variations in use, flexitime is the most frequently used and widely known AWP (Newstrom & Pierce, 1979).

Characteristics. Based on organizational and employee needs, numerous flexitime combinations are possible. However, most private and federal agencies employ one of the two types of schedules illustrated in Table 2 (Finkle, 1979; Nollen & Martin, 1978; Petersen, 1980; Wheat, 1982).

Table 2
Flexitime Schedules

7a.m.	9a.m.	3p.m.	6p.m.
Flexible Band	Core Hours	Flexible Band	

7a.m.	9a.m.	11a.m.	1p.m.	3p.m.	6p.m.
Flexible Band	Core Hours	Flexible Band	Core Hours	Flexible Band	

(Finkle, 1979; Petersen, 1980)

The key characteristic reflected in these schedules is the opportunity afforded an employee to select his/her own starting and quitting times in the flexible bands. Allowing individual selection of work hours based on lifestyle, personal commitments, and work needs results in the organization actively encouraging an employee to exercise some degree of control over his/her working environment (Finkle, 1979; Nollen & Martin, 1978).

Evaluation. Flexitime first appeared in the U.S. in 1972 when Control Data Corporation instituted a flexitime program (Petersen, 1980). Nollen and Martin (1978) and Petersen (1980) both reported that in 1977 approximately 5.8 percent of the U.S. workforce was engaged in some form of flexitime. France, Germany, and Switzerland, on the other hand, had over 20 percent of their workforces on flexitime (Petersen, 1980).

In 1978, Nollen and Martin studied flexitime in 196 organizations. Their data base was obtained through a mail survey of approximately 2,900 firms regarding several AWP's including flexitime. The survey return rate was 28 percent. Of those who did not respond to the survey, 100 telephone interviews were conducted. The reported organizational benefits were based, in part, on data that the firms had collected by in-house surveys and/or analysis of personnel records. Some firms, however, did not collect data. From this survey data base, Nollen and Martin (1978) found that flexitime reportedly increased employee morale, reduced tardiness, absenteeism, and turnover rates, decreased time spent in commuting to work, and improved productivity. Ronen and Primps (1980) studying 25 public agencies, Petersen (1980) investigating 11 case histories, and others (Golembiewski & Hills, 1977; Mueller & Cole, 1977) generally found support for a number of these types of outcomes. For example, Ronen and Primps (1980) found a positive change in

productivity based on objective and subjective data. Production criteria used by the 25 public agencies they studied differed and included factors such as "quality of work, quantity produced, accuracy, efficiency, ability to meet schedules, and increases in interdepartmental or interorganizational communications" (p. 200). However, it must be noted that the total number of agencies using objective data (11) and subjective data (17) was small. Ronen and Primps (1980) also found from comparison of reports between supervisors and employees that, on the whole, employees perceived a greater increase in productivity than did supervisors although both groups reported positive effects. There were no reported productivity decreases. In the area of increased employee morale, all data were subjective and supported a positive change. Also, objective and subjective data indicated a decrease in absenteeism similar to that reported by Nollen and Martin (1978). However, all forms of absence were included in Ronen and Primps' (1980) findings and no distinction was made between sick leave and annual leave.

Other organizational benefits frequently cited for flexitime included job satisfaction (Petersen, 1980; Ronen & Primps, 1980) and reduced overtime rates (Golembiewski, Hills, & Kagno, 1974). The reported findings on absenteeism and job satisfaction appear mixed. While Finkle (1979) reported fewer short term absences, Golembiewski, Hills, and

Kagno (1974) found that flexitime did not reduce short time absences more than long term absences. On the other hand, Kim and Campagna (1981) in an empirical study of four divisions of a county welfare agency reported reductions in all unpaid absences with unpaid short term absences being affected more strongly than unpaid long term absences. In the area of job satisfaction, Hicks and Klimoski (1980) reported a lack of significant differences on job satisfaction measures between flexitime and fixed hour working groups. They surmised this finding was due to the fact that the terms "flexitime" and "altered work schedule" were never mentioned in the study questionnaire or in discussions.

The most frequent organizational problem associated with flexitime is management's concern over lack of supervision of some employees during the flexible bands (Finkle, 1979; Nollen & Martin, 1978). Communication difficulties are also often cited as a problem (Nollen & Martin, 1978).

From the employee point of view, major positive aspects of flexitime included control of working hours and reduced commuting time (Finkle, 1979).

Telesubstitution: Telecommuting

Expanded Definition. Telecommuting can be further defined as a work schedule where employees work at home with electronically transferred information using a personal computer or remote terminal with a telephone link to a central office. It is a decentralized work concept which furnishes

information to employees at home rather than a centralized work concept in which large numbers of employees travel daily to information based work offices. Depending on organizational and employee needs, a worker may telecommute from one to five days per week.

Characteristics. The primary characteristic of this AWP is the location of work. Instead of the traditional office setting, work is performed at home. While the number of days and hours of work required each week do not increase or decrease, the daily work time period can vary from the normal nine-to-five time period. It is important to note here that a solid foundation of trust between the supervisor and the worker is mandatory for telecommuting to succeed (Barnes, 1983; "If home is," 1983). Not all jobs, managers or employees are suited for telecommuting as a high degree of self motivation and discipline are required to work at home ("Telecommuting: The State," 1984). In addition, supervisors of telecommuters must provide the same support and communication links for their telecommuters as they do for office personnel, otherwise morale and performance can suffer resulting in alienation of the telecommuter (Barnes, 1983).

Evaluation. Because telecommuting is the newest AWP, no empirical studies were found in a review of the literature. All case study data to date are anecdotal. Scientific research is required to verify reported productivity

gains and other claimed advantages. Until such research is done, case study evidence must be viewed with caution.

In a telecommuting conference conducted by a New York based telecommuting consultant, several case studies were presented by Marguthe H. Olson, an Associate Professor at the Graduate School of Business Administration, New York University ("Telecommuting: The State," 1984). The three most well known telecommuting projects involved American Express, Blue Cross & Blue Shield of South Carolina, and Control Data Corporation. At American Express, the telecommuting program was designed specifically to employ home-bound disabled and consisted of 10-12 full-time permanent employees performing word processing functions. A yearly cost of \$3,600 per person for special telephone lines and a one time cost of \$2,000 per employee for an in-house copying capability was required. American Express maintained that telecommuting still was cost efficient when compared to bringing employees into a downtown Manhattan office where space per person was estimated to cost \$7,000 per person per year. The Blue Cross & Blue Shield of South Carolina program is perhaps the most controversial telecommuting experiment. It involved data entry and data coding clerical personnel who were paid by piece rate while office employees performing the same work were paid by the hour. The company cited increased performance, reduced turnover rates, and decreased overtime as benefits produced by tele-

commuting. Productivity for telecommuters was 50 percent greater than office workers performing the same tasks ("It's Rush Hour," 1984). A major experimental confound with this program is the unequal pay rate between telecommuters and office employees. A possible explanation of the higher productivity rate for telecommuters could be the pay differential issue and not necessarily that telecommuting itself was responsible for the reported productivity increase. The Control Data Corporation program, the best U.S. example of professional telecommuting, consisted of 50-100 professional employees who received full salaries, had little managerial responsibilities, and whose work was project oriented and therefore, fairly easy to track. Based on an objective measure of employee replacement costs, \$25,000 to \$30,000 per person, the company estimated they saved between \$300,000 to \$360,000 for 12 employees whom they would have lost without telecommuting ("Telecommuting: The State," 1984). As a result of their project, Control Data Corporation developed a training program package for supervisors of remote employees.

Only one federal sector telecommuting program was found. This pilot program was conducted by the Automated Logistics Management Systems Activity (ALMSA), U.S. Army Material Development and Readiness Command located in St. Louis, Mo. This 18 month program which began in October 1980 consisted of four non-handicapped civil service employees ranging in

grade from GS-11 to GS-13. All were volunteers and were computer specialists. Results of the program included "increased productivity and employee morale, energy conservation, retention of skilled personnel, reduced employee work-related expenses, and more efficient utilization of computer resources" (ALMSA Report, 1983). Extensive productivity documentation was maintained and included: individual Central Processing unit efficiency rates prior to the test and during the test for both telecommuters and office employees; established supervisory controls which consisted of hours logged on computer and resource units used; well defined/well written work agreements; and project completion status data. Major governmental issues pertaining to communication installation, liability for loss or damage to government equipment or property, work related injuries, and labor union views were thoroughly investigated and resolved prior to program implementation. After the test program, official concern with the public perception of fraud and abuse by government employees working at home resulted in a post audit recommendation to discontinue the program. This recommendation was based on the conclusion that "potential" risks of fraud and abuse outweighed the organizational and employee benefits received (ALMSA Report, 1983).

Organizational advantages cited by various users of telecommuting included increased productivity, retention of skilled employees, reduced turnover and absenteeism rates,

energy conservation, more efficient utilization of resources and facilities, recruitment from new labor markets, and increased employee morale (ALMSA Report, 1983; "It's Rush Hour," 1984; "Telecommuting: The State," 1984; Zippo, 1982). Problem areas involved equipment difficulties, management resistance, possible worker exploitation, potential risks of fraud and abuse, and compensation/benefit differences (ALMSA Report, 1983; "A job with," 1983; "It's Rush Hour," 1984; "Telecommuting: The State," 1984; Zippo, 1982).

From the employee point of view, telecommuting reduced stress, provided a distraction-free work setting, increased leisure time, and reduced work related costs (ALMSA Report, 1983; "A job with," 1983; Barnes, 1983; "It's Rush Hour," 1984; "Telecommuting: The State," 1984). Disadvantages included isolation, possible career blocking, and lower compensation ("Telecommuting: The State," 1984; Zippo, 1982).

Conclusions

Although job sharing, 4/40 CWW, flexitime, and telecommuting AWP's were reported to have produced significant organizational benefits in morale, employee withdrawal behavior, and productivity, some conflicting study results were also reported. Several explanations are possible for conflicting reports. First, while some positive change might be expected to occur with the implementation of an AWP, methods of measuring changes may have been inadequate. In some cases, results were reported based entirely on sub-

jective rather than objective data. If AWP's do actually produce the claimed benefits, it is possible that inadequate or inappropriate measurement methods were unable to quantify the true amount of change produced. More empirical research is needed to clarify what benefits, if any, are actually produced by AWP's. A second explanation of mixed results might be that any AWP would produce positive change over rigid, inflexible workforms regardless of subjective or objective measurement methods. A third possibility is that AWP's are, in fact, ineffective.

All four AWP's appear to produce differing organizational problems. In the 4/40 CWW, fatigue was reported as the major problem. Some lack of supervision of employees during flexible bands was cited as the major difficulty with the flexitime AWP. Job sharing difficulties included cost inefficiency, management resistance to change, concern over task responsibility/accounting, and fear of growth of part-time workers. Telecommuting disadvantages centered on equipment failures, possible worker exploitation, and the potential risks of fraud and abuse. Organizational disadvantages seem to be peculiar to each particular AWP and may be directly related to the underlying characteristics of a procedure.

