THE QUIET SUCCESS:
TELECOMMUTING'S IMPACT ON TRANSPORTATION AND BEYOND

by Ted Balaker

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Telecommuting's Impact on Transportation and Beyond

By Ted Balaker

Executive Summary

The decision to forego the daily commute and work from home might not seem particularly revolutionary. Yet telecommuting has a positive impact on a surprisingly wide range of issues.

Telecommuting may be the most cost-effective way to reduce rush-hour traffic and it can even improve how a weary nation copes with disasters, from hurricanes to terrorist attacks. It helps improve air quality, highway safety, and even health care as new technology allows top-notch physicians to be (virtually) anywhere. Telecommuting expands opportunities for the handicapped, conserves energy, and—when used as a substitute for offshore outsourcing—it can help allay globalization fears. It can even make companies more profitable, which is good news for our nation's managers, many of whom have long been suspicious of telecommuting.

Other than driving alone, telecommuting is the only commute mode to gain market share since 1980. The Census Bureau notes that from 1990 to 2000 the number of those who usually worked at home grew by 23 percent, more than twice the rate of growth of the total labor market. Since 2000, telecommuting has continued to grow in popularity. Roughly 4.5 million Americans telecommute most work days, roughly 20 million telecommute for some period at least once per month, and nearly 45 million telecommute at least once per year.

And telecommuters drive less than office workers. During the days they telecommute, workers reduce their daily trips by 27 to 51 percent and driving (vehicle miles traveled) by 53 to 77 percent. Although they effectively receive no public subsidies, telecommuters actually outnumber transit commuters in a majority (27) of the 50 most populous metropolitan areas. Telecommuters outnumber transit commuters in places like San Diego, Dallas, and Phoenix. They outnumber commuters by more than two to one in places like Raleigh-Durham, Tampa-St. Petersburg, and Nashville. In Oklahoma City telecommuters outnumber transit commuters by nearly five to one.

Telecommuters tend to be highly educated and financially well-off. Most of the top telecommuting metropolitan areas tend to be fast-growing regions with high concentrations of technologically savvy workers who feel comfortable using the Internet and other tools common to remote work. Denver, Portland, and San Diego are the top three telecommuting metropolitan areas (as measured by the percentage of workforce that telecommutes). Atlanta and Washington, D.C. lead the nation in telecommuting growth, yet every major metropolitan area has experienced strong growth.

Many strong social trends suggest that telecommuting will become even more prevalent in the future. For example, telecommuting-enabling technology continues to improve, telecommuting-friendly jobs are becoming more prevalent, and workers have shown they enjoy telecommuting. And why not? Telecommuting offers potentially big cumulative time savings. In most of our nation's large cities, those who telecommute "usually" (three out of five work days) for a year would save five or more calendar days (roughly 15 8-hour work days). New York City commuters would save the most time—nearly 8 days (23 work days) per year.

Yet even with all these benefits, the workplace often resists telecommuting. There are three formidable barriers to increased telecommuting: technology, perception, and public policy.

Slow, complicated, and expensive technology can make telecommuting more trouble than it's worth. Yet technological barriers are becoming less daunting all the time and as they continue to recede, other barriers become more significant by comparison.

Telecommuting often improves bottom lines and yet managers are slow to embrace the practice. Many still regard telecommuters as low-grade slackers, loafing at home when they should be in the office working.

It is odd that public policy so often hinders telecommuting, particularly since elected officials are some of telecommuting's most enthusiastic supporters. But, from unfriendly zoning ordinances to frustrating tax laws, political barriers to telecommuting can be found at every level of government. The right reforms can end the disconnect between lawmakers' kind words and their less than cordial policies.

Technology has done its part to spread it and America's workers have shown they are open to it. Now it's up to our leaders in politics and business to allow telecommuting to reach its full potential.

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Introduction

The alarm clock sounds. The woman wakes up and begins her morning routine: she gets showered, gets dressed, gets coffee. But at the point when most of us reach for the car keys, she does something else. She sits down in front of her home computer and logs on. Almost instantly she is "at" work. What she does—contacting clients, responding to emails, preparing reports, and so on—is what most any office worker would do. The big difference is what she doesn't do. She doesn't worry about getting to work on time, she doesn't stop to gas up her car, she doesn't spend an hour of her day in the gauntlet of rush-hour traffic.

She is a telecommuter, for instead of keeping to the traditional routine of driving to and from an office each day, she works from home. Sometimes she even works from a park or a coffee house. She still goes to the office, just not as often. She drives to work only when it makes sense to do so, that is, only when the office offers the environment best suited to completing whatever task is at hand.

