

Telework Initiatives A Comparison of State Rankings

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Abstract

Since the government pushed to expand and integrate the capabilities of the information superhighway, many government agencies have undergone extensive research to study the areas of technology. The concept of telecommuting has particularly become a recent area of focus for many Americans as a justifiable alternative to traditional working conditions. Despite many studies documenting the potential overall benefits to the working community, the telecommuting phenomenon's initiative has not reached a national, mainstream level of success yet. This study examines why certain levels of isolated telecommuting success exist within the United States. Data obtained for this study came from journals, government websites, and magazine articles. This study also examines the extent or lack of effective implementation of telecommuting programs of several state governments in an attempt to rank the programs according to chosen criteria that looks at how persuasively those initiatives are being sold to management and agencies in that state. This study will attempt to enhance the existing research on the factors of telecommuting. Further analysis will compare the state rankings according to the factors such as population density and economic factors. This study should attract interest to all strata of the business, educational, psychological, and legal communities, which attempt to research telecommuting's purpose and scope.

Keywords: Telecommuting, telework, telecenter, distance learning, population density

1. INTRODUCTION

Early in the 1990's, as a result of its growth, the Internet was recognized as a universal resource applicable to all areas of society. During President Clinton's administration, the telecommuting act of 1992 was passed to ensure that society would assimilate and grow with available technological advances. The Federal government named Jack Niles as the father of telecommuting in response to his extensive knowledge in this area. Niles attributes the explosive increase in the number of telecommuters to the immense growth of the Internet.

Teleworking is any form of substitution of information technologies (such as telecommunications and computers) for work-related travel. *Telework centers* are located in suburbs and outlying cities across the country. They provide an alternative office setting for Federal employees who otherwise face a long commute--in time or distance--between home and work. *Telecommuting* is moving the work to the workers instead of moving the workers to work; periodic work out of the principal office, one or more days per week either at home or in a *telework center*. The emphasis here is on the reduction or elimination of the daily commute to and from the workplace (Niles 2001). Through telecommunications

innovations in information technology, the transfer of information, specifically data, voice, and video, is increasingly becoming a part of the traditional architecture of many businesses (O'Brien 2002).

With the WTC (World Trade Center) tragedy, telecommunication options have been viewed as a priority for global business communications. Before the prioritization of telecommunication options, telecommuting had already started to materialize, mainly in the form of government research projects to test part time and full time telecommuting situations. To integrate the information highway's capabilities into every aspect of society, government's studies and statistics are needed to provide telecommuting's effectiveness in business. Various government agencies have published their studies on telecommuting. Agencies such as the Department of Labor, the Office of Personnel Management, and the Department of Transportation have had promising results from their findings. They focus on the benefits and disadvantages of telecommuting specific to their departments. The Department of Labor's study demonstrates that America is going through a historic transformation in the workplace and concludes that telework holds vast potential to benefit workers, employers, and the American workforce as a whole: to help employees balance the demands of work and

family, to provide diversity and new opportunities for Americans who are outside the economic mainstream, and to increase worker productivity and to help companies compete in the global marketplace. Telework's success depends on a collective collaboration of educational institutions, corporations, technological advances, and the government (U.S. Department of Labor 2000). Immediately after the tragedy, corporate America felt a need to assure that their data was secure. Corporations turned to many areas of technology such as the educational, industrial, and analytical for answers. Three key elements to assure the recovery of data and voice networking include: *redundancy*, *backup*, and *geographic disbursement* (Freund 2001). The U.S. Department of Personnel Management's study presents examples of telework success stories from a variety of jobs and work situations. The Department of Personnel Management realizes its leadership role in expanding telecommuting options in businesses (U.S. Office of Personnel Management, 2001). The Department of Transportation's study closely examines the transportation and environmental benefits of telecommuting. The study focuses on the increase in productivity by telecommuting instead of physically commuting to the traditional workplace. The study suggests that overall emissions of pollutants are projected to increase by almost 40 percent by 2010 because we are driving more and under more congested conditions (U.S. Department of Transportation 2000).