Major employee advantages claimed were fairly uniform across all four AWP's and included increased leisure time, reduced work-related costs, and increased control over the

working environment. Disadvantages, however, appear to be related to the underlying work form characteristic. For example, job sharing and telecommuting share the same basic principle of less physical contact with supervisors and upper level management. The perceived disadvantage of limited career advancement is probably linked to this specific characteristic.

Despite mixed study results, inadequate or inappropriate measurement methods, and some experimental failures, continued interest in AWP's remains high. Extensive empirical research is required before a final decision on the effectiveness of AWP's can be formed. For example, while difficult to accomplish, controlled field experiments for each AWP reviewed are needed. Complete definitions and objective measurements of productivity, employee morale, tardiness, absenteeism, and turnover rates are required. Longitudinal designs with appropriate control groups need to be employed. While random selection of participants in both the experimental and control groups may not be possible, matching groups or selected individuals between groups would help eliminate some possible experimental confounds as would the use of statistical controls to standardize results.

III. Method

Overview

In the 1980s, the newest AWP, called telecommuting, is currently under study by several private sector companies who are engaged in pilot telecommuting programs. The purpose of this thesis was to investigate the attitudes held by military officers and civil service employees regarding the use of telecommuting as an AWP in a DOD environment. A mail survey was deemed the most appropriate method of data collection to answer the research questions posed in this thesis.

Setting

In the Air Force, the third largest major command in terms of people employed is the Air Force Logistics Command (AFLC) with headquarters at Wright-Patterson AFB, OH. With approximately 93,000 employees (excluding defense contractor personnel), AFLC employs one out of every eight people working for the Air Force ("AFLC; The Commander's," 1984). This workforce, composed of 10,176 military and 82,642 civilians, is geographically dispersed across the United States. Major installations include: Hq AFLC, Wright-Patterson AFB, OH; Sacramento Air Logistics Center (ALC); McClellan AFB, CA; Ogden ALC, Hill AFB, UT; Oklahoma ALC, Tinker AFB, OK; San Antonio ALC, Kelly AFB, TX; Warner-

Robbins ALC, Warner-Robbins AFB, GA; and, Newark Air Force Station, OH.

Sample Population

Constraints. Time constraints, numerous geographically separated locations, and research costs were limiting factors in choosing a research population. The convenience of a large local population combined with AFLC experience with altered workstyles such as flexitime was a significant factor in choosing Wright-Patterson AFLC employees as the research population. Excluded from the sample population were General Officers, Senior Executive Service employees, General Schedule (GS) employees below the grade of GS-7, and all wage grade personnel.

Sample. From the population, 333 military officers and 567 civil service employees were selected for the sample. Random selection was achieved by selecting individuals from a master list using the last digit of the social security number. Digits used to select personnel for the sample were 0, 1, 2, 5, and 8. AFIT/DPW provided the names and office address labels for the military portion of the sample population while the 2750th Air Base Wing/DPC provided the names and office address labels for the civilian employees.

Sample Characteristics. To provide a profile of a typical military and civilian respondent, frequency distributions were constructed for both groups from background

and job characteristic survey data.

A military officer was most frequently male, held the rank of Captain, was 36-45 years old, married, had a master's degree or higher, and did not own a personal computer, but did plan to buy one. In addition, the typical military member was in the Logistics career field which includes the functional areas of maintenance, supply, transportation, and contracting. He was a supervisor and was permitted a great deal of discretion in deciding how to accomplish his work. His job most frequently required the use of a wide variety of skills, was sometimes measurable, and required contact, cooperation, and/or coordination with other people as well as some visual interaction with others.

A civil service respondent was most frequently male, held a GS-12 grade level (comparable to a Captain), was 46-55 years old, possessed an undergraduate degree, and did not own a personal computer, but did plan to buy one. Like the typical military member, the civil service employee was also in the Logistics career field. He was not, however, functioning in a supervisory capacity, but was permitted a great deal of discretion in deciding how to accomplish his work. His job most frequently required the use of a wide variety of skills, was sometimes measurable, and required contact, cooperation, and/or coordination with other people as well as some visual interaction with others.

Measures

Measurement Instrument. The measurement instrument was a 29 item questionnaire created by partially adapting questions and scales used in altered work pattern research such as research on flexitime and the compressed 4 day/40 hour workweek (Hine & Clarke, 1972; Kimsey & Prince, 1974). Two survey instruments were developed - one for the military and one for civilians. The surveys contained the same questions except for one item which addressed rank for the military officers and grade level for the civil service employees.

Demographic Items. Part I of the survey contained eight background items. Information obtained in this section of the survey included: rank/grade; age; sex; marital status; educational level; personal computer ownership; use of personal computer; and, plans to purchase a computer.

Job Characteristics Items. Part II of the survey contained seven items related to present job characteristics. Data in this portion of the survey included: functional work area; number of personnel supervised; amount of job discretion; range of job skills used, job measurability; the extent of interpersonal interaction; and, the extent of visual interaction required.

Telecommuting Opinion Items. Part III of the survey contained 13 items measuring opinions concerning telecommuting. Descriptive name, survey question, and response

scales are given below:

Preference for Telecommuting. This item stated, "I would enjoy working at home by telecommuting." The response scale was: Strongly agree (0); Agree (1); Neither agree nor disagree (2); Disagree (3); or, Strongly disagree (4).

Number of Days Preferred. This item asked, "If you telecommuted, how many days would you prefer to work at home?" The response scale was: None (0); 1-2 (1); 3 (2); 4 (3); or, 5 (4).

Job Compatibility. This question asked, "What percentage of your job do you believe could be done by telecommuting?" The response scale was: None (0); 25% or less (1); 26-50% (2); 51-75% (3); or, 76-100% (4).

Impact on Work Quantity. This item asked, "How do you believe telecommuting would affect the amount of work you could do?" The response scale was: Greatly increase (0); Slightly increase (1); No change (2); Slightly decrease (3); Greatly decrease (4).

Impact on Co-Worker Work Quantity. This item asked, "How do you believe telecommuting would affect the amount of work done by your co-workers?" The response scale was: Greatly increase (0); Slightly increase (1); No change (2); Slightly decrease (3); or, Greatly decrease (4).

Impact on Sick Leave Use. This question

asked, "How do you believe telecommuting would affect your sick leave?" The response scale was: Greatly increase (0); Slightly increase (1); No change (2); Slightly decrease (3); or, Greatly decrease (4).

Impact on Work Quality. This item asked, "How do you believe telecommuting would affect the quality of work you do?" The response scale was: Greatly increase (0); Slightly increase (1); No change (2); Slightly decrease (3); or, Greatly decrease (4).

Impact on Personal Life. This item asked, "How do you believe telecommuting would affect your personal life?" The response scale was: Greatly increase problems (0); Slightly increase problems (1); Create no change (2); Slightly decrease problems (3); or, Greatly decrease problems (4).

Anticipated Hindrances. This question asked, "If you telecommuted, do you believe any of the following factors might hinder your job performance?" The response choices were: No hindrance expected (0); Family or relatives (1); Friends or neighbors (2); Household chores (3); or, Other (4). This was the only item in the survey that permitted the respondent to make multiple responses.

Capability to Supervise Telecommuters. This item stated, "I believe it is possible to adequately supervise telecommuting employees." The response scale was: Strongly agree (0); Agree (1); Neither agree or disagree (2);

Disagree (3); or, Strongly disagree (4).

Applicability of Telecommuting to the Military. This item was phrased, "I believe telecommuting could be used as an alternative work schedule for military officers assigned to AFLC." The response scale was: Strongly agree (0); Agree (1); Neither agree or disagree (2); Disagree (3); or, Strongly disagree (4).

Applicability of Telecommuting to Civil Service Employees. This item stated, "I believe telecommuting could be used as an alternative work schedule for civil service employees assigned to AFLC." The response scale was: Strongly agree (0); Agree (1); Neither agree or disagree (2); Disagree (3); or, Strongly disagree (4).

• Desirability of a Test Program. This item stated, "I would like AFLC to conduct a test program with telecommuting." The response scale was: Strongly agree (0); Agree (1); Neither agree or disagree (2); Disagree (3); or, Strongly disagree (4).

Data Analysis. The research data base generated by the return of 586 usable surveys was organized into two major groups - military and civilian responses. The military group was composed of 221 cases while the civilian group contained 365 cases. A profile of characteristics based on the demographic and job characteristic data was developed for each group.

Student t-tests were used to identify mean differences

between the military and civilian groups. An alpha significance level of .05 was used. The null hypothesis assumed the military group mean and the civilian group mean were the same. The alternative hypothesis assumed that group means were not equal. Results of statistical tests are presented in section IV of this thesis.

Procedure

Prior to data collection, the survey instruments were circulated for review and revision. The initial drafts were first reviewed by the thesis chairman and then by a private sector telecommuting consultant company. Using suggestions from these reviews, questions were added, deleted, or restructured and rating scales were modified as required. The surveys were then submitted to Hq AFIT for review. The next critical step was review of the surveys by Hq USAF Military Personnel Center (MPC) and Air Force Government Employee (AFGE) Union Local 1138.

Hq USAF/MPC approved the military survey on 17 April 1984 contingent upon minor word and response changes to some items. USAF Survey Control Number 84-32A was assigned. The civilian survey required approval of AFGE Local 1138. This approval was obtained from the local union president, Mr. Don Cook, on 8 May 1984. At that time, Hq USAF/MPC approved the civilian survey contingent upon the same minor word and response changes required for the military survey. USAF Survey Control Number 84-32B was assigned. Appendix A

contains Hq USAF/MPC survey approval and required changes. Appendix B contains the military survey package, and Appendix C contains the civil service survey package.

After the surveys were approved and printed, the cover letter was date stamped and attached to the surveys which were then placed in large envelopes and sealed. Address labels were attached and the packages placed in the base distribution system on 1 June 1984.

A survey package contained general information, survey completion instructions, a brief description of terms, a response sheet, a self-addressed pre-paid return envelope, and a cover letter signed by the Associate Dean of the School of Systems and Logistics, Air Force Institute of Technology.

The general information explained the purpose of the survey, gave the required USAF Survey Control Number, informed respondents how data provided would be used, advised participants that research results would have unlimited distribution, and emphasized that participation was voluntary. In addition, individuals were reminded that no adverse action would be initiated against anyone who refused to answer all or any portion of the questionnaire.

Survey completion instructions explained that automatic scanning of response sheets would be used, gave an example of how to use the answer sheet, and listed important requirements for completing the answer sheet in order to fa-

cilitate automatic scanning.

To familiarize respondents with the concept of telecommuting, a brief description of the concept and related terms such as standard workweek and altered work schedule was provided. Finally, the cover letter stressed the anonymity and confidentiality of individual responses, the voluntary nature of the survey, and requested surveys be returned within 10 days of receipt.