She telecommutes because she likes it. She'd rather sleep in than hit the highways and she enjoys the comfortable work environment she's created at home. In fact, her personalized workspace actually helps boost her productivity. Clearly, there are many selfish reasons to choose telecommuting, but the benefits of working at home extend far beyond the individual telecommuter.

Telecommuting may be the most cost-effective way to reduce rush-hour traffic and it also helps improve air quality, highway safety, and health care—new technology allows top-notch physicians to be (virtually) anywhere.

Telecommuting touches a surprisingly wide range of issues. It may be the most cost-effective way to reduce rush-hour traffic and it also helps improve air quality, highway safety, and health care—new technology allows top-notch physicians to be (virtually) anywhere. Telecommuting expands opportunities for the handicapped, conserves energy, and—when used as a substitute for offshore outsourcing— it can help allay globalization fears. It can even make companies more profitable, which is good news for our nation's managers, many of whom have long been suspicious of telecommuting.

What's even more noteworthy is that all these good things have happened rather quietly.

Our telecommuter's neighbors may not know they live next door to a telecommuter, and if they do, it's unlikely they appreciate the impact her simple decision has on the world around them. More and more Americans are working from home, yet policymakers have been slow to appreciate this trend. Perhaps this has something to do with the fact that telecommuters typically do not organize and speak with one voice the way so many other attention-grabbing interest groups do. Telecommuting is a very decentralized practice. Telecommuters are not clustered in one location or in one industry and those who work from home do not think of themselves as telecommuters first. They identify themselves in many other ways—as a parent, by their profession, by religion or political party—before they identify themselves as a telecommuter.

Telecommuting has snuck up on policymakers who have spent decades trying to get us out of our cars. They crafted many policies designed to support alternatives to driving, yet Americans are driving more than ever.

Some policymakers hoped for a public transit revival, but even with hefty public subsidies transit's commute share still declines. Some policymakers have tried to meet motorists half-way. They decided that if Americans are determined to stay in their cars they should at least put more passengers in them. In hopes that carpooling would take cars off the road, policymakers built carpool lanes at a rapid clip. Today our nation is home to 2,400 miles of carpool lanes, roughly the airline distance across the continental United States. And yet carpooling's commute share continues to decline. Compared to recent decades, Americans are even less likely to commute on foot or by bicycle. Other than driving alone, telecommuting is the only commute mode to gain ground since 1980.

It's time we learned more about these people who have quietly done so much.

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Telecommuters: Who Are They? How Many Are There? Where Are They?

Researchers have had a very hard time defining telecommuting.[1] Nearly everyone agrees that salaried employees who work from home instead of commuting to an office are telecommuters. But what about home-based workers, live-in nannies, and contract workers? Should part-day telecommuters be counted as telecommuters?

Indeed one's definition of a telecommuter will depend on the purpose one has in mind.[2] Later discussion will broaden to explain the wide-ranging benefits telecommuting offers to employees, companies, and to society at large. But this study's first purpose is to address telecommuting from a congestion mitigation standpoint. Some studies consider telecommuting's effects on, for example, total vehicle miles traveled. Such research is important, yet this study will focus more directly on peak-period travel (generally weekdays 6-9 a.m. and 4-7 p.m.). Traffic congestion is a large, growing, and often debilitating problem for our nation's large metropolitan areas with extreme congestion. Though these areas may be gridlocked during the morning and afternoon rush, they flow much more smoothly during other times.

Surprisingly, no matter the time, most people on the road are not driving to and from work.[3] Even at 8:00 Monday morning most motorists are not on their way to work: they're embarking upon many different kinds of non-work trips (going to school, visiting friends, shopping, going to the dentist, and so on). But even though most people on the road at rush hour are not work commuters, work trips are highly concentrated during that time and the high concentration of work trips is substantial enough to drag many of our roads into gridlock. Also, the work trip often anchors other kinds of trips. In other words, when a person decides to go to the dry cleaners or the post office often has much to do with when he or she goes to and from work. If work trips were evenly distributed, motorists in most areas would find traveling during the morning and afternoon much more tolerable.
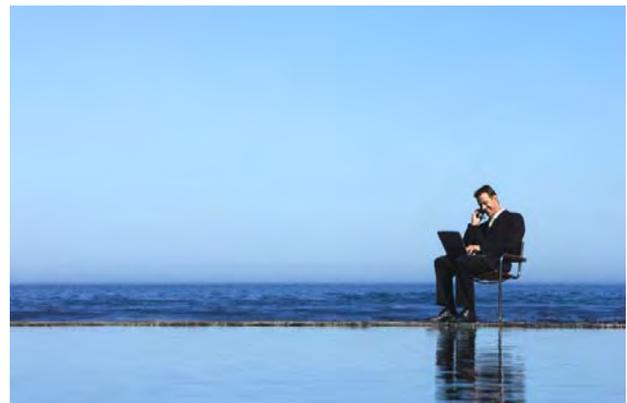
Who Are They?

