

EVALUATING THE SUCCESS OF TELECOMMUTING AT THE CENSUS BUREAU¹

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Abstract

Many administrative programs have been launched at the Census Bureau with little prior testing and evaluation. In an effort to create programs that are mutually desirable for both employees and the agency, the Census Bureau has started to thoroughly evaluate such programs before full implementation. The first program to undergo a large-scale, comprehensive evaluation was a telecommuting pilot that involved employees working in three areas at Census. The purpose of the evaluation was to measure the effect of telecommuting on key factors such as performance, productivity, and job satisfaction. In an attempt to attribute any differences in these factors to telecommuting, the evaluation required the collection of repeated measurements before and after the pilot. In this paper, we compare results from the pre- and post-telecommuting periods to determine what changes occurred as a result of the telecommuting pilot. Furthermore, we use logistic regression to measure associations between participation in the telecommuting pilot and work performance.

1. INTRODUCTION

There are many reasons why the Federal government is eager to adopt telecommuting. Research shows that telecommuting can improve employees' productivity, motivation, and concentration in addition to reducing stress and tension among coworkers (OPM, 2001; Joice, 1993; Allenby, 2001; Bellinger *et. al.*, 1992).

Despite the success of early telecommuting, the number of telecommuters has not dramatically increased (Armour, 2001; Ballard, 2001). Companies in both the private and public sectors exhibit managerial reluctance to make changes that comply with telecommuting (Joice, 1993; Bartlett, 2001). In addition, concerns about security risks, restraints on productivity, meeting conflicts, and jobs that are unsuitable for telecommuting have seemingly stunted the expansion of telecommuting (Ballard, 2001; Armour, 2001).

In the spring of 2000, the Census Bureau's Labor Management Partnership Council chartered a workgroup to develop recommendations for a pilot telecommuting program. The workgroup recommended testing a six-month telecommuting pilot, involving all interested employees who receive supervisory approval within three areas at Census: Services Sector Statistics Division (SSSD), Demographic Surveys Division (DSD), and the Commerce Administrative Management Systems (CAMS) office of the Financial and Administrative Systems Division (FASD). The telecommuting pilot permitted participants to work from home or a telecommuting center a maximum of two days in a two-week period.

The Partnership Council recommended a formal evaluation of the pilot to identify any critical issues related to telecommuting. In addition to identifying problems, the evaluation sought to provide feedback on the design of the pilot, the amount of interest by employees, and the effect of telecommuting on factors such as morale, productivity, performance, and job satisfaction.

The telecommuting pilot evaluation marks the first large scale assessment of an administrative program initiative at the Census Bureau. The Census Bureau has historically introduced many administrative programs with little to no prior evaluation of the effects on work or morale. Therefore, we designed this evaluation to be a comprehensive, ground-breaking evaluation that would detail the effects of telecommuting on the Census Bureau's work and employees. It is our intention for this evaluation to serve as the premier model or standard by which all forthcoming initiatives at the Census Bureau are evaluated.

2. METHODS

The telecommuting pilot ran from June 4, 2001 to November 30, 2001. The evaluation team gathered data in three stages: *pre-pilot* (February to May, 2001), *pilot* (June 4 to November 30, 2001), and *post-pilot* (November 30 to December 13, 2001).

¹ This paper reports the results of research and analysis undertaken by Census Bureau staff. It has undergone a Census Bureau review more limited in scope than that given to official Census Bureau publications. This report is released to inform interested parties of ongoing research and to encourage discussion of work in progress.

2.1 Design of Telecommuting Pilot

1. *Universe* - The divisions that participated in the pilot were selected based upon the level of support exhibited by division management and the major occupational series within each division. The intention was to have a balanced cross-section of employees who occupy the major job series within the Census Bureau participate in the pilot. There were roughly 500 employees and supervisors in the pilot areas.

2. *Selection procedure* - Employees who wished to telecommute completed an application. Applicants' supervisors were authorized to select telecommuters.