A termination date of 27 June 1984 was established for accepting returned surveys as part of the research data base. A sample size of 200 civilians and 200 military officers was desired for statistical calculations.

On 1 June 1984, a total of 900 survey packages were distributed with 567 sent to civilian employees and 333 to military officers. Table 3 summarizes the return rate by subgroups.

Table 3
Survey Return Rate

Group	Returned	Mailed	Return Rate
Military	221	333	66.4%
Civilians	365	567	64.6%
Undeliverable	13		1.4%
Totals	599	900	66.5%

Within five days, a total of 249 surveys were returned with 164 from civilians, 76 from military officers, and 9 unde-

liverable. In the next six days, an additional 217 were returned with 130 from civilians, 83 from military members, and 4 undeliverable. In the first 11 days, the return rate was 51.8% for civilians, 47.7% for the military, and 1.4% undeliverable. By 27 June 1984, 599 of the 900 surveys mailed had been returned which represented a return rate of 66.5%. Only 13 surveys were returned because individuals were no longer employed or had been reassigned to a different location. The final sample size of 365 civilian and 221 military surveys met the desired sample size for statistical purposes. Of the 599 returned questionnaires, 586 contained valid responses. Surveys with incomplete responses were included in the analysis.

IV. Results

Introduction

The research data base generated by the survey is analyzed in this section. Parts I and II of the survey contained measures of demographic and job characteristics for the sample. Frequency distributions for these items are contained in Appendix D.

Data obtained in Part III of the survey were used to assess opinions and perceptions concerning telecommuting for military officers and civil service employees. Part III data were analyzed to evaluate the research questions posed in section I of this study.

Research Question 1

Research question 1 dealt with the opinions and perceptions of military officers and civil service employees concerning telecommuting as an acceptable altered workstyle in the AFLC workplace. Seven survey items addressed different aspects of acceptability. Frequency distributions for these items are contained in Appendix E. Table 4 provides group means and t-test results for AFLC military and civilian personnel on items measuring the extent of preference for telecommuting, the number of days employees preferred to telecommute, the percentage of job time that could be accomplished by telecommuting, the perceived cap-

ability to supervise telecommuters, the perceived applicability of telecommuting to military officers and civil service employees, respectively, and, the desirability of a telecommuting test program.

Table 4
Comparison of Group Means for
Measures of Acceptability

Item	Group	n	Mean	d.f.	t Value
Preference for Telecommuting	Military	221	1.68	584	-3.29*
	Civilian	365	1.33		
Number of Days Preferred	Military	220	.99	583	4.97*
	Civilian	365	1.43		
Percentage of Job Compatibility	Military	221	1.32	584	3.93*
	Civilian	365	1.67		
Capability to Supervise Telecommuters	Military	221	2.06	584	-2.11
	Civilian	365	1.85		
Applicability of Telecommuting to Military	Military	221	2.00	584	- .58
	Civilian	365	1.94		
Applicability of Telecommuting to Civilian	Military	221	2.06	584	-4.85*
	Civilian	365	1.58		
Desirability of a Test Program	Military	221	1.57	581	-3.25*
	Civilian	362	1.24		

Note: The n represents the number of respondents who chose to answer a question.

* $p < .05$

Preference for Telecommuting. For the military group, 48.9% expressed a positive preference for telecommuting, 22.6% indicated no preference, and 28.5% specified a negative preference. In the civilian group, 60.8% expressed a positive preference for telecommuting, 20.8% indicated no preference, and 18.4% specified a negative preference

As previously stated, group means, t-test results, and significance levels are contained in Table 4. Although both groups expressed a preference for telecommuting, the civilian data indicated a significantly greater preference than the military. A stepwise regression analysis for each group was performed to determine which of the 15 demographic and job characteristic items measured by the survey might be significant factors in predicting a preference for telecommuting. The results for the military and civilian groups are presented in Tables 5 and 6, respectively.

As displayed in table 5, only three variables entered significantly into the regression equation for the military group ($p < .05$). The first item to enter was perceived extent of visual interaction required by the job ($F = 24.44$) with a negative regression weight ($Beta = -.27$). This finding indicated that as the perceived amount of visual interaction required by the job decreased, preference for telecommuting increased. The second item to significantly enter the regression equation was personal computer ownership ($F = 14.09$; $Beta = .35$). This result indicated that as

Table 5
Results of Military Group Stepwise
Regression Analysis for Predictors
of Preference for Telecommuting

Variable	Beta	F to Enter	R ²	R ² Change
Extent of Visual Interaction	-.27	24.44*	.115	.115
Computer Ownership	.35	14.09*	.177	.063
Rank	.27	18.65*	.252	.075

Note: N = 190. Critical F = 3.91

*p < .05

Table 6
Results of Civilian Group Stepwise
Regression Analysis for Predictors
of Preference for Telecommuting

Variable	Beta	F to Enter	R ²	R ² Change
Number of Personnel Supervised	.10	16.70*	.049	.049
Personal Computer Use	.25	13.53*	.088	.039
Sex	-.16	12.55*	.122	.034
Age	.11	9.08*	.146	.024
Extent of Visual Interaction	-.09	4.98*	.159	.013

Note: N = 328. Critical F = 3.89

*p < .05

personal computer ownership increased, preference for telecommuting also increased. The third and final item to enter the equation at the specified significance level was the rank of the military member ($F = 18.65$; Beta = .27). This finding indicated that as the rank of the military member increased, the preference for telecommuting decreased.

For the civilian group (see Table 6), five variables entered significantly ($p < .05$) into the regression equation. The first item to enter was the number of personnel supervised ($F = 16.70$) with a Beta weight of .10. This indicated that as the number of personnel directly supervised decreased, preference for telecommuting increased. The second variable to significantly enter the regression equation was the amount of personal computer use ($F = 13.53$; Beta = .25). This result indicated that as personal computer use increased, preference for telecommuting increased. The sex of the individual was the third item to enter ($F = 12.55$; Beta = -.16). This finding indicated that females were more likely to express a positive preference for telecommuting than their male counterparts. The fourth item to enter was the age of the respondent ($F = 12.55$; Beta = .11). This result indicated that as the age of the individual increased, preference for telecommuting decreased. The fifth and final item to enter the regression equation was the extent of visual interaction required by the job ($F = 4.98$) with a negative Beta of -.09. As with the military group, this Beta

weight indicated that as the perceived amount of visual interaction required by the job decreased, preference for telecommuting increased.

From the stepwise regression analysis for both groups, it is evident that the military and civilian groups differ. Although some predictors were similar for both groups, this analysis revealed some differences between the groups with respect to predictors for preference for telecommuting.

Number of Days Preferred. In the military group, 28.5% indicated they did not want to work at home any number of days, 52.0% chose 1-2 days per week, 13.6% preferred 3 days per week, 2.3% indicated a preference for 4 days per week, 3.2% chose 5 days per week, and .5% did not choose any response category.

For the civilian group, 18.9% did not want to work at home any number of days, 41.6% chose 1-2 days per week, 25.2% preferred 3 days per week, 5.8% indicated a preference for 4 days per week, and 8.5% chose 5 days per week.

While the most frequently chosen response for both groups was the 1-2 day category, civilians preferred 3, 4, or 5 days more often than the military. The civilian group mean of 1.43 indicated that group would choose to telecommute significantly more often than the military.

Job Compatibility. For the military group, 16.3% considered their job unsuitable for telecommuting, 48.4% indicated that one fourth of their job could be accomplished

via telecommuting, 23.5% thought one fourth to one half of their job was compatible, and 11.8% considered more than half of their job suitable for telecommuting. In the civilian group, 14.2% considered their job unsuitable for telecommuting while 34.5% indicated that one fourth of their job could be accomplished via telecommuting. An additional 26.6% thought that one fourth to one half of their job was compatible, and 24% considered that more than half of their job was suitable for telecommuting.

Most respondents reported that some portion of their job could be accomplished by telecommuting. The higher group mean for civilians indicated they believed a greater portion of their job was suitable for telecommuting.

Capability to Supervise Telecommuters. For the military group, 38.5% agreed it was possible to supervise telecommuters, 19.9% neither agreed nor disagreed, and 41.7% disagreed with the premise that telecommuters could be adequately supervised. For the civilian group, 46.1% agreed it was possible to supervise telecommuters, 24.7% neither agreed nor disagreed, and 39.4% disagreed with the premise that telecommuters could be adequately supervised.

Although the most frequently chosen civilian response indicated they believed telecommuters could be adequately supervised while the most frequently chosen military response indicated that the military respondents disagreed with this item, the group means were not significantly different with $p < .05$.

Applicability to Military Officers. For the military group, 43.0% agreed that telecommuting could be used as an altered work schedule for military officers, 18.1% neither agreed nor disagreed, and 48.5% disagreed. For the civilian group, 37.3% agreed that telecommuting could be used as an altered work schedule for military officers, 35.9% neither agreed nor disagreed, and 26.9% disagreed. There was no significant differences between the group means.

Applicability to Civilians. For the military group, 37.5% agreed that telecommuting could be used as an altered work schedule for civilians, 24.4% neither agreed nor disagreed, and 37.1% disagreed. For the civilian group, 57.2% agreed that telecommuting could be used as an altered work schedule for civilians, 23.0% neither agreed nor disagreed, and 29.7% disagreed.

The military group mean of 2.06 indicated basically a neutral position on this item. The civilian group mean of 1.58 indicated more willingness to consider telecommuting applicable for civil service employees.

Desirability of a Test Program. For the military, 57.5% expressed a desire for a test program, 18.6% indicated no preference, and 24.0% did not want a test program conducted. For the civilians, 65.7% expressed a desire for a test program, 20.5% indicated no preference, 12.9% did not want a test program conducted, and .8% did not choose any

response category.

Although both groups agreed they would like AFLC to conduct a test program, the civilian group mean indicated a greater desire for such a program than the military.

Research Question 2

Research question 2 asked, "What are the opinions and perceptions of both military officers and civil service employees regarding the effects of telecommuting on productivity?" Four survey items addressed different aspects of productivity. Frequency distributions for these items are contained in Appendix F. Table 7 provides group means and

Table 7
Comparison of Group Means for
Measures of Productivity

Item	Group	n	Mean	d.f.	t Value
Impact on Work Quantity	Military	219	1.97	581	-2.52*
	Civilian	362	1.71		
Impact on Co-Worker Work Quantity	Military	219	2.06	581	-2.08
	Civilian	364	1.85		
Impact on Sick Leave Use	Military	220	2.27	582	2.59*
	Civilian	364	2.43		
Impact on Work Quality	Military	220	1.92	582	-2.54*
	Civilian	364	1.71		

Note: The n represents the number of respondents who chose to answer a question.