Telecommuters tend to:

- Be highly educated.
- Be financially well-off.
- Have children in the household.
- Work in management or sales.
- Have jobs that do not require face-to-face contact with coworkers or employees.
- Have worked at their current job for a rather long period of time.

How Many?

- Roughly 4.5 million Americans telecommute most work days.
- Roughly 20 million telecommute for some period at least once per month.
- Nearly 45 million telecommute at least once per year.

Where?

Among the 50 most populous metropolitan areas, the top telecommuting areas are …

- Denver
- Portland
- San Diego

A. Who Are They?

Since congestion is at its worst during periods of high work commuting, that is where this study will focus. The emphasis on commuters is a key reason why this study puts added importance on analyses that track work trips. Here, whether or not someone is a telecommuter will depend mostly on one question: Is the worker helping to reduce peak-hour congestion?

If the answer is "yes," that worker is helping improve traffic flow at a most critical time. And since congestion is non-linear, small changes can have a disproportional effect on travel times. Just as a small increase in traffic can turn a highway from free flow to gridlock, a small decrease in traffic can bring a highway back to improved flow.

This study's definition of telecommuter includes salaried employees of companies who work from home instead of driving to the office. It also includes home-based business owners or home-based workers. Some researchers do not include home-based workers on the grounds that, because they are based at home, they are

not avoiding a trip to the office. Yet it is reasonable to assume if the option to work at home were somehow wiped away, most home-based workers would not stop working. They would simply work somewhere else, which would likely entail a conventional commute.[4] Unlike other telecommuters who work at home less often, home-based workers are more likely to avoid a work commute every day. In this respect they may be the ultimate telecommuters, providing perhaps the most congestion relief.

Someone who works from home during peak hours and commutes during off-peak periods also helps reduce peak-hour travel. But because so little is known about these part-day telecommuters, they will not be included in this quantification of telecommuting. Somewhat more attention has been paid to center-based telecommuters—those who travel to a telecommuting center located closer to their home instead of traveling to an office—yet there is still not enough information available to quantify them either. Since center-based telecommuting probably accounts for only a tiny portion of the workforce, excluding these telecommuters probably does not do much to compromise our view of telecommuting. (Of course, center-based telecommuting or the use of distributive workplaces, as well as other forms of telecommuting, may very well increase in the future.)

Telecommuters themselves are a rather mixed bunch. As telecommuting-enabling technology continues to improve, as more jobs become suitable for telecommuting, and as more managers embrace telecommuting, we can expect telecommuters to be even more heterogeneous. Even so, we can make some general assumptions about the characteristics of telecommuters.[5]

Telecommuters tend to:

- Be highly educated.

- Be financially well-off.

- Have children in the household.

- Work in management or sales.

- Have jobs that do not require face-to-face contact with coworkers or employees.

- Have worked at their current job for a rather long period of time.

The time spent at the current job suggests that telecommuting is a learning process. Someone new to a job does not yet have a clear picture regarding which parts of the job—if any—may be suitable to telecommuting. Perhaps even more important is trust. Telecommuters must prove to their employers that they are productive, even in the absence of constant supervision.

B. How many are there?

A concept that is difficult to define is, of course, also difficult to quantify. Many different studies, organizations and government bodies have come up with many different telecommuting figures. The Bureau of Labor Statistics puts the number of at-home workers—defined as those who work from home for some period at least once per week—at nearly 20 million.[6] For its Journey-to-Work figures the U.S. Census Bureau defines an at-home worker as someone who "usually" works from home and since this definition is more narrow than the BLS definition the number will naturally be smaller. The Census counts 4.2 million Americans as at-home workers in 2000 accounting for 3.3 percent of the work trip market share.[7] The

American Community Survey finds 4.5 million telecommuters in 2003 accounting for 3.5 percent of the work trip market share.[8]

This study's primary reliance on Census figures means that while its definition of a telecommuter is wider than some, its focus on those who telecommute "usually" means its threshold is more stringent than most.[9] (Using Census figures also makes it easier to chart changes over time and among many different metropolitan areas.) Still, it is probably not necessary to hold to one definition of telecommuting. The practice is a highly personalized one and as such workers will come up with countless variations of the theme. No doubt many of those variations will continue to frustrate those of us who try to quantify telecommuting.

Telecommuting is most prevalent in fast-growing areas with high concentrations of technologically savvy workers.

C. Where Are They?

Like telecommuters it is difficult to generalize about the top telecommuting metropolitan areas. But again, that's not to say there aren't any similarities. Most tend to be fast-growing areas with high concentrations of technologically savvy workers who feel comfortable using the Internet and other tools common to remote work.