3. *Mandatory Training* - There were three mandatory phases of training for telecommuters: overview training, employee/supervisor training, and laptop training. The overview session encouraged employees to take part in the program. Employee/supervisor training provided tips for a successful telecommuting experience. The laptop training instructed telecommuters on how to access their e-mail remotely.

4. *Frequency of telecommuting* - Telecommuters were permitted to telecommute no more than two days in a pay period (two weeks).

5. *Technical limitations* - Due to the sensitivity of data on internal Census networks, telecommuters did not have access to any servers or data that reside within the Census firewall from a remote site. Telecommuters were not permitted to work with data protected under Title 13 of the US Code from their remote location.

2.2 Methods for the Evaluation

The evaluation team used both quantitative and qualitative methods to collect data. We used web surveys to collect quantitative data. Qualitative data were gathered through focus groups and suggestion boxes.

Quantitative Data: We used WebSurveyor software to design the web surveys. The surveys were single-screen scrollable forms in html format. We chose this format for two reasons: 1) there were no complex skip patterns in the questionnaires, and 2) to minimize the time to complete the survey. All survey instruments underwent thorough testing in the form of expert review, cognitive testing, usability testing, and field testing.

In addition to providing the software for questionnaire development, WebSurveyor also hosted the surveys on their site. Employees received a personalized e-mail inviting them to participate in a survey by clicking on an

Internet link. The link contained an embedded identification number so that employees would not have to log into the survey. After three to five days, all employees received a generic reminder asking them to complete the survey. We then sent a personalized follow-up e-mail that contained the survey link to nonrespondents asking them to respond promptly. The surveys stayed in the field for roughly two weeks.

Qualitative Data: We used focus groups to: 1) capture qualitative data that could not be measured by a survey or were unanticipated by evaluators, and 2) collect information to assist in the content development of the questionnaires. We recruited employees for the focus groups in a random fashion; however, the groups did not contain a random sample since participation was ultimately voluntary.

In addition to focus groups, the evaluation team issued suggestion boxes for each participating area in order to capture information that may be too sensitive or undesirable to express during a focus group.

There were nine components of the evaluation conducted throughout the stages of the telecommuting pilot, in the following chronology:

Pre-Pilot Phase:

1. *Focus Groups with Employees and Managers in the Participating Areas, 2/01.*

2. *Pre-Pilot Web Survey of All Employees in the Participating Areas, 3/01.* We collected quantitative measures from employees on their work performance, productivity, job satisfaction, commuting factors, and opinions about telecommuting before the pilot began. We obtained an 88% response rate.

3. *Focus Groups with Supervisors of Selected Telecommuters, 5/01.*

4. *Pre-Pilot Web Survey of Supervisors of Selected Telecommuters, 5/01.* We administered a short web survey to all supervisors who managed telecommuters. The survey requested information regarding telecommuters' current performance and productivity. Supervisors with more than one telecommuter on their staff completed one survey for each telecommuter. We obtained a 93% response rate.

Pilot Phase:

1. *Focus Groups after Month 1 of the Telecommuting Pilot with telecommuters, their coworkers and supervisors, 7/01.*

2. *Focus Groups after Month 2 of the Telecommuting*

Pilot with telecommuters, their coworkers and supervisors, 8/01.

Post-Pilot Phase:

1. *Focus Groups after the Telecommuting Pilot with telecommuters, their coworkers and supervisors, 12/01.*

2. *Post-Pilot Web Survey of All Employees in the Participating Areas, 12/01.* We collected quantitative measures from employees on their work performance, productivity, job satisfaction, and commuting factors during the pilot. We obtained an 81% response rate.

3. *Post-Pilot Web Survey of Supervisors of Selected Telecommuters, 12/01.* We administered a web survey to all supervisors who managed telecommuters. The survey supervisors' assessments of a telecommuter's performance and productivity during the pilot. Supervisors who managed more than one telecommuter completed one survey for each telecommuter. We obtained a 93% response rate.