* $p < .05$

t-test results for AFLC military and civilian personnel on items measuring the perceived impact of telecommuting on work quantity, co-worker work quantity, sick leave use, and work quality.

Impact on Work Quantity. For the military group, 41.1% believed telecommuting would result in an increase in their work quantity, 24.9% expected no change, 32.2% believed work quantity would decrease, and .9% did not choose any response category. For the civilian group, 46.1% believed telecommuting would result in an increase in their work quantity, 32.9% expected no change, 20.8% believed work quantity would decrease. Although both groups expected telecommuting to create an increase in work quantity produced, the civilian mean of 1.71 indicated a greater expected increase.

Impact on Co-Workers' Work Quantity. For the military group, 38.0% thought telecommuting would result in an increase in the work quantity produced by co-workers, 27.1% expected no change, 33.9% believed telecommuting would result in a decrease, and .9% did not choose any response category. For the civilian group, 42.8% thought telecommuting would result in an increase in the work quantity produced by co-workers, 30.7% expected no change, 26.3% believed telecommuting would result in a decrease, and .3% did not choose any response category.

While the military and civilian group means were not significantly different, both were indicative of a percep-

tion of no expected change. Interestingly, it appears that while both the military and civilian groups perceive that their own work quantity might increase as a result of telecommuting, they expected the productivity of their co-workers to be unaffected by telecommuting.

Impact on Sick Leave Use. For the military group, .9% indicated that telecommuting would increase the amount of sick leave used, 77.8% expected no change, 20.8% believed a decrease would occur, and .5% did not choose any response category. For the civilian group, 5.2% indicated that telecommuting would increase the amount of sick leave used, 55.9% expected no change, 38.6% believed a decrease would occur, and .3% did not choose any response category.

As indicated in Table 7, there was a significant difference between the two group means. Although both groups expected no change to occur, the larger civilian mean indicated some anticipation of sick leave reduction. Because military personnel are not charged for sick leave absence while civilians are, this item may not convey a true picture of the relationship between sick leave use and telecommuting for the military.

Impact on Work Quality. For the military group, 33.4% believed telecommuting would result in an increase in their work quality, 44.3% expected no change, 32.7% thought a decrease in work quality would occur, and .5% did not choose any response category. For the civilian group, 37.3% be-

lieved telecommuting would result in an increase in their work quality, 50.7% expected no change, 11.8% thought a decrease in work quality would occur, and .3% did not choose any response category. The group means for this item were almost identical to the group means on the impact of work quantity. Both groups expected telecommuting to create an increase in their work quality; however, the civilian mean of 1.71 indicated a significantly greater expected increase in the quality of work produced.

Research Question 3

Research question 3 asked, "What do both groups perceive as advantages and disadvantages of telecommuting?" Two survey items addressed this question.

Impact on Personal Life. For the military group, 22.6% indicated that telecommuting would increase personal problems, 39.8% expected no change, 37.1% thought personal problems would decrease, and .5% did not choose any response category. For the civilian group, 19.2% indicated that telecommuting would increase personal problems, 41.6% expected no change, and 39.2% thought personal problems would decrease.

The military group mean was 2.13, and the civilian group mean was 2.25. The group means were not significantly different with $p < .05$. Both groups basically indicated that telecommuting would produce neither an increase nor a decrease in personal problems.

Anticipated Hindrances. This was the only item in the survey that permitted the respondent to make multiple responses. Table 8 provides a simple frequency distribution of the number of responses in each category by group.

Table 8
Sources of
Anticipated Hindrances

Response Category	Military Group		Civilian Group	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
None Expected	91	29.9	222	50.9
Family, Relatives	70	23.0	93	21.4
Friends, Neighbors	38	12.5	28	6.4
Household Chores	92	30.3	79	18.1
Other	13	4.3	14	3.2
Totals	304	100.0	436	100.0

For the military group, 58 out of 221 respondents gave two or more answers for this item. Only 51 out of 365 civilian respondents gave two or more answers. For the civil service group, approximately 51% of the sample did not expect any hindrances to degrade their job performance. On the other hand, 30.3% of the military group expected household chores to degrade job performance.

V. Conclusions and Recommendations

Introduction

The purpose of this research study was to investigate the attitudes held by military officers and civil service employees concerning the use of telecommuting as an acceptable altered work pattern in a DOD environment. To accomplish this goal, objectives were established, research questions posed, a sample population selected, opinion surveys developed, and survey data analyzed.

This section presents conclusions drawn from the analysis of survey data, suggests possible directions for future research efforts, and offers recommendations concerning the use of telecommuting in a DOD environment. Conclusions are presented as they relate to the objectives of this study.

Conclusions

Objective One. The first objective was to assess the potential acceptance of telecommuting in the AFLC work environment. Based on the seven measures of acceptability presented in the results section of this study and on the differences between the military and civilian groups on five of the seven measures, it appears that civilian employees generally have a more favorable opinion concerning telecommuting as an acceptable altered workstyle than the military. Although the military group did not reject out-

right telecommuting as an acceptable altered workstyle, they did provide more cautious opinions. One possible explanation for the difference in attitudes between the military and civilian groups may be due to the all encompassing nature of military service. Almost all military members are considered either "on the job", "on call", or "on duty" for 24 hours a day, 7 days a week. This same concept does not generally apply to civil service employment.

Another possible explanation for the difference between the groups might be some of the distinctive characteristics of military service. Few occupations require their members to change jobs and locations as often as the military. For example, over a 20 year career, a military officer might anticipate seven or more relocations. Such frequent moves are not normally experienced by most civil service employees. When moving into a new job position, both military and civil service managers are cautioned not to make radical organizational changes immediately. Because civilians generally remain in a management position for longer periods of time, they have more opportunities to initiate and follow through to completion organizational changes they began. In addition, differences exist in the promotion systems for military officers and civilian employees. Because a longer period of performance time is considered for military promotions, the consequences of a poor management decision could more adversely impact the career of the military mem-

ber for a greater period of time. Hence, their greater caution in advocating new and innovative management programs. These are examples of some of the factors that might influence military officers toward a more conservative approach concerning new management ideas such as telecommuting.

Despite speculation on the causes of these different points of view, it appears that both groups tempered their opinions with some degree of reservation on all seven measures of the desirability of telecommuting. For example, while expressing a preference for working at home via telecommuting, both groups indicated a time preference of 1-2 days per week and considered only 30% of their job compatible with telecommuting. Neither group appeared to be certain regarding their ability to adequately supervise telecommuters or the applicability of telecommuting for military officers. While the military group expressed essentially a neutral opinion on the applicability of telecommuting to civil service employees, the civilian respondents expressed generally a positive opinion. Both groups, however, favored a telecommuting test program.

Objective Two. The second objective of this study was to identify the perceived effects of telecommuting on employee productivity. Based on the four aspects of productivity measured by the survey questionnaire, the civilian group generally expected a greater increase in productivity

than the military. Both groups, however, believed that telecommuting would tend to increase productivity for the specific aspects measured.

As previously stated, it appears that the military reflected somewhat more cautious opinions. Interestingly, both groups appeared to believe that their own work quantity would increase while the productivity of their co-workers would remain unchanged. It should be noted here that the results regarding sick leave use may not be valid for the military group. Civilians are charged for absences related to sickness while the military members are not.

The literature review of selected AWP's would appear to support the findings of expected productivity increases. Although many authors (ALMSA Report, 1983; "It's Rush Hour," 1984; McCarthy & Rosenberg, 1981; Nollen & Martin, 1978; Ronen & Primps, 1980; "Telecommuting: The State," 1984) cite productivity increases as an organizational benefit associated with specific AWP's, some conflicting reports were also found (Cohen & Gaden, 1978; Ronen & Primps, 1981). These mixed study results indicate that the issue of productivity gains as a valid organizational benefit of AWP's is still open to interpretation and question.

Objective Three. The third objective was to ascertain the advantages and disadvantages of telecommuting as viewed by AFLC employees. Based on the perceived impact on personal life and anticipated sources of hindrances, the

results are mixed. No general conclusion may be drawn. Both groups indicated that telecommuting would not affect their personal lives either positively or negatively. However, 30.3% of the military group tended to think that household chores might affect their job performance. On the other hand, 51.0% of the civilians did not think that home influences would affect their job performance. One probable explanation of the mixed results is that the two items used to measure the advantages and disadvantages of telecommuting were inappropriate and too narrow in scope.

Future Research Efforts

There is little literature available concerning telecommuting in a DOD environment. Research possibilities are endless. Some suggested areas for future study are: the identification of career fields and specific types of jobs that are most suitable for telecommuting; development of criteria and work standards for telecommuters; creation of standardized measures of productivity for experimental telecommuting studies; formation of supervisory techniques applicable to telecommuters; and, development of procedures to insure security of classified information.

Recommendations

It is possible that jobs associated with work performed at AFLC Air Logistics Centers (ALCs) could more easily be accomplished via telecommuting than the jobs performed at

the headquarters level. An investigation of the potential applicability of telecommuting at ALCs should be conducted. This recommendation could be implemented through a research study using surveys and structured interviews with managers at a selected ALC.

After further study of the areas suggested for future research efforts and an investigation into the applicability of telecommuting to ALCs, a small experimental telecommuting program could be conducted with civil service employees. There are, however, at least five major steps that must be taken prior to the implementation of any test program. Failure to accomplish these steps will most likely result in a test program failure.

Union Involvement. Union officials should be consulted and included as part of the task group designing a test program. Without union support and participation, implementation of a trial telecommuting program will probably not occur.

Key Issues. Major issues must be researched, resolved, and documented. Some major issues found by the literature review include: public perception of fraud/abuse by government personnel; risk assessment of the potential for fraud and abuse; security of classified data; liability for loss or damage to government property; work related injuries; supervisory controls; and, well defined performance measures.

Job Compatibility. Determine which career fields and jobs are best suited for telecommuting. Select an organization where telecommuting would be supported by employees, first line supervisors, and upper levels of management.

Design Test. Ideally, an experimental and control group test design would be used which provides for pre and post test measures. Clear and understandable measures are required to evaluate the advantages and disadvantages produced by telecommuting.

Individual Selection. Voluntary participation in a telecommuting test program must be one of the first requirements. In addition, personnel selected from volunteers should be individuals who are disciplined, self motivated and who have a proven performance record.

Study Limitations

This study was conducted to investigate some basic opinions and perceptions of military officers and comparable civil service employees concerning telecommuting as an acceptable AWP in the AFLC work environment at Wright-Patterson AFB, OH. Results and conclusions were based on brief and tentative data. Although statistically significant differences were found between the military and the civilian groups on many measures contained in the survey, single item measures are usually unreliable. Also, the study was descriptive and cause and effect relationships may not be inferred.

Due to the various study limitations described above and the unknown likelihood of potential study confounds, extreme caution must be exercised in generalizing the results beyond the sample studied. To determine the actual reliability of the results and conclusions contained in this study, replication of these results is required.