Since Colorado has the highest concentration of technology workers we should not be surprised to find Denver atop the telecommuting list (Table 1).[10]

Table 1: Top Telecommuting Metros (Work Trip Market Share 2000)		
Rank	**MSA**	**% Telecommute (2000)**
1.	Denver	4.7
2.	Portland	4.6
3.	San Diego	4.4
4.	Seattle	4.2
5.	W. Palm Beach	4.1
5.	San Francisco	4.1
7.	Sacramento	4
8.	Salt Lake City	3.8
8.	Minneapolis	3.8
10.	Phoenix	3.7

Source: U.S. Census Bureau

If we examine recent telecommuting growth we again find that telecommuting is associated with high population growth (Table 2). Recent telecommuting growth has been particularly robust in the South and West, the areas that have led the nation in population growth.

Table 2: Top Metros by Telecommuting Growth (Percent Increase 1990-2000)		
Rank	MSA	% increase 1990-2000
1.	Atlanta	59
2.	Raleigh-Durham	52
2.	W. Palm Beach	52
4.	Memphis	47
4.	Charlotte	47
6.	Orlando	45
7.	Las Vegas	44
8.	New Orleans	41
9.	Miami	40
10.	Chicago	38

Source: Calculated from U.S. Census Bureau Data

Turning toward trends since 1980 (Table 3) our data set shrinks somewhat, but we can still note how telecommuting has grown in our nation's larger metropolitan areas. By this measure Washington, D.C. leads the pack and Atlanta still makes a very strong showing. Again, the list is dominated by the South and West, with metros in those regions accounting for eight of the top 10.

Table 3: Top Metros by Telecommuting Growth (Percent Increase 1980-2000)		
Rank	MSA	% increase 1980-2000
1.	Washington, D.C.	234
2.	Atlanta	192
3.	Chicago	144
4.	Los Angeles	137
5.	Miami	135
6.	Phoenix	131
7.	New Orleans	129
8.	Denver	128
9.	Houston	127
10.	Dallas	121

Source: Calculated from U.S. Census Bureau Data

P a r t   3

How Does it Rate?

It is difficult to gauge telecommuting's performance without first comparing it to other commute modes. Here we focus on comparing telecommuting with the most popular commute modes, driving (sometimes separated into solo driving and carpooling) and public transit.

Solo driving is by far the most popular commute mode, accounting for over three-fourths of work trips. Telecommuting's work trip market share of just over 3 percent is indeed small when compared against single occupancy driving, but as we look for ways to relieve congestion—as well as ways to mitigate other negative effects of driving—we need not look for a single solution. The solution will likely be found not in one grand policy; rather it will emerge only after a variety of proposals has been cobbled together. Telecommuting is not *the* solution, but it is *a* solution. And there is still much reason to tout telecommuting on its own merits. For example, telecommuting's performance is quite impressive when considering three key metrics—growth, impact, and cost-effectiveness.

Telecommuting is not *the* solution, but it is *a* solution.

A. Growth

Since 1980, only one commute mode besides single occupancy driving has increased—telecommuting. And telecommuting's growth has surpassed that of driving alone (Figure 1). The Census Bureau notes that from 1990 to 2000 the number of those who usually worked at home grew by 23 percent, more than twice the rate of growth of the total labor market.[11] Other evidence of growth can be found in the American Community Survey, which finds that telecommuting has continued to grow from 2000 to 2003.[12] Though it uses a very broad definition of telecommuting, a survey by Dieringer Research Group finds that the practice grew from 2003 to 2004.[13]

Figure 1: Percent Change by Mode (Journey to Work 1980-2000)