2. STATEMENT OF THE PROBLEM

Despite being underway for more than a decade, telework programs are still new or non-existent for most State Agencies and corporate organizations. Management is still reluctant to accept the telecommuting concept as a mainstream business practice. Many employers hesitate to integrate telecommuting programs into their business policies because of the expense and restructuring involved in undertaking the telecommuting venture (Ballard 2001).

There is no significant management to manage workers remotely; "it is still scary to be in a position to manage people you can't see" (IRM Pilot Study 2000; HR Magazine 2001). There are also technological barriers as well as literacy skills that would be needed to successfully implement telecommuting programs that are lacking in some states. It is difficult for eligible teleworkers to find such positions. Careful planning and legal issues have to be considered for a telecommuting program to operate efficiently (Anonymous, 2001). Establishment of effective guidance on program practice is a key factor for continued and successful growth of the telework movement.

Another problem with telecommuting from the perspective of the employers is the issue of cost sharing of telecommuting equipment. Optimal telecommuting equipment would include a phone line, specifically a DSL line, and hardware such as the computers and accompanying peripherals (printers, microphones, scanners, and fax machines) (Kistner 2001). New technology has enabled much of these functions to be accomplished by one system such as the Xerox "Three in One" which prints, copies, scans, and faxes. Some companies offer equipment reimbursement for the telecommuting workforce, but some companies do not offer any type of assistance to telecommuting employees. If companies would see that the overhead cost of setting up home offices is at a fraction of the cost of the traditional offices, they would consider setting this up as an alternative.

Niles suggests that telecommuting should be increased especially in areas closely affected by the WTC tragedy. Telecommuting would avoid the decreased productivity primarily due to the trauma experienced not only by the New York and Washington area employees, but most of the country (Niles 2001). In order for management to retain and recruit professionals in many areas, telecommuting would probably be an attractive benefit to retain top employees and prospects. Information Technology professionals want to have the option to telecommute in their current jobs because they realize that the technology is already in place to realistically complete their work responsibilities by telecommuting (Boyd 2001).

3. STATEMENT OF THE OBJECTIVE

Many government studies on telecommuting have concluded that telecommuting is a very effective business practice with minor drawbacks. According to the studies conducted by the (U.S. Department of Labor 2000; the U.S. Department of Transportation 2000; and the U.S. office of Personnel Management 2001), telecommuting would positively affect many areas of the workforce professionally and psychologically. Increased productivity, environmental improvements, and personal well being are consistent motives for endorsement of telecommuting programs. This study examines the extent or lack of effective implementation of telecommuting programs of several state governments in an attempt to rank the programs according to chosen criteria. These criteria measure how persuasively those initiatives are being sold to management and agencies in that state. Further analysis will compare the state rankings according to the factors such as population density and economic factors.

This study should be of interest to all areas of the business, legal, psychological, and educational

communities who are willing to increase their level of understanding of telecommuting's scope and efficiency. This study will attempt to enhance the existing research on the parameters of telecommuting.

4. METHODOLOGY

Data for this study were obtained from the State's Government Web Access home pages of chosen states. An extensive search of each state site was performed via a site search of the keywords "Telework", "Telecommute", and "Work at Home" to see if the states had any Telework policies in place in their online resources. We also searched each State's Department of Labor, Department of Transportation, Department of Environment, and Department of Human Resources Divisions to see if any of the relevant telecommuting issues were explored. Any Technology initiative links on the state's website were also examined.

We used *Sample Size Calculator*, an online public service of *Creative Research Systems* (www.surveysystem.com) to determine the sample size. There are a total of 50 U.S. states, so we have a fixed *population size* of 50. The *confidence interval* is the plus-minus figure usually reported in newspaper or television opinion poll results. The *confidence level* is expressed as a percentage and represents how often the true percentage of the population who would pick an answer lies within the confidence interval. Most researchers use the 95% confidence level. Based on the result of the calculation, a *sample size* of 33 states out of the possible 50 U.S. states was needed to assure that we have a *confidence interval* of 10 at a *confidence level* of 95%. The confidence interval calculations assume that a genuine *random sample* of the relevant population is utilized. If the sample is not truly random, the calculation cannot rely on the interval. Then we randomly selected 8 states from each of the 4 quadrants of the US map, i.e. upper left, upper right, lower left, and lower right, as illustrated in Figure 4.1.