Appendix A: USAF/MPC Approval Letter



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE MANPOWER AND PERSONNEL CENTER
RANDOLPH AIR FORCE BASE TX 78150

17 APR 1984

REF: TO
ATTN: MPCYPS

SUBJECT: Request for Survey Approval

TO: AFIT/LS

1. Mrs Carole Smith's survey has been reviewed by our office and has been approved for administration to military personnel only, contingent upon these changes being made:

- a. The Privacy Act Statement is not necessary. Please delete.
- b. Question 7, add e. Do not own a computer.
- c. Question 8, change response c to "c. Don't know/Undecided" and delete d.
- d. Question 11, change stem to read: "Are you permitted...your job?"

Also change responses to read:

- a. All the time
- b. Most of the time
- c. Some of the time
- d. Seldom
- e. Never

e. Question 12, change stem to read: "Does your job...and talents?"
Use the same response options as Question 11.

f. Question 13, change stem to read: "Is your job...and measurable?"
Use the same response options as Question 11.

g. Question 14, change stem to read: "Does your...other people?"
Use the same response options as Question 11.

h. Question 15, change stem to read: "Does your...contact?"
Use the same response options as Question 11.

i. Questions 16 and 26-29, change c response to "Neither agree or disagree."

2. A survey control number of USAF SCN 84-32A is assigned to the military instrument. After you have accomplished HQ AFMPC coordination for the civilian form, please advise our office and with the revisions herein, that instrument will be assigned a control number.

Enclosure to the Mission Enclosure to the Target

3. If you have any further questions concerning this survey, please direct your inquiries to Mr Robert E. Tetreault, phone (512)650-5742.

FOR THE COMMANDER


JOHN A. BALLARD, Maj, USAF
Acting Chief, Research &
Measurement Division

Appendix B: Military Survey Package



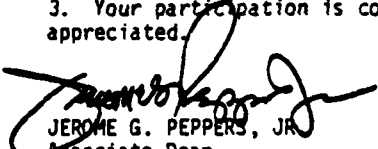
DEPARTMENT OF THE AIR FORCE
AIR FORCE INSTITUTE OF TECHNOLOGY (AFIT)
WRIGHT-PATTERSON AIR FORCE BASE, OH 45433

REPLY TO: LS (C.H. Smith, 5-4437)
ATTN OF:
SUBJECT: Telecommuting Opinion Survey

1 JUN 1984

TO: AFLC Employee

1. Please take the time to complete the attached questionnaire and return it in the enclosed envelope within 10 days of receipt.
2. You are one of a group of Air Force Logistics Command (AFLC) military officers at Wright-Patterson AFB, Ohio who have been selected to participate in a survey examining the feasibility of telecommuting in the AFLC work environment. A description of telecommuting is attached to help familiarize you with the concept and aid you in answering the attached questionnaire. The data gathered will become part of an AFIT research project and may influence future work schedules. Your individual response will be combined with others and will not be attributed to you personally.
3. Your participation is completely voluntary and will be greatly appreciated.


JEROME G. PEPPERS, JR.
Associate Dean
School of Systems and Logistics

- 3 Atch
1. Questionnaire
 2. Response Form
 3. Return Envelope

USAF Survey Control No. 84-32A

AIR FORCE - A GREAT WAY OF LIFE

GENERAL INFORMATION

Principal Purpose. This survey is being conducted to collect information to be used in research aimed at illuminating and providing inputs to the solution of problems of interest to the Air Force and/or DOD. USAF Survey Control No. 84-32A has been assigned for this project.

Routine Uses. The survey data will be converted to information for use in research of management related problems. Results of the research, based on data provided, will be included in written master's thesis and may also be included in published articles, reports, or texts. Distribution of the results of the research, based on the survey data, whether in written form or presented orally, will be unlimited,

Participation. Participation in this survey is entirely voluntary. No adverse action of any kind may be taken against any individual who elects not to participate in any or all of this survey.

INSTRUCTIONS

This survey contains 29 questions about telecommuting. A brief description of telecommuting and related terms has been provided to aid you in completing the questionnaire. It is very important that you answer each question and fill in your response ON THE ANSWER SHEET provided. This is not a test and there are no right or wrong answers. If for any item you do not find a response that fits your situation exactly, please use the one that is the closest to the way you feel.

This survey is designed for automatic scanning of your responses. You answer each question by marking the appropriate space on the answer sheet, as in this example.

Example: Question or statement found in the survey.

81. It always rains in Dayton, Ohio :

- | | |
|-------------------|----------------------|
| a. Strongly agree | d. Disagree |
| b. Agree | e. Strongly disagree |
| c. No opinion | |

Answer Sheet

81. ☐ ^a ☐ ^b ☒ ^c ☐ ^d ☐ ^e

Please use a "soft-lead" pencil (No. 2), and observe these important requirements:

1. Make heavy black marks that fill in the entire space.
2. Erase cleanly any response you wish to change.
3. Make no stray pencil markings of any kind.
4. Do not staple, fold, or tear the answer sheet.
5. Do not provide your name on the answer sheet or survey.

When you are finished, please return the survey and the answer sheet in the enclosed envelope. Thank you for your cooperation.

TELECOMMUTING OPINION SURVEY

Definition of Terms

Standard workweek

Americans generally describe a normal or standard workweek as any daily eight hour period for five days a week. This definition includes shift work as a standard work form. However, a more precise definition of a standard workweek is a work environment consisting of an eight or nine-to-five daily time period for five consecutive days with employees commuting daily to office or production locations.

Altered Work Schedule

An altered work schedule is any work form that deviates from the standard workweek in time or location. The most well known and frequently used altered work schedule is flexitime.

Telecommuting

Telecommuting can be defined as an altered work schedule where employees work at home with electronically transferred information using a personal computer or remote terminal with a telephone link to a central office location. It is a decentralized work concept which furnishes information to employees at home rather than a centralized work concept in which large numbers of employees travel daily to information based work offices. Depending on organizational and employee needs, a worker may telecommute from one to five days a week.

PART I

BACKGROUND INFORMATION

This section of the survey contains several items dealing with personal characteristics. This information will be used to obtain an idea of the background of a "typical military officer".

1. Your current rank is:

- | | |
|------------|---------------------------|
| a. 2nd Lt | d. Major |
| b. 1st Lt | e. Lt. Colonel or Colonel |
| c. Captain | |

2. Your age is:

- | | |
|------------------|----------------|
| a. 25 or younger | d. 46-55 |
| b. 26-35 | e. 56 or older |
| c. 36-45 | |

3. Your sex is:

- | | |
|---------|-----------|
| a. Male | b. Female |
|---------|-----------|

4. Your marital status is:

- | | |
|------------|----------------|
| a. Married | b. Not married |
|------------|----------------|

5. Your highest educational level obtained was:

- | | |
|-----------------------------|-----------------------------|
| a. Non high school graduate | d. College graduate |
| b. High school graduate | e. Masters degree or higher |
| c. Some college work | |

6. Do you own a personal computer?

- | | |
|--------|-------|
| a. Yes | b. No |
|--------|-------|

7. If you own a personal computer, how much do you use it?

- | | |
|-----------------|--------------------------|
| a. A great deal | d. Not at all |
| b. Some | e. Do not own a computer |
| c. Very little | |

8. Do you plan to buy a personal computer?

- | | |
|--------|-------------------------|
| a. Yes | c. Don't know/Undecided |
| b. No | |

PART II

JOB CHARACTERISTICS

This section of the questionnaire asks you to describe your job as objectively as you can.

9. My general area of work is:
- a. Logistics (includes Supply, Maintenance, Transportation and Contracting)
 - b. Automated Data Processing, Computer Programming, or Computer Specialist
 - c. Finance, Personnel, or Administration
 - d. Engineering
 - e. Other (Please specify) _____
10. How many people do you directly supervise? That is, those for whom you write performance reports.
- a. None
 - b. 1-5
 - c. 6-10
 - d. 11-15
 - e. 16 or more
11. Are you permitted to decide on your own how to go about doing your job?
- a. All the time
 - b. Most of the time
 - c. Some of the time
 - d. Seldom
 - e. Never
12. Does your job require you to do many different things at work, using a variety of your skills and talents?
- a. All the time
 - b. Most of the time
 - c. Some of the time
 - d. Seldom
 - e. Never
13. Is your job quantifiable and measureable?
- a. All the time
 - b. Most of the time
 - c. Some of the time
 - d. Seldom
 - e. Never
14. Does your job require you to contact, cooperate, and/or coordinate with other people?
- a. All the time
 - b. Most of the time
 - c. Some of the time
 - d. Seldom
 - e. Never
15. Does your job require face to face contact with people rather than telephone contact?
- a. All the time
 - b. Most of the time
 - c. Some of the time
 - d. Seldom
 - e. Never

PART III

OPINIONS ABOUT TELECOMMUTING

Please review the definition of telecommuting before completing this section.

16. I would enjoy working at home by telecommuting.
- a. Strongly agree
 - b. Agree
 - c. Neither agree or disagree
 - d. Disagree
 - e. Strongly disagree
17. If you telecommuted, how many days would you prefer to work at home?
- a. None at all
 - b. 1-2
 - c. 3
 - d. 4
 - e. 5
18. What percentage of your job do you believe could be done by telecommuting?
- a. None
 - b. 25% or less
 - c. 26-50%
 - d. 51-75%
 - e. 76-100%
19. How do you believe telecommuting would affect the amount of work you could do?
- a. Greatly increase
 - b. Slightly increase
 - c. No change
 - d. Slightly decrease
 - e. Greatly decrease
20. To what degree do you believe telecommuting would affect the amount of work done by your co-workers?
- a. Greatly increase
 - b. Slightly increase
 - c. No change
 - d. Slightly decrease
 - e. Greatly decrease
21. How do you believe telecommuting would affect your sick leave?
- a. Greatly increase
 - b. Slightly increase
 - c. No change
 - d. Slightly decrease
 - e. Greatly decrease
22. To what degree do you believe telecommuting would affect the quality of work you do?
- a. Greatly increase
 - b. Slightly increase
 - c. No change
 - d. Slightly decrease
 - e. Greatly decrease

23. To what degree do you think telecommuting would affect the quality of work you do?
- a. Greatly increase
 - b. Slightly increase
 - c. No change
 - d. Slightly decrease
 - e. Greatly decrease
24. To what degree do you believe telecommuting would affect your personal life?
- a. Greatly increase problems
 - b. Slightly increase problems
 - c. Create no change
 - d. Slightly decrease problems
 - e. Greatly decrease problems
25. If you telecommuted, do you believe any of the following factors might hinder your job performance? (Choose as many as appropriate)
- a. No hindrance expected
 - b. Family or relatives
 - c. Friends or neighbors
 - d. Household chores
 - e. Other (Please specify) _____
26. I believe it is possible to adequately supervise telecommuting employees.
- a. Strongly agree
 - b. Agree
 - c. Neither agree or disagree
 - d. Disagree
 - e. Strongly disagree
27. I believe telecommuting could be used as an alternative work schedule for military officers assigned to AFLC.
- a. Strongly agree
 - b. Agree
 - c. Neither agree or disagree
 - d. Disagree
 - e. Strongly disagree
28. I believe telecommuting could be used as an alternative work schedule for civil service employees assigned to AFLC.
- a. Strongly agree
 - b. Agree
 - c. Neither agree or disagree
 - d. Disagree
 - e. Strongly disagree
29. I would like AFLC to conduct a test program with telecommuting.
- a. Strongly agree
 - b. Agree
 - c. Neither agree or disagree
 - d. Disagree
 - e. Strongly disagree

Please feel free to use the space provided below to comment on the advantages, disadvantages, problems, or other important aspects of telecommuting as it affects you and/or AFLC.