Because we surveyed all employees, the data are not subject to sampling error. Thus, we present results which are practically rather than statistically significant.

3. RESULTS

3.1 Pilot Participation

3.1.1 *Number of telecommuters exceeded expectations*

Participation in the pilot far exceeded the anticipated level. Pilot participation (44%) dwarfed the 15% level cited by some federal agencies. This large telecommuter pool may have resulted from supervisors' fears about the selection process. Supervisors said they would approve telecommuting for virtually all applicants, because they feared grievances related to the selection process.

3.1.2 *Before the pilot, telecommuters systematically differed from non-telecommuters on satisfaction, performance, work and demographic factors*

Telecommuters were more likely to rate their work performance as "excellent", and were more satisfied with their job duties compared to non-telecommuters. However, they were less satisfied than non-telecommuters with their productivity, relationships with supervisors/coworkers, flexibility of schedule, quality of life, ability to manage child care, commuting time and costs, physical surroundings at work, and the Census Bureau as a place of employment. Moreover, telecommuters averaged higher commuting costs per week (\$26.14) than non-telecommuters (\$21.03).

Likewise, more telecommuters were female (64%) than non-telecommuters. Telecommuters were also more likely to be non-supervisory and, on average, higher pay-graded than non-telecommuters. Telecommuters worked primarily as statisticians and computer specialists.

3.1.3 *Most unable to telecommute to the full extent*

Although many employees signed up to participate in the pilot, 65% telecommuted one day or less per pay period. The main reason for missed telecommuting days stemmed from the inability to do priority work from a remote location (56%). Many telecommuters felt that the inability to work behind the firewall prevented them from telecommuting because it restricted the work they could perform remotely. Telecommuters cited the lack of access to the network (39%), Title 13 data (27%), and internal servers (14%) as the biggest disadvantages of telecommuting.

3.1.4 *Number of telecommuting days varied by job duties*

More supervisors (56%) reported telecommuting less than one day per pay period compared to non-supervisors (37%). Likewise, participation depended on job series. Computer specialists logged more telecommuting hours than statisticians. About 51% of statisticians telecommuted less than one day per pay period compared to 34% of computer specialists.

3.2 The Effects of the Pilot on Key Measures

We compare measures of productivity, performance, satisfaction, and morale between the pre- and post-pilot periods to determine if there are differences attributable to telecommuting.

3.2.1 *Telecommuting had little to no effect on productivity and performance*

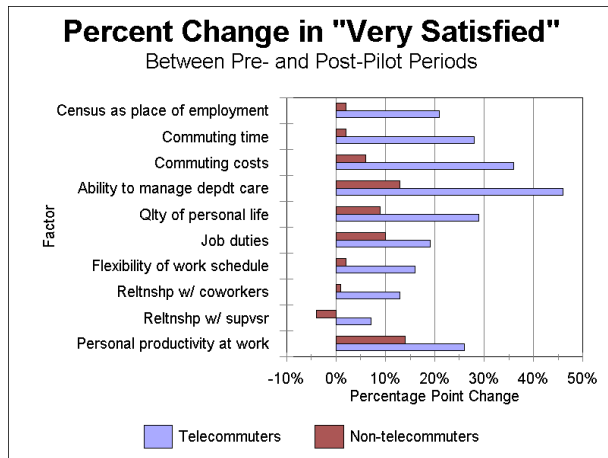
Employees rated their performance and productivity before and after the pilot. We used logistic regression to determine whether telecommuting was associated with any decline in these measures, while controlling for work and demographic factors such as work schedule, number of awards received, amount of meetings per week, supervisory status, job series, grade, years of experience, age, and gender. We found no evidence to suggest that telecommuting had a negative impact on productivity or performance.

3.2.2 *Other factors showed some positive effects*

Telecommuters reported decreases in the cost and time

of their commutes to work from the pre-pilot period, whereas non-telecommuters reported increases in both factors. Moreover, compared to the pre-pilot period, telecommuters experienced greater increases than non-telecommuters in their satisfaction with: professional relationships, flexibility of work schedule, job duties, personal life quality, child/dependent care management, commuting costs and time, and the Census Bureau as a place of employment. Figure 1 below illustrates the percentage point change in the amount of employees reporting that they were “very satisfied” with work factors between the pre- and post-pilot periods.