☐ Work at Home ■ SOV ■ HOV ■ Transit ■ Walk

Percent Change

60
40
20
0
-20
-40
-60

Source: U.S. Decennial Census
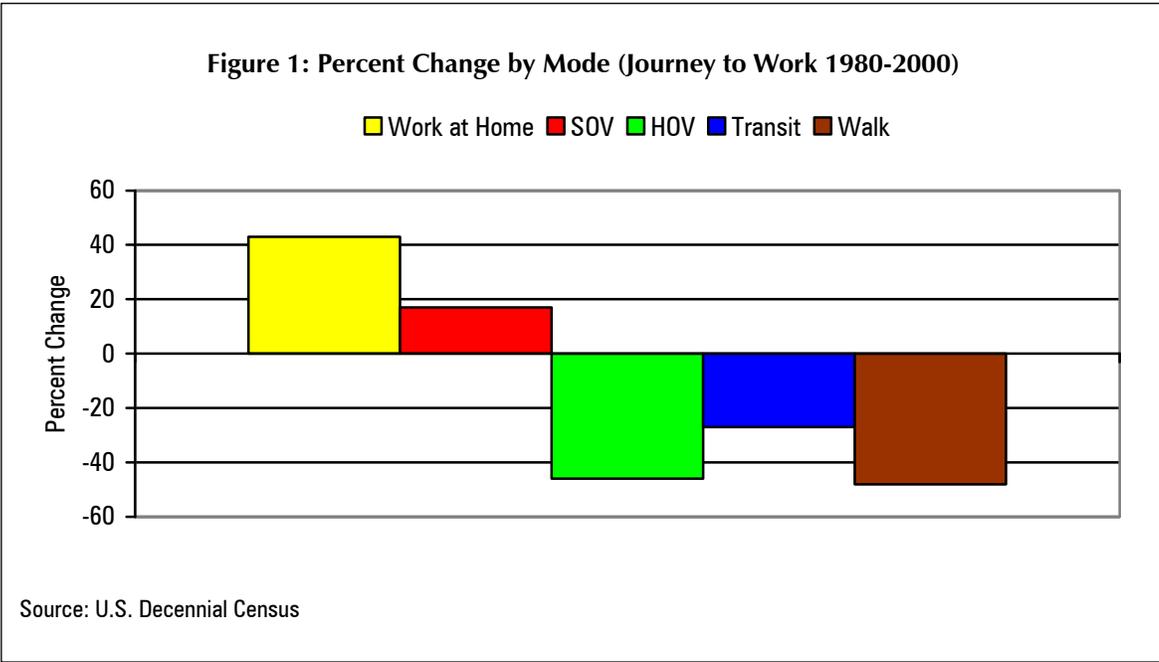
Certainly the strong growth figures depicted in Figure 1 have much to do with the fact that, since it started from a small base, telecommuting had much more room for growth. Yet carpooling and transit also had much room for growth and they also enjoyed the huge advantage of policy support. Our nation moved quickly to add more and more carpool lanes (referred to as a "high occupancy vehicle" or HOV) and to devote more money to transit, yet both modes declined anyway (Figures 2 and 3). (Walking has also declined, and is now a less common commute mode than transit or telecommuting.)

Figure 2: More Carpool Lanes, But Less Carpooling (Change 1980 - 2000)

☐ HOV route miles* (868% increase) ■ HOV work trip market share (38% decrease)

1000%
800%
600%
400%
200%
0%
-200%

* HOV route mile growth measured from 1983 to 2001.

Source: U.S. Census Bureau, Chuck Fuhs and Jon Obenberger, "HOV Facility Development: A Review of National Trends," Transportation Research Record No. 1781, "HOV and Demand Management 2002, Transportation Research Board, Washington, D.C., 2002.

Figure 3: More Transit Spending, But Less Transit Commuting (Change 1980-2000)

☐ Annual Transit Subsidy (133% increase)   ☐ Work-trip Market Share (26% decrease)
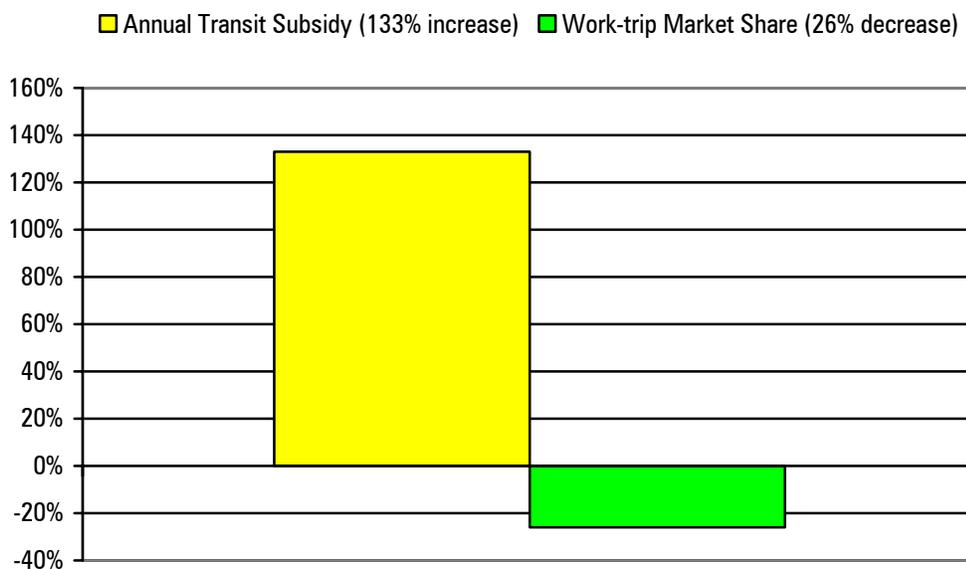
Data compared using 2002 dollars. Sources: US Census, FTA National Transit Database, PublicPurpose.com

In every metropolitan area solo driving's work-trip market share has increased and carpooling's has decreased. Only Houston and Las Vegas experienced a decrease in the share of total auto commuting and the only areas to increase transit's share were Houston, Phoenix, San Diego, Orlando, and Las Vegas (although, except for Houston, these areas started from a very low base). Meanwhile telecommuting has enjoyed widespread growth. Every major metro area for which data are available has experienced great telecommuting growth (Table 4).