ADDITIONAL COMMENTS:

THANK YOU FOR YOUR COOPERATION

Appendix C: Civilian Survey Package



DEPARTMENT OF THE AIR FORCE
AIR FORCE INSTITUTE OF TECHNOLOGY (AFIT)
WRIGHT-PATTERSON AIR FORCE BASE, OH 45433

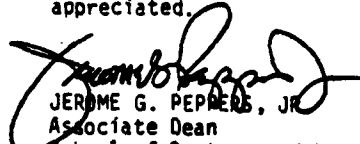
REPLY TO: LS (C.H. Smith, 5-4437)
ATTN OF:
SUBJECT: Telecommuting Opinion Survey
TO: AFLC Employee

1 JUN 1984

1. Please take the time to complete the attached questionnaire and return it in the enclosed envelope within 10 days of receipt.

2. You are one of a group of Air Force Logistics Command (AFLC) civil service employees at Wright-Patterson AFB, Ohio who have been selected to participate in a survey examining the feasibility of telecommuting in the AFLC work environment. A description of telecommuting is attached to help familiarize you with the concept and aid you in answering the attached questionnaire. The data gathered will become part of an AFIT research project and may influence future work schedules. Your individual response will be combined with others and will not be attributed to you personally.

3. Your participation is completely voluntary and will be greatly appreciated.


JEROME G. PEPPERS, JR.
Associate Dean
School of Systems and Logistics

3 Atch
1. Questionnaire
2. Response Form
3. Return Envelope

USAF Survey Control No. 84-32B

AIR FORCE - A GREAT WAY OF LIFE

GENERAL INFORMATION

Principal Purpose. This survey is being conducted to collect information to be used in research aimed at illuminating and providing inputs to the solution of problems of interest to the Air Force and/or DOD. USAF Survey Control No. 84-32B has been assigned for this project.

Routine Uses. The survey data will be converted to information for use in research of management related problems. Results of the research, based on data provided, will be included in written master's thesis and may also be included in published articles, reports, or texts. Distribution of the results of the research, based on the survey data, whether in written form or presented orally, will be unlimited.

Participation. Participation in this survey is entirely voluntary. No adverse action of any kind may be taken against any individual who elects not to participate in any or all of this survey.

INSTRUCTIONS

This survey contains 29 questions about telecommuting. A brief description of telecommuting and related terms has been provided to aid you in completing the questionnaire. It is very important that you answer each question and fill in your response ON THE ANSWER SHEET provided. This is not a test and there are no right or wrong answers. If for any item you do not find a response that fits your situation exactly, please use the one that is the closest to the way you feel.

This survey is designed for automatic scanning of your responses. You answer each question by marking the appropriate space on the answer sheet, as in this example.

Example: Question or statement found in the survey.

81. It always rains in Dayton, Ohio :

- | | |
|-------------------|----------------------|
| a. Strongly agree | d. Disagree |
| b. Agree | e. Strongly disagree |
| c. No opinion | |

Answer Sheet

81. ☐ ^a ☐ ^b ☒ ^c ☐ ^d ☐ ^e

Please use a "soft-lead" pencil (No. 2), and observe these important requirements:

1. Make heavy black marks that fill in the entire space.
2. Erase cleanly any response you wish to change.
3. Make no stray pencil markings of any kind.
4. Do not staple, fold, or tear the answer sheet.
5. Do not provide your name on the answer sheet or survey.

When you are finished, please return the survey and the answer sheet in the enclosed envelope. Thank you for your cooperation.

TELECOMMUTING OPINION SURVEY

Definition of Terms

Standard workweek

Americans generally describe a normal or standard workweek as any daily eight hour period for five days a week. This definition includes shift work as a standard work form. However, a more precise definition of a standard workweek is a work environment consisting of an eight or nine-to-five daily time period for five consecutive days with employees commuting daily to office or production locations.

Altered Work Schedule

An altered work schedule is any work form that deviates from the standard workweek in time or location. The most well known and frequently used altered work schedule is flexitime.

Telecommuting

Telecommuting can be defined as an altered work schedule where employees work at home with electronically transferred information using a personal computer or remote terminal with a telephone link to a central office location. It is a decentralized work concept which furnishes information to employees at home rather than a centralized work concept in which large numbers of employees travel daily to information based work offices. Depending on organizational and employee needs, a worker may telecommute from one to five days a week.

PART I**BACKGROUND INFORMATION**

This section of the survey contains several items dealing with personal characteristics. This information will be used to obtain an idea of the background of a "typical civil service employee".

1. Your current grade is:

- | | |
|---------------------|-------------------|
| a. GS-7 thru GS-9 | d. GS-13 or GM-13 |
| b. GS-10 thru GS-11 | e. GS-14 or GM-14 |
| c. GS-12 | |

2. Your age is:

- | | |
|------------------|----------------|
| a. 25 or younger | d. 46-55 |
| b. 26-35 | e. 56 or older |
| c. 36-45 | |

3. Your sex is:

- | | |
|---------|-----------|
| a. Male | b. Female |
|---------|-----------|

4. Your martial status is:

- | | |
|------------|----------------|
| a. Married | b. Not married |
|------------|----------------|

5. Your highest educational level obtained was:

- | | |
|-----------------------------|-----------------------------|
| a. Non high school graduate | d. College graduate |
| b. High school graduate | e. Masters degree or higher |
| c. Some college work | |

6. Do you own a personal computer?

- | | |
|--------|-------|
| a. Yes | b. No |
|--------|-------|

7. If you own a personal computer, how much do you use it?

- | | |
|-----------------|--------------------------|
| a. A great deal | d. Not at all |
| b. Some | e. Do not own a computer |
| c. Very little | |

8. Do you plan to buy a personal computer?

- | | |
|--------|-------------------------|
| a. Yes | c. Don't know/Undecided |
| b. No | |

PART II

JOB CHARACTERISTICS

This section of the questionnaire asks you to describe your job as objectively as you can.

9. My general area of work is:
- a. Logistics (includes Supply, Maintenance, Transportation and Contracting)
 - b. Automated Data Processing, Computer Programming, or Computer Specialist
 - c. Finance, Personnel, or Administration
 - d. Engineering
 - e. Other (Please specify) _____
10. How many people do you directly supervise? That is, those for whom you write performance reports.
- a. None
 - b. 1-5
 - c. 6-10
 - d. 11-15
 - e. 16 or more
11. Are you permitted to decide on your own how to go about doing your job?
- a. All the time
 - b. Most of the time
 - c. Some of the time
 - d. Seldom
 - e. Never
12. Does your job require you to do many different things at work, using a variety of your skills and talents?
- a. All the time
 - b. Most of the time
 - c. Some of the time
 - d. Seldom
 - e. Never
13. Is your job quantifiable and measureable?
- a. All the time
 - b. Most of the time
 - c. Some of the time
 - d. Seldom
 - e. Never
14. Does your job require you to contact, cooperate, and/or coordinate with other people?
- a. All the time
 - b. Most of the time
 - c. Some of the time
 - d. Seldom
 - e. Never
15. Does your job require face to face contact with people rather than telephone contact?
- a. All the time
 - b. Most of the time
 - c. Some of the time
 - d. Seldom
 - e. Never

PART III

OPINIONS ABOUT TELECOMMUTING

Please review the definition of telecommuting before completing this section.

16. I would enjoy working at home by telecommuting.
- a. Strongly agree
 - b. Agree
 - c. Neither agree or disagree
 - d. Disagree
 - e. Strongly disagree
17. If you telecommuted, how many days would you prefer to work at home?
- a. None at all
 - b. 1-2
 - c. 3
 - d. 4
 - e. 5
18. What percentage of your job do you believe could be done by telecommuting?
- a. None
 - b. 25% or less
 - c. 26-50%
 - d. 51-75%
 - e. 76-100%
19. How do you believe telecommuting would affect the amount of work you could do?
- a. Greatly increase
 - b. Slightly increase
 - c. No change
 - d. Slightly decrease
 - e. Greatly decrease
20. To what degree do you believe telecommuting would affect the amount of work done by your co-workers?
- a. Greatly increase
 - b. Slightly increase
 - c. No change
 - d. Slightly decrease
 - e. Greatly decrease
21. How do you believe telecommuting would affect your sick leave?
- a. Greatly increase
 - b. Slightly increase
 - c. No change
 - d. Slightly decrease
 - e. Greatly decrease
22. To what degree do you believe telecommuting would affect the quality of work you do?
- a. Greatly increase
 - b. Slightly increase
 - c. No change
 - d. Slightly decrease
 - e. Greatly decrease

23. To what degree do you think telecommuting would affect the quality of work you do?
- a. Greatly increase
 - b. Slightly increase
 - c. No change
 - d. Slightly decrease
 - e. Greatly decrease
24. To what degree do you believe telecommuting would affect your personal life?
- a. Greatly increase problems
 - b. Slightly increase problems
 - c. Create no change
 - d. Slightly decrease problems
 - e. Greatly decrease problems
25. If you telecommuted, do you believe any of the following factors might hinder your job performance? (Choose as many as appropriate)
- a. No hindrance expected
 - b. Family or relatives
 - c. Friends or neighbors
 - d. Household chores
 - e. Other (Please specify) _____
26. I believe it is possible to adequately supervise telecommuting employees.
- a. Strongly agree
 - b. Agree
 - c. Neither agree or disagree
 - d. Disagree
 - e. Strongly disagree
27. I believe telecommuting could be used as an alternative work schedule for military officers assigned to AFLC.
- a. Strongly agree
 - b. Agree
 - c. Neither agree or disagree
 - d. Disagree
 - e. Strongly disagree
28. I believe telecommuting could be used as an alternative work schedule for civil service employees assigned to AFLC.
- a. Strongly agree
 - b. Agree
 - c. Neither agree or disagree
 - d. Disagree
 - e. Strongly disagree
29. I would like AFLC to conduct a test program with telecommuting.
- a. Strongly agree
 - b. Agree
 - c. Neither agree or disagree
 - d. Disagree
 - e. Strongly disagree

Please feel free to use the space provided below to comment on the advantages, disadvantages, problems, or other important aspects of telecommuting as it affects you and/or AFLC.