Figure 1. Percentage Point Change in Telecommuters and Non-telecommuters reporting that they were “Very Satisfied” Between the Pre- and Post-Pilot Periods with Work and Personal Factors



3.2.3 Factors related to unsuccessful telecommuting

Supervisors assessed the productivity and performance of their telecommuters before and after the pilot. Logistic regression results suggest that there are several factors associated with a drop in these factors (Table 1).

Table 1. Logistic Regression Coefficients Predicting the Log Odds of a Decrease in Productivity/Performance (telecommuters only)

Variable	Prdctvty	Prfmce
Telecommuting Factors:		
Tc-ed <=1 day/pay pd = 1	-.97*	.84
Felt job limits tc-ing = 1	-1.09*	-1.14
Voicemail in office = 1	.82	.41
Comm inc w/ sup = 1	-2.13*	-.89
Comm inc w/ cwkr = 1	-.72	-.47
Used planning tools = 1	-.26	-.03
Planning tools req = 1	1.25	-1.13
Could do critical work offsite most/always = 1	-.18	.93
Check-in when TC = 1	-.70	.85
Can switch TC day = 1	-.09	-1.14
Work Factors and Demographics:		
Alt Work Schedule = 1	.27	-1.21
Award count(6/00-12/00)	-.16	-.10
Meetngs w/ sup/wk	.01	.01
Meetngs w/ cowkr/wk	.96*	-.16
Supervisor tc-ed = 1	-.11	-.73
Coworkers tc-ed = 1	-1.18	.41
Supervisor = 1	-1.10	-.83
Comp Specialist = 1	-1.42	2.05
Statstcn (Surv/Math) = 1	-1.01	1.61
DSD = 1	-1.57	.33
SSSD = 1	-.92	-.35
Grade	.04	-.54*
Yrs in Commerce Dept	.01	-.00
Female = 1	-1.08*	-1.18*
Age (as of 12/01)	-.02	.04

* significant at $\alpha = .10$

The following factors were associated with a drop in productivity:

1. *Amount of telecommuting* – Telecommuting more than one day per pay period had a negative impact on productivity compared to telecommuting one day or less per pay period.
2. *Feelings about job suitability* – Telecommuters who felt that their job duties did not restrict their participation in the telecommuting pilot were more likely to experience a drop in reported productivity than those who felt somewhat restricted.
3. *Communications with supervisors* – Having experienced a decreased communication with supervisors during the pilot was associated with a drop in productivity.
4. *Gender* – Telecommuting males more often experienced significant decreases in productivity as compared to telecommuting females.
5. *Meetings with coworkers* – Telecommuters with many meetings with coworkers more often experienced drops in productivity as compared to telecommuters who met with coworkers less often.

The following factors were associated with a decline in performance:

1. *Gender* – Telecommuting males more often experienced significant decreases in performance compared to telecommuting females.
2. *Pay grade* – Lower-graded telecommuters experienced a decrease in performance more often than telecommuters in higher pay grades.

3.3 Perspectives on Telecommuting

3.3.1 *Telecommuters realized many benefits of telecommuting, with minor costs*

Prior to the pilot, telecommuters anticipated many positive effects of telecommuting such as reduced stress associated with work and their commutes to work, as well as increased productivity resulting from less distractions. Many reported that these gains were realized during the pilot. As the pilot progressed, however, telecommuters noted some minor costs that come with telecommuting. They mentioned that telecommuting was more difficult than they had expected because of the preparation time involved in planning a day away from the office.