AK	WA	ND	OR	MO	OH	PE	NY
SD	MT	WY	MN	RI	DE	ME	NH
CA	AZ	TX	CO	GA	LA	AR	FL
NV	UT	NM	OK	SC	AL	MS	VA

Figure 4.1 Four quadrants of States

Hawaii was included to make it total 33 states. Therefore 67% of the states were included in our analysis.

Abstracts for the 33 chosen states were investigated via a literature search on the *WebSpir system*. Five variables were picked up: *Policy, Initiative, Visibility, Time Frame, Equipment*, as they correlated to statewide *Telework* program .

Each variable was judged individually on a 0 to 3 point scale, whereas 0 point was awarded for no references of that item found, 1 point for a minimal mention of that item, 2 for substantial reference, and 3 for extensive references to that item. The entire process was repeated on each state's government web site portal. Thus, two trials of 5 items, each potentially worth 0-3 points each, yield a possible point total of 0 to 30 points for each state examined. The more points the state receives, the better in terms of rank.

Correlation is a statistical technique, which can show whether and how strongly pairs of variables are related. In addition, three more factors were used: *Population Density, Statewide Economy, and Distance Learning Initiative*. There are three levels of evaluation (Top, Bottom, Middle) for each factor. This gives us nine different letters to associate with each state,(given in Figure 4.2) and then we will compare our letter grade evaluations to our point total system.

5. RESEARCH ISSUES EXAMINED

Three major research issues about the existing Telework programs in each state were chosen. Each state's economy, population density, and its distance learning initiative were researched.

The first research issue, state economy, led us to predict that states that have strong economic conditions, especially those that are technologically advanced, would have progressive *Telework Initiatives*. We researched each state's website and assigned a strong (S), average (A), or weak (W) rating for the appropriate level of each state's economy.

The second research issue, population density, led us to predict that states that have a high population density will face *commuting challenges*; i.e., *time commutes* (referring to a commute that may not involve a long distance to travel yet still takes a significant amount of travel time due to congested roadways) and *distance commutes*.(referring to a commute that may incur very long driving distances typically from one town to another non adjacent community). Thus, states that experience *commuting challenges* will tend to have more extensive programs. For example, California with a high population will tend to have traffic congestion; therefore, the time of commute may be lengthy even though the distances may not. Thus it is leading to a strong incentive to have established telecommuting programs. Likewise, Alaska would tend to have programs entrenched to overcome the huge commuting distances from town to town. Conversely, states, such as Louisiana, that are poorly ranked in technology lists and having below

average economic development and moderate traffic problems would be predicted to be ranked rather low.

Our third research issue is based on strength of *Distance Learning programs* at State institutions. We chose this because of the strong connection between telecommuting and telelearning. Both concepts are essentially the same with the exception that telecommuting is for the sake of business while the latter is all about education. We researched each state University's web site and assigned a progressive (P), ordinary (O), or a regressive (R) rating for the appropriate level of its distance learning initiatives.

We, therefore, will have three levels (Top, Middle, Bottom) of our three factors: *Economy, Population Density (Commuting Challenge)* and *Distance Learning (DL)*. This gives us nine different letters to associate with each state, and then we will compare our letter grade evaluations to our point total system. A cross reference of these two systems in combination will hopefully demonstrate that our hypothesis is true: States with strong economic conditions, commuting challenges, and established DL programs will have the highest point totals and thus the most likely to be progressive minded towards telework concepts.

6. PRESENTATION TOOLS

Our presentation tools for our *Telework Initiative* comparison study include a *ranking sheet*, a *geographic analysis diagram*, and a *cross-reference analysis diagram*.

6.1 Ranking Sheet

The ranking sheet that we created is a tool we used to evaluate the general strength of a state's *Telework Initiative* as illustrated in Figure 6.1.