ADDITIONAL COMMENTS:

THANK YOU FOR YOUR COOPERATION

Appendix D: Part I and II Frequency Distributions

Rank or Grade

Response Category	<u>Military</u>		<u>Civilian</u>	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
2nd Lt. or GS-7, 8, 9	23	10.4	74	20.3
1st Lt. or GS-10,11	12	5.4	69	18.9
Captain or GS-12	71	32.2	135	37.0
Major or GS-13, GM-13	46	20.8	67	18.4
Lt. Col., Col. or GS-14, GM-14	69	31.2	20	5.5
Total	221	100.0	365	100.0

Age

Response Category	<u>Military</u>		<u>Civilian</u>	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
25 or younger	24	10.9	10	2.7
26-35	77	34.8	76	20.8
36-45	87	39.4	110	30.1
46-55	33	14.9	135	37.0
56 or older	0	0.0	34	9.3
Total	221	100.0	365	100.0

AD-A147 221

TELECOMMUTING: AN ALTERED WORK PATTERN(U) AIR FORCE
INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF SYSTEMS
AND LOGISTICS C H SMITH SEP 84 AFIT/GLM/LSM/845-59

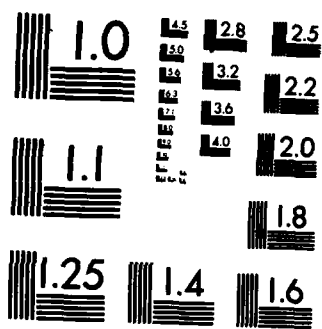
2/2

UNCLASSIFIED

F/G 17/2

NL





Sex

Response Category	<u>Military</u>		<u>Civilian</u>	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
Male	195	88.2	256	70.1
Female	26	11.8	109	29.9
Total	221	100.0	365	100.0

Marital Status

Response Category	<u>Military</u>		<u>Civilian</u>	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
Married	186	84.2	272	74.5
Not Married	35	15.9	93	25.5
Total	221	100.0	365	100.0

Educational Level

Response Category	<u>Military</u>		<u>Civilian</u>	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
Non HS Graduate	1	0.5	4	1.1
HS Graduate	1	0.5	44	12.1
Some College	1	0.5	124	34.0
College Graduate	77	34.8	125	34.2
Masters or Higher	141	63.8	68	18.6
Total	221	100.0	365	100.0

Computer Ownership

Response Category	<u>Military</u>		<u>Civilian</u>	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
Yes	75	33.9	75	20.5
No	<u>146</u>	<u>66.1</u>	<u>290</u>	<u>79.5</u>
Total	221	100.0	365	100.0

Personal Computer Use

Response Category	<u>Military</u>		<u>Civilian</u>	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
A Great Deal	26	11.8	10	2.7
Some	29	13.1	38	10.4
Very Little	17	7.7	25	6.8
Not At All	4	1.8	4	1.1
Do Not Own A Computer	137	62.0	276	75.6
Out of Range	<u>8</u>	<u>3.6</u>	<u>12</u>	<u>3.3</u>
Total	221	100.0	365	100.0

Plan To Buy Computer

Response Category	<u>Military</u>		<u>Civilian</u>	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
Yes	91	41.2	119	32.6
No	45	20.4	112	30.7
Undecided	69	31.2	115	31.5
Out of Range	<u>16</u>	<u>7.3</u>	<u>19</u>	<u>5.2</u>
Total	221	100.0	365	100.0

Functional Work Area

Response Category	<u>Military</u>		<u>Civilian</u>	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
Logistics (Supply, Maintenance, Transportation, and Contracting	109	49.3	160	43.8
ADP, Programmer, or Computer Specialist	7	3.2	94	25.8
Finance, Personnel, or Administration	25	11.3	59	16.2
Engineering	28	12.7	22	6.0
Other	49	22.2	29	7.9
Out of Range	<u>3</u>	<u>1.4</u>	<u>1</u>	<u>0.3</u>
Total	221	100.0	365	100.0

Number of Personnel Supervised

Response Category	<u>Military</u>		<u>Civilian</u>	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
None	107	48.4	291	79.7
1 to 5	58	26.2	24	6.6
6 to 10	34	15.4	31	8.5
11 to 15	9	4.1	10	2.7
16 or More	13	5.9	9	2.5
Total	221	100.0	365	100.0

Amount of Job Discretion

Response Category	<u>Military</u>		<u>Civilian</u>	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
All the Time	51	23.1	84	23.0
Most of the Time	140	63.3	245	67.1
Some of the Time	38	12.7	34	9.3
Seldom	0	0.0	1	0.3
Never	2	0.9	1	0.3
Total	221	100.0	365	100.0

Range of Job Skills

Response Category	<u>Military</u>		<u>Civilian</u>	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
All the Time	91	41.2	95	26.0
Most of the Time	95	43.0	195	53.4
Some of the Time	29	13.1	69	18.9
Seldom	4	1.8	4	1.1
Never	2	0.9	2	0.5
Total	221	100.0	365	100.0

Job Measurability

Response Category	<u>Military</u>		<u>Civilian</u>	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
All the Time	8	3.6	22	6.0
Most of the Time	41	18.6	108	29.6
Some of the Time	94	42.5	140	38.4
Seldom	74	33.5	84	23.0
Never	4	1.8	11	3.0
Total	221	100.0	365	100.0

Extent of Interaction

Response Category	Military		Civilian	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
All the Time	129	58.4	159	43.6
Most of the Time	77	34.8	152	41.6
Some of the Time	15	6.8	50	13.7
Seldom	0	0.0	4	1.1
Never	0	0.0	0	0.0
Total	221	100.0	365	100.0

Extent of Visual Interaction

Response Category	Military		Civilian	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
All the Time	11	5.0	15	4.1
Most of the Time	67	30.3	85	23.3
Some of the Time	133	60.2	232	63.6
Seldom	10	4.5	31	8.5
Never	0	0.0	2	0.5
Total	221	100.0	365	100.0

**Appendix E: Frequency Distributions for
Measures of Acceptability**

Preference for Telecommuting

Response Category	<u>Military</u>		<u>Civilian</u>	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
Strongly Agree	45	20.4	106	20.0
Agree	63	28.5	116	31.8
Neither Agree or Disagree	50	22.6	76	20.8
Disagree	43	19.5	47	12.9
Strongly Disagree	<u>20</u>	<u>9.0</u>	<u>20</u>	<u>5.5</u>
Total	221	100.0	365	100.0

Number of Days Preferred

Response Category	<u>Military</u>		<u>Civilian</u>	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
None at All	63	28.5	69	18.9
1-2 Days	115	52.0	152	41.6
3 Days	30	13.6	92	25.2
4 Days	5	2.3	21	5.8
5 Days	7	3.2	31	8.5
No Response	<u>1</u>	<u>0.5</u>	<u>0</u>	<u>0.0</u>
Total	221	100.0	365	100.0

Percentage of Job Compatibility

Response Category	<u>Military</u>		<u>Civilian</u>	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
None	36	16.3	52	14.2
25 Percent or Less	107	48.4	126	34.5
26 to 50 Percent	52	23.5	97	26.6
51 to 75 Percent	22	10.0	68	18.6
76 to 100 Percent	<u>4</u>	<u>1.8</u>	<u>22</u>	<u>6.0</u>
Total	221	100.0	365	100.0

Capability to Supervise Telecommuters

Response Category	<u>Military</u>		<u>Civilian</u>	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
Strongly Agree	17	7.7	32	8.8
Agree	68	30.8	136	37.3
Neither Agree or Disagree	44	19.9	90	24.7
Disagree	68	30.8	67	18.4
Strongly Disagree	<u>24</u>	<u>10.9</u>	<u>40</u>	<u>11.0</u>
Total	221	100.0	365	100.0

Applicability of Telecommuting to Military

Response Category	Military		Civilian	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
Strongly Agree	26	11.8	23	6.3
Agree	71	32.1	113	31.0
Neither Agree or Disagree	40	18.1	131	35.9
Disagree	45	20.4	58	15.9
Strongly Disagree	39	17.6	40	11.0
Total	221	100.0	365	100.0

Applicability of Telecommuting to Civilian

Response Category	Military		Civilian	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
Strongly Agree	15	6.8	45	12.3
Agree	70	31.7	164	44.9
Neither Agree or Disagree	54	24.4	84	23.0
Disagree	50	22.6	41	11.2
Strongly Disagree	32	14.5	31	8.5
Total	221	100.0	365	100.0

Desirability of a Test Program

Response Category	<u>Military</u>		<u>Civilian</u>	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
Strongly Agree	47	21.3	99	27.1
Agree	80	36.2	141	38.6
Neither Agree or Disagree	41	18.6	75	20.5
Disagree	27	12.2	28	7.7
Strongly Disagree	26	11.8	19	5.2
No Response	<u>0</u>	<u>0.0</u>	<u>3</u>	<u>0.8</u>
Total	221	100.0	365	100.0

**Appendix F: Frequency Distributions for
Measures of Productivity**

Impact on Work Quantity

Response Category	<u>Military</u>		<u>Civilian</u>	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
Greatly Increase	27	12.2	51	14.0
Slightly Increase	66	29.9	117	32.1
No Change	55	24.9	120	32.9
Slightly Decrease	26	12.7	38	10.4
Greatly Decrease	43	19.5	38	10.4
No Response	<u>2</u>	<u>0.9</u>	<u>1</u>	<u>0.3</u>
Total	221	100.0	365	100.0

Impact on Co-Worker Work Quantity

Response Category	<u>Military</u>		<u>Civilian</u>	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
Greatly Increase	15	6.8	35	9.6
Slightly Increase	69	31.2	121	33.2
No Change	60	27.1	112	30.7
Slightly Decrease	36	16.3	53	14.5
Greatly Decrease	39	17.6	43	11.8
No Response	<u>2</u>	<u>0.9</u>	<u>1</u>	<u>0.3</u>
Total	221	100.0	365	100.0

Impact on Sick Leave Use

Response Category	Military		Civilian	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
Greatly Increase	0	0.0	8	2.2
Slightly Increase	2	0.9	11	3.0
No Change	172	77.8	204	55.9
Slightly Decrease	30	13.6	95	26.0
Greatly Decrease	16	7.2	46	12.6
No Response	<u>1</u>	<u>0.5</u>	<u>1</u>	<u>0.5</u>
Total	221	100.0	365	100.0

Impact on Work Quality

Response Category	Military		Civilian	
	Absolute Frequency	Relative Frequency (Percent)	Absolute Frequency	Relative Frequency (Percent)
Greatly Increase	18	8.1	31	8.5
Slightly Increase	56	25.3	105	28.8
No Change	98	44.3	185	50.7
Slightly Decrease	20	9.0	23	6.3
Greatly Decrease	28	12.7	20	5.5
No Response	<u>1</u>	<u>0.5</u>	<u>1</u>	<u>0.3</u>
Total	221	100.0	365	100.0