3.3.2 *At the onset, supervisors were supportive, yet skeptical of telecommuting*

Prior to the pilot, supervisors were divided on their views on telecommuting. Results from the surveys suggest that supervisors were generally pleased with the employees chosen to telecommute. Yet, focus group results revealed that managers were somewhat skeptical of telecommuting. Some supervisors believed that telecommuting would make them susceptible to grievances based on the selection process, and would result in them losing control of their employees (Rappaport, 2002). Despite the concerns, there were no Equal Employment Opportunity complaints, grievances, or workers' compensation claims for telecommuters.

3.3.3 *Supervisors of telecommuters found telecommuting to have little effect on most factors, except morale and workloads*

Supervisors observed no major changes in the productivity and performance of telecommuters, but when changes were observed, many were in a positive direction. For example, 78% of supervisors noticed no change in productivity during the pilot, while 19% found an increase. Morale was one factor for which many supervisors noticed change. About 43% of supervisors reported an increase in morale due to telecommuting. Despite the overall lack of change, 26% of supervisors admitted that their workloads increased due to supervising telecommuters.

3.3.4 *Supervisors' views differed depending on whether they managed telecommuters, and if so, how many*

Focus group and survey results revealed that feelings about the pilot depended largely upon whether managers supervised telecommuters, and if so, how many. Supervisors who managed telecommuters exhibited more support for telecommuting than those supervisors who did not. For instance, 70% of telecommuters' supervisors favored implementing a full telecommuting program compared to 58% of supervisors who did not manage any telecommuters.

Additionally, supervisors who managed a large number of telecommuters expressed more frustration with telecommuting. Compared to supervisors who managed up to two telecommuters, supervisors who managed three or more telecommuters were less than half as likely to report that their telecommuters completed all of their tasks on time. Perhaps the most striking dissimilarity between these supervisors pertained to their feelings about the effect of supervising telecommuters on their workloads. Almost half (43%) of supervisors with three or more telecommuters reported an increase in their

workload compared to 15% of supervisors with less than three telecommuters.

3.3.5 *Coworkers of telecommuters were not greatly affected by telecommuting*

Coworkers (non-telecommuters, non-supervisors) felt that telecommuting had little effect on working conditions, especially since most telecommuters were not using all of their permitted telecommuting days. They noted that their workloads only increased slightly when telecommuters were away from the office, mostly due to less office coverage. Most were supportive of the program and hoped to someday telecommute as well (Rappaport, 2002).

3.4 Future of Telecommuting at the Census Bureau

3.4.1 *Most employees recommended implementing a full telecommuting program with the pilot's design*

About 77% of employees wanted a full telecommuting program with the pilot's design. Those who did not recommend expanding the program with the same design cited the need for greater flexibility in scheduling and switching telecommuting days, as well as more access to internal networks and data. Others did not want to see telecommuting offered because they felt that the pilot was disruptive, biased against certain job positions, and logistically difficult to coordinate. However, most employees felt that a telecommuting program could improve efforts to recruit (92%) and retain (89%) employees at the Census Bureau.

3.4.2 *Majority would participate in future program*

If the Census Bureau initiated a full telecommuting program with the same design, 66% of employees said they would telecommute and 14% said they were unsure. However, 43% of these employees indicated that they could realistically only telecommute one day or less per pay period on a continual basis.

4. CONCLUSIONS

While many employees reported strong positive feelings, some were extremely frustrated with the pilot. The biggest complaints centered around the lack of network, server and data access that not only frustrated telecommuters, but also prevented them from participating. Well over half of the telecommuters telecommuted significantly less than permitted due to the inability to work behind the firewall.

Despite low level of telecommuting, most telecommuters reported feeling more productive, less

stressed, and more satisfied than before the pilot. While self-assessments of productivity and performance revealed no significant changes during the pilot, telecommuters experienced substantial increases in their satisfaction with work and personal factors, morale, and commuting times and costs.

5. LIMITATION

Repeated measurements - Some telecommuters' supervisors passed the survey invitation to another supervisor who was involved with the telecommuter. This transfer disabled the tracking of respondents, and thus could potentially confound pre- and post-pilot comparisons of telecommuter performance.

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