Table 4: Work Trips in the Top 50 Metropolitan Areas (All figures are percentages (%))
Growth = Change in Mode (1980 to 2000)   Share = Work Trip Market Share (2000)

MSAs listed by Population	SOV* Growth	SOV Share	HOV	HOV Share	Total Auto Growth	Total Auto Share	Transit Growth	Transit Share	Work at Home Growth	Work at Home Share
New York	16	56.3	-38	9.4	3	65.7	-6	24.7	97	3
Los Angeles	3	72.4	-11	15.2	0	87.6	-8	4.7	137	3.6
Chicago	19	70.5	-35	11	7	81.5	-29	11.5	144	2.9
Washington, DC	25	70.4	-44	12.8	5	83.2	-25	9.4	243	3.5
San Francisco	8	68.1	-21	12.9	2	81	-17	9.3	114	4.1
Philadelphia	22	73.3	-43	10.3	7	83.6	-30	8.7	78	2.8
Boston	22	73.9	-55	8.8	3	82.7	-5	8.9	NA	3.2
Detroit	13	84.2	-45	9.3	2	93.5	-47	1.8	119	2.3
Dallas	11	78.8	-32	14	1	92.8	-47	1.8	121	3
Houston	11	77	-37	14.2	-1	91.2	10	3.2	127	2.5
Atlanta	12	77	-33	13.6	2	90.6	-47	3.7	192	3.5
Miami	10	76.6	-30	13.4	1	90	-22	3.8	135	2.8
Seattle	12	71.6	-32	12.8	2	84.4	-16	6.3	103	4.2

Table 4: Work Trips in the Top 50 Metropolitan Areas (All figures are percentages (%)) Growth = Change in Mode (1980 to 2000) Share = Work Trip Market Share (2000)									
MSAs listed by Population	SOV* Growth	SOV Share	HOV	HOV Share	Total Auto Growth	Total Auto Share	Transit Growth	Transit Share	Work at Home Growth	Work at Home Share
Phoenix	7	74.6	-21	15.3	1	89.9	5	2	131	3.7
Minneapolis	24	78.3	-50	10	6	88.3	-46	4.5	63	3.8
Cleveland	17	82.3	-46	8.7	5	91	-54	3.5	116	2.7
San Diego	16	73.9	-25	13	7	86.9	3	3.4	116	4.4
St. Louis	23	82.6	-54	9.9	4	92.5	-57	2.4	72	2.8
Denver	16	75.6	-43	11.5	2	87.1	-24	4.4	128	4.7
Tampa	11	79.7	-33	12.4	2	92.1	-24	1.3	99	3.1
Pittsburgh	26	77.4	-51	9.7	7	87.1	-40	6.2	95	2.4
Portland	12	73.1	-34	12.1	2	85.2	-22	5.6	109	4.6
Cincinnati	17	81.4	-47	10	4	91.4	-48	2.9	100	2.7
Sacramento	9	75.3	-24	13.5	2	88.8	-18	2.8	99	4
Kansas City	20	82.8	-52	10.4	3	93.2	-66	1.3	104	3.4
Milwaukee	22	80.1	-48	9.9	6	90	-44	4	58	2.5
Orlando	16	80.6	-40	12.1	4	92.7	6	1.7	NA	2.9
Indianapolis	17	82.8	-50	10.5	2	93.3	-57	1.3	79	2.9
San Antonio	14	76.2	-27	14.7	5	90.9	-36	2.9	83	2.6
Norfolk	31	78.9	-48	12.1	9	91	-60	1.8	NA	2.7
Las Vegas	5	74.5	-21	15	-1	89.5	100	4	NA	2.3
Columbus	16	82	-47	9.6	3	91.6	-45	2.3	95	3
Charlotte	17	80.9	-45	12.9	2	93.8	-46	1.4	NA	2.8
New Orleans	18	73	-31	14.6	6	87.6	-46	5.5	129	2.4
Salt Lake City	17	77.2	-41	13.1	2	90.3	-39	3	NA	3.8
Greensboro	15	81.2	-42	13.1	1	94.3	-44	0.9	NA	2.4
Austin	13	76.5	-35	13.7	2	90.2	-10	2.6	NA	3.6
Nashville	17	80.7	-43	12.8	3	93.5	-71	1	NA	3.2
Providence	23	80.7	-51	10.6	5	91.3	-44	2.5	NA	2.1
Raleigh-Durham	20	78.5	-46	12.9	2	91.4	-37	1.7	NA	3.5
Hartford	23	82.5	-56	9	4	91.5	-47	2.8	NA	2.5
Buffalo	23	81.7	-49	9.4	7	91.1	-45	3.6	40	2.1
Memphis	17	80.9	-35	13	5	93.9	-63	1.7	NA	2.2
W. Palm Beach	13	79.6	-41	11.9	1	91.5	-21	1.5	NA	4.1
Jacksonville	21	80.3	-42	12.6	5	92.9	-67	1.5	NA	2.3
Rochester	26	81.8	-57	9.1	6	90.9	-59	2	NA	2.9
Grand Rapids	15	84	-49	9.2	2	93.2	-47	0.8	NA	3.1
Oklahoma City	13	81.8	-41	12	1	93.8	-45	0.6	NA	2.8
Louisville	19	82	-49	10.9	3	92.9	-51	2.2	NA	2.4
Richmond	NA	82	NA	10.4	NA	92.4	NA	2.1	NA	2.6