Bibliography

- A company that works at home. Business Week, January 26, 1981, pp. 98; 103.
- A job with a view. Forbes, September 12, 1983, pp. 143-146; 150.
- AFLC: The Commander's Perspective. Skywriter, January 13, 1984, pp. 2-5.
- Automated Logistics Management Systems Activity (ALMSA) Work-At-Home Prototype Study Results. Unpublished report and papers, U.S. Army Material Development and Readiness Command, St. Louis, MO., 1983.
- Barnes, K. 'So you want to work at home, eh?' Infosystems, April, 1983, pp. 90-92.
- Best, F. Exchanging Earnings for Leisure: Findings of an Explanatory National Survey on Work-Time Preference. Washington, D.C.: U.S. Department of Labor, Employment and Training Administration, 1980.
- Cheathan, C. B. New Workplace Techniques. The Woman CPA, 1983, 45, 3-5.
- Cohen, A. R., & Gadon, H. Alternative Work Schedules: Integrating Individual and Organizational Needs. Reading, MA.: Addison Wesley Publishing Company, 1978.
- Cross, W. The Four-Day Work Week is Coming Sooner Than You Think. Business Management, 1971, 40, 14-16.
- Finkle, A. L. Flexitime in Government. Public Personnel Management, 1979, 8, 152-155.
- Golembiewski, R. T., & Hilles, R. J. Drug company workers like new schedules. Monthly Labor Review, 1977, 100, 69-71.
- Golembiewski, R. T., Hilles, R. J., & Kagno, M. S. A longitudinal study of flexitime effects: Some Consequences of an OD structural intervention. Journal of Applied Behavioral Science, 1974, 4, 503-532.
- Hellriegel, D. The Four-Day Workweek: A Review and Assessment. MSU Business Topics, 1972, Spring, 30-48.

- Hicks, W. D., & Klimoske, R. J. The Impact of Flexitime on Employee Attitudes. Academy of Management Journal, 1981, 24, 333-341.
- Hine, W. H., & Clarke, H. F. An investigation into the Behavioral and Economic Aspects of the Four-Day, 40 Hour Workweek in AFLC AMA Maintenance Organizations. Master's Thesis, School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB, OH, 1972.
- If home is where the worker is. Business Week, May 3, 1983, pp. 66.
- It's Rush Hour for 'Telecommuting'. Business Week, January 23, 1984, pp. 99; 102.
- Kim, J. S., & Campagna, A. F. Effects of Flexitime on Employee Attendance and Performance: A Field Experiment. Academy of Management Journal, 1981, 24, 729-741.
- Kimzey, R. T., & Prince, S. M. Flexitime: A Modified Work Force Scheduling Technique For Selected Headquarters Air Force Logistics Command Organizations. Master's Thesis, School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson, AFB, OH., 1974.
- Mahoney, T. A., Newman, J. M., & Frost, P. J. Workers' perceptions of the four day week. California Management Review, 1975, 18, 31-35.
- McCarthy, M. E., & Rosenberg, G. S. Work Sharing Case Studies. Kalamazoo, Mi.: W. E. Upjohn Institute for Employment Research, 1979.
- Meir, G. Job Sharing: A New Pattern for Quality of Work and Life. Kalamazoo, Mi.: W. E. Upjohn Institute for Employment Research, 1979.
- Mueller, O., & Cole, M. Concept wins converts at federal agency. Monthly Labor Review, 1977, 100, 71-74.
- Newstrom, J. W., & Pierce, J. L. Alternative Work Schedules: the state of the art. The Personnel Administrator. 1979, October, 19-23.
- No Workplace Like Home. Wall Street Journal, February 23, 1984, pp. 26.
- Nollen, S. D., & Martin, V. H. Alternative Work Schedules Part 1: Flexitime. New York: AMACOM, 1978.

- Nollen, S. D., & Martin, V. H. Alternative Work Schedules Parts 2 and 3. New York: AMACOM, 1978.
- Olmsted, B. Job Sharing: an emerging work-style. International Labor Review, 1979, 118, 283-297.
- Olmsted, B. Changing Times: The use of reduced work time options is the United States. International Labor Review, 1983, 122, 479-492.
- Petersen, D. J. Flexitime in the United States: The Lessons of Experience. Personnel, 1980, January-February, 21-31.
- Ronen, S., & Primps, S. B. The Compressed Work Week as Organizational Change: Behavioral and Attitudinal Outcomes. Academy of Management Review, 1981, 6, 61-74.
- Ronen, S., & Primps, S. B. The Impact of Flexitime on Performance and Attitudes in 25 Public Agencies. Public Personnel Management Journal, 1980, 9, 201-207.
- Rosow, J. M., & Zager, R. Punch out the time clocks. Harvard Business Review, 1983, 61, 12-30.
- Schroeer, S. G. Alternate Workstyles: A solution to productivity problems? Supervisory Management, 1983, 28, 24-30.
- Smith, S., & Olmsted, B. Analyzing the Cost. San Francisco, Ca.: New Ways to Work, 1981.
- Telecommuting: The State of the Art and Market Trends. New York: Electronic Services Unlimited, 1984.
- Tele-Work-At-Home Trend Gaining. MIS Week, September 14, 1983.
- The potential for telecommuting. Business Week, January 26, 1981, pp. 94; 98.
- Wheat, R. A. The Federal Flexitime System: Comparison and Implementation. Public Personnel Management Journal, 1982, 2, 22-30.
- Work in America Institute, Inc. New Work Schedules for a Changing Society. Scarsdale, NY: Work in America Institute, 1981.
- Zippe, M. Roundup, Personnel, September-October, 1983, 45-51.

Vita

Ms. Carole H. Smith was born on 15 August 1943 in Memphis, Tennessee where she graduated from high school. She attended Memphis State University from which she received the degree of Bachelor of Music in May 1965. She received her commission in the USAF through Officers Training School in March 1967 and served until June 1969 as Administrative Officer of the 3346th Field Training Detachment Squadron, Chanute AFB, Illinois. She was transferred in July 1969 to Ramey AFB, Puerto Rico where she served as Assistant Chief of Base Administration and, Chief, Administrative Communications Branch. She requested and received an honorable discharge from the USAF in June 1971.

Ms. Smith began her civil service career in October 1977 as a three year Logistics Management trainee with the Air Force Acquisition Logistics Center, Wright-Patterson AFB, Ohio. She completed her training program in November 1980 and was then assigned to the Deputy Program Manager for Logistics in the Propulsion System Program Office. She served as the Foreign Military Sales Integrated Logistics Support manager for the F100/200 engines until entering the School of Systems and Logistics, Air Force Institute of Technology, in June 1983.

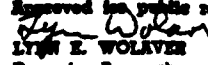
Permanent address:

7572 Pelbrook Farm Dr.
Centerville, Ohio 45459

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED			1b. RESTRICTIVE MARKINGS		
2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited		
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE					
4. PERFORMING ORGANIZATION REPORT NUMBER(S) AFIT/GLM/LSM/84S-59			5. MONITORING ORGANIZATION REPORT NUMBER(S)		
6a. NAME OF PERFORMING ORGANIZATION School of Systems and Logistics		6b. OFFICE SYMBOL (If applicable) AFIT/LS		7a. NAME OF MONITORING ORGANIZATION	
6c. ADDRESS (City, State and ZIP Code) Air Force Institute of Technology Wright-Patterson AFB, Ohio 45433			7b. ADDRESS (City, State and ZIP Code)		
8a. NAME OF FUNDING/SPONSORING ORGANIZATION		8b. OFFICE SYMBOL (If applicable)		9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER	
8c. ADDRESS (City, State and ZIP Code)			10. SOURCE OF FUNDING NOS.		
			PROGRAM ELEMENT NO.		PROJECT NO.
			TASK NO.		WORK UNIT NO.
11. TITLE (Include Security Classification) See Box 19					
12. PERSONAL AUTHOR(S) Carole H. Smith, B.M., GS-12					
13a. TYPE OF REPORT MS Thesis		13b. TIME COVERED FROM _____ TO _____		14. DATE OF REPORT (Yr., Mo., Day) 1984 September	
				15. PAGE COUNT 112	
16. SUPPLEMENTARY NOTATION					
Approved for public release; distribution unlimited.  LYNN E. WOLAVER Dean for Research and Professional Development Air Force Institute of Technology (AFIT) Wright-Patterson AFB, Ohio 45433					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB. GR.			
05	09		Attitudes, Behavioral Science, Management, Personnel, Scheduling, Work		
	10				
19. ABSTRACT (Continue on reverse if necessary and identify by block number)					
Title: TELECOMMUTING: AN ALTERED WORK PATTERN Thesis Chairman: Dr. Robert P. Steel					
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT UNCLASSIFIED/UNLIMITED ☒ SAME AS RPT. ☐ DTIC USERS ☐			21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED		
22a. NAME OF RESPONSIBLE INDIVIDUAL Dr. Robert P. Steel			22b. TELEPHONE NUMBER (Include Area Code) 513 255-4549		22c. OFFICE SYMBOL AFIT/LSB

DD FORM 1473, 83 APR

EDITION OF 1 JAN 73 IS OBSOLETE.

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE

Rising energy prices, high costs for office construction and maintenance, traffic and parking congestion, increased pollution, and concern with the quality of work life are contributing factors to pressing social, economic, and productivity problems. With limited resources and spending priority conflicts, Department of Defense (DOD) managers seek solutions offering reduced costs, improved productivity, and increased employee job satisfaction. Based on new developments in the electronics and communications fields, a new altered work pattern called telecommuting appears to offer a partial solution to social, economic, and productivity problems.)

Telecommuting can be defined as an altered work environment where employees work at home with electronically transferred information using a personal computer or a remote terminal with a telephone. It is a decentralized work concept which furnishes information to employees at home rather than a centralized work concept where large numbers of employees commute daily to information based locations. Several test programs have been generated by the private work sector. With many jobs in the private sector being similar to those performed in the federal sector, telecommuting may be applicable as an alternative work setting for some DOD organizations.

→ ^{thesis} This study investigates attitudes held by Air Force military officers and comparable civil service employees assigned to Air Force Logistics Command, ~~Wright-Patterson AFB, Ohio,~~ concerning the potential acceptance of telecommuting, effects on productivity, and perceived advantages/disadvantages of telecommuting. A mail survey of 221 military and 365 civilians was conducted. Survey data analysis indicated that civilians favored telecommuting more than military. However, both groups believed that a test program would be desirable and that productivity would tend to increase. Neither group thought telecommuting would affect their personal lives. The military group, however, tended to believe that household chores might affect job performance while the civilian group did not. ↑

END

FILMED

12-84

DTIC