Each column in the table is listed as:

- Rank
- State
- Quadrant in the United States
- Density (population density)
- E-Univ. (distance learning programs)
- Economy
- Policy (if an established telecommuting policy is stated)
- Initiative
- Visibility
- Length
- Equipment

There are 3 factors: Population Density, Economy, and Distance Learning with three levels of evaluation as illustrated in Figure 6.2.

<i>Symbol/Abbrev.</i>	<i>Definition</i>
<u>Population Density</u>	
L	Low
M	Medium
H	High
<u>Statewide Economy</u>	
S	Strong
A	Average
W	Weak
<u>Distance Learning Initiative</u>	
P	Progressive
O	Ordinary
R	Regressive

Figure 6.2 Definition of Evaluation Factors

Five criteria, *Policy, Initiative, Visibility, Length, and Equipment*, are each evaluated in 0 to 3 points. The ranking team consisted of two researchers who independently investigated each state's government website and each state university's website within the determined sample size of 33 states. Each researcher scored and logged the scores into the ranking sheet. The researchers added up the scores for each state, providing a maximum of 6 points for each of these categories.

The rank of a state is determined by the points the state earns. The points ranged from 2 points (the lowest) to 29 points (the highest). The higher the points, the higher the rank is. The state with the highest points is ranked as rank 1. California ranked first with a 29 point total, and Arkansas and Hawaii shared a ranking of 20th with a 2-point total.

6.2 Geographic Analysis

The *geographic analysis* was done on regions as a control to see if there was any strong regional influence that might be involved. We calculated the average ranking of the states in a region. The lower the average ranking number, the better the rank is. At a first glance at Figure 6.3, one might suspect that the Southwestern region of the United States has a slight edge in average ranking, 10.8 as opposed to the other states having average rankings closer to 12 or 13. Upon further analysis, we discovered that the regional influence was not the reason that the SW ranked a little higher; it was due to the coincidence that the number one state (CA) and number two state (TX) just happened to be in the Southwest region.

Quad	Total Pts	Avg pts	Avg Rank
NE	88	11.00	12.13
NW	91	11.38	11.88
SE	84	10.50	12.75
SW	122	13.56	10.78

Figure 6.3 Geographic Analysis Table

Rank	State	Quad	Density	E-Univ.	Econ	Policy	Initiative	Visibility	Length	Equip	Points
1	CA	SW	H	P	S	6	6	6	6	5	29
2	TX	SW	M	P	S	6	6	4	4	4	24
3	AZ	SW	L	P	A	4	6	4	4	4	22
4	FL	SE	H	P	S	4	4	4	4	4	20
5	GA	SE	H	R	S	4	6	4	2	3	19
6	MO	NE	M	O	A	4	2	4	4	4	18
6	WA	NW	M	P	A	5	4	4	2	3	18
7	VA	SE	M	O	A	4	2	4	4	3	17
8	OR	NW	L	P	W	4	4	2	4	2	16
9	CO	SW	M	P	A	4	2	2	4	3	15
10	NY	NE	H	P	S	5	2	3	1	2	13
10	OH	NE	H	O	S	4	3	2	1	3	13
11	PE	NE	H	O	S	4	4	1	2	1	12
11	SD	NW	L	P	W	4	3	3	0	2	12
12	MT	NW	L	O	W	2	3	4	1	1	11
12	RI	NE	H	P	S	3	2	1	1	4	11
13	AK	NW	L	O	W	2	3	1	1	3	10
13	UT	SW	L	R	W	3	1	3	0	3	10
14	AL	SE	M	R	A	2	2	2	2	1	9
14	ME	NE	L	R	W	2	2	2	2	1	9
14	MN	NW	L	O	A	3	2	1	1	2	9
14	NV	SW	L	O	A	2	1	2	0	4	9
15	ND	NW	L	P	W	4	2	2	0	0	8
15	NH	NE	H	R	S	1	2	3	1	1	8
16	SC	SE	M	R	A	1	3	2	0	1	7
16	WY	NW	L	O	W	2	2	1	0	2	7
17	LA	SE	M	O	W	2	1	2	0	1	6
17	OK	SW	M	R	A	1	2	1	0	2	6
18	NM	SW	L	R	W	1	1	1	0	2	5
19	DE	NE	H	O	S	2	2	0	0	0	4
19	MS	SE	M	R	W	2	2	0	0	0	4
20	AR	SE	M	R	W	2	0	0	0	0	2
20	HI	SW	L	P	A	0	2	0	0	0	2