* SOV = Single Occupancy Vehicle; HOV = High Occupancy Vehicle; Transit = rail + bus + taxi.

Source: Calculated from 2000 U.S. Census Bureau data   NA = Not available

B. Impact

Telecommuting is quickly gaining ground on transit as the most popular non-automobile commute mode. In many respects, telecommuting has already surpassed transit. In 2000, there were 4,184,223 telecommuters and 6,067,703 transit commuters nationwide. Yet this view is complicated by the transit anomaly of the New York metropolitan area. This one area accounts for over 38 percent of our nation's transit commuters. Remove this outlier and, nationwide, telecommuters outnumber transit commuters (3,904,656 to 3,747,218). And when the 50 most populous metropolitan areas are considered separately, telecommuters outnumber transit commuters in a majority (27) of cases (see Table 5A). Sometimes the margin is quite large.

Telecommuters outnumber transit commuters in places like San Diego, Dallas, and Phoenix. They outnumber transit commuters by more than two to one in places like Raleigh-Durham, Tampa-St. Petersburg, and Nashville. In Oklahoma City telecommuters outnumber transit commuters by nearly five to one.

Table 5A: Number of Telecommuters Per Transit Commuter			
MSA	**Telecommuters/ Transit Commuters**	**MSA**	**Telecommuters/ Transit Commuters**
Oklahoma City	4.67	Louisville	1.09
Grand Rapids	3.88	Denver	1.07
Nashville	3.20	Atlanta	0.95
W. Palm Beach	2.73	Cincinnati	0.93
Greensboro	2.67	San Antonio	0.90
Kansas City	2.62	Hartford	0.89
Tampa	2.38	Minneapolis	0.84
Indianapolis	2.23	Providence	0.84
Raleigh	2.06	Portland	0.82
Charlotte	2.00	Houston	0.78
Phoenix	1.85	Cleveland	0.77
Orlando	1.71	Los Angeles	0.77
Dallas	1.67	Miami	0.74
Jacksonville	1.53	Seattle	0.67
Norfolk	1.50	Milwaukee	0.63
Rochester	1.45	Buffalo	0.58
Sacramento	1.43	Las Vegas	0.58
Austin	1.38	San Francisco	0.44
Columbus	1.30	New Orleans	0.44
San Diego	1.29	Pittsburgh	0.39
Memphis	1.29	Washington, DC	0.37
Detroit	1.28	Boston	0.36
Salt Lake City	1.27	Philadelphia	0.32
Richmond	1.24	Chicago	0.25
St. Louis	1.17	New York	0.12

Source: Calculated from 2000 U.S. Census Data

In the 23 areas with rail transit, rail commuters outnumber telecommuters in only five cases (New York, Chicago, Washington, D.C., Philadelphia, and Boston). Note these are areas with well-established heavy rail systems that offer many capacity advantages compared to the light rail systems that have opened in recent decades. But even in heavy rail San Francisco, telecommuters outnumber rail commuters. In light rail areas, telecommuters often outnumber rail commuters by particularly wide margins. In San Diego the figure is 22 to 1, and in Denver it is 47 to 1 (see Table 5B).[16]

Why do certain areas have such large disparities? While answering such questions in detail is beyond the scope of this study, we can at least begin the chin-scratching process.