Figure 6.1 Ranking Sheet

6.3 Cross-reference Analysis Diagram

The *cross-reference analysis diagram* as illustrated in Figure 6.4 is the most revealing indicator. It is designed to take a three dimensional view of our factors. There are 3 factors: *Population Density*, *Economy*, and *Distance Learning* with three levels of evaluation (Top, Bottom, Middle) for each factor. This yields 27 possibilities of arrangements (3^3). The point tallies as illustrated in Figure 6.5 for each combination were looked at in terms of percentage of the total possible points for that category. This matrix analysis allows us to look at our data from different angles and multiple points of view.

		S	A	W	Totals
L	P		AZ(22) HI(2) NV(9)	ND(8) OR(16) SD(12)	69
M	P	TX(24)	WA(18) CO(15)		57
H	P	NY(13) RI(11) FL(20) CA(29)			73
L	O		MN(9)	AK(10) MT(11) WY(7)	37
M	O		MO(18) VA(17)	LA(6)	41
H	O	DE(4) OH(13) PE(12)			29
L	R			ME(9) NM(9) UT(10)	28
M	R		AL(9) SC(7) OK(6)	AR(2) MS(4)	28
H	R	NH(18) GA(19)			37
	Totals	163	132	104	

Figure 6.4 Cross Reference Analysis Diagram
(State point total in parenthesis)

	Points	%
S	163	40.8
A	132	33.1
W	104	26.1
P	199	49.9
O	107	26.0
R	93	23.3
L	134	33.6
M	126	31.6
H	139	34.9

Figure 6.5 Point Total by Item

7. FINDINGS

Based on our hypothesis, we expected to find that high-ranking states would have a low population density (*L*), a strong economic climate (*S*), and a progressive distance-learning program (*P*). We concluded that the success of a distance-learning program is dependent on the degree of its state's technological advancement and its progressiveness. Our statistics strongly reflect that 49.9% of the points are associated with progressive distance leaning programs (*P*) as compared to 23.3% with the more regressive distance leaning states (*R*).

We assumed that states with low population densities would have been an excellent indicator of a successful telework program, but it was contraindicated by the fact that traffic congestion problems are inherent in densely populated areas which would prompt a stimulation in telecommuting. The aforementioned factors are oppositional in nature and tend to cancel each other. Our percentages here were pretty much even.

Obviously we predicted that states with bustling economies would rank higher compared to states with weaker economies. However, we discovered that a minor flaw existed in our point system simply because there are more states with average economies compared to those that have strong economies. We realized that we must use a weighted average to compensate for these types of discrepancies in future analysis. For example, California ranked the highest in population density, statewide economy, and its distance learning initiative, contradictorily, even though Arkansas has a medium population density, its

economy and distance learning initiative indicators ranked very low.

8. LIMITATIONS, CONCLUSIONS, AND FUTURE STUDIES

Even though our ranking method is well structured; however, some measurement is subjective, such as whether any individual item gets a minimal or substantial rating. We noticed that one judge generally rated a little tougher than the other judge. The dual trial system did somewhat balance out some of this error. Also, the thoroughness of the state's web portal design may have affected the ease of how related links were made available and searchable.

Through this study, we have found that the quality of the state's web portal may also translate into a direct connection between a state's technological initiative and general level of progressiveness. The more progressive a state tends to have, a more pronounced level of *Telework Initiative*. This implies that telecommuting will become a mainstream business practice in time. The statistics supporting this prediction are clearly discernible.

For further research, we intend to include all of the states in our ranking study in order to achieve a more accurate analysis of the *Telework Initiatives* of each of the states. We also intend to present statistics on how many people are actually taking advantage of telework programs. We further intent to investigate the current economic impact on telecommuting.

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