Rail areas like San Diego, Portland, and Denver may be revealing the effects of economies with high concentrations of high-tech workers. These areas also have very high concentrations of "early adopters"—people who are quick to make use of new technology. Improved technology often makes it easier for workers to telecommute. Recall that these areas already lead the nation in telecommuting. Conversely, the limitations of rail can frustrate the desire to commute by transit. Because of the time and expense involved in building a rail network, it is difficult for rail transit to serve much more than a small collection of corridors in a metropolitan area. This is true even for an area like Portland, which has made such a strong commitment to rail transit.

So whether we examine rail specifically or transit in general, service intensity also plays a role in such disparities. If an area has little transit service we cannot expect transit to make much impact. It is not surprising, then, that New York and Oklahoma City are on opposite ends of the telecommuter-transit commuter list. Then again, even if New York's transit system could somehow be superimposed on Oklahoma City it's unlikely Oklahoma City's transit share would bear any resemblance to New York's. Since they are typically based on the hub-and-spoke model, transit systems have more substantial work trip market shares when they can transport large numbers of commuters to and from downtown. Naturally, these systems work best when downtown employment centers are large. New York's downtown contains about a quarter of area employment, the highest percentage in the nation. Oklahoma City's downtown accounts for only a tiny percentage of jobs and, as we will examine later, it is difficult for transit systems to serve areas where decentralized employment is the norm. Notably, the strong trend toward decentralization has also impacted New York, as its downtown is also losing influence to suburban areas.

Table 5B: Number of Telecommuters Per Rail Commuter (Areas with Rail in 2000)			
MSA	**Telecommuters/rail commuters**	**MSA**	**Telecommuters/rail commuters**
Denver	47.00	Portland	9.20
Dallas	30.00	Cleveland	9.00
Hartford	25.00	Buffalo	7.00
Pittsburgh	24.00	Miami	5.60
Greensboro	24.00	Atlanta	3.18
San Diego	22.00	Providence	3.00
West Palm Beach	20.50	San Francisco	1.17
St. Louis	14.00	Philadelphia	0.85
Sacramento	13.33	Washington, DC	0.70
Salt Lake City	12.67	Boston	0.58
Los Angeles	12.00	Chicago	0.44
		New York	0.18

Source: Calculated from 2000 U.S. Census Data

Various trends (see Part 5, Section B), from the expansion of telecommuting friendly technology to the increase in telecommuting friendly professions, leave telecommuting poised for future growth. Indeed in some of our nation's largest cities, for example, Atlanta, Houston, and Los Angeles, the number of telecommuters and transit commuters is almost even. Each of these areas has experienced strong recent growth in telecommuting (see Table 3) and they also tend to contain high concentrations of early adopters. We should not be surprised if telecommuting soon overtakes transit commuting in other metropolitan areas. Although relatively few people live near a bus stop or rail station, each day more of us realize we have the tools—laptop, cell phone, broadband—to create our own "telecommuting stations."

C. Cost-effectiveness

Telecommuting continues to grow even though investments in it are comparatively minor. There are some costs associated with telecommuting (computer, Internet access, phone, etc.), but in most cases these costs are tiny compared to costs associated with driving (insurance, gas, repairs, and depreciation). And unlike the cost of building, operating, and maintaining highway and transit facilities, telecommuting costs almost always fall upon the workers themselves or their employers. Taxpayers pay almost nothing. In fact, it is difficult to determine if, on balance, telecommuting is subsidized slightly or if the practice actually results in increased government revenue.[17]

The cost disparity becomes even more pronounced when one considers how much benefit is purchased. Driving costs a great deal but it yields a great deal of transportation benefit. Nearly 88 percent of Americans travel to and from work on roads and that figure does not count bus transit commuters, who, of course, also use roads. Moreover, drivers pay most driving-related costs themselves. In fact, when considering federal subsidies, highway users pay more through taxes than they get in return. This is true whether measured on the basis of net federal subsidy per thousand passenger miles or total dollar amount of net federal subsidy.[18] Taking a longer view and considering total federal, state, and local highway spending reveals that monies collected from highway users over the years 1961 through 2002 ranged from a low of 66 percent of all highway and local street spending (in 1981) to a high of 92 percent (in 1996).[19]

When it comes to cost-effectiveness the starkest comparison may be between telecommuting and transit, where transportation benefits are similar but costs to taxpayers are anything but. Transit subsidies keep increasing, absolutely and in terms of market share, yet their significance has shrunk. From 1980 to 2000, subsidies increased by 133 percent, but the total number of commuters taking transit dropped by 2 percent. Meanwhile, telecommuting has continued to contribute more, even without public subsidies. From 1980 to 2000, the number of telecommuters grew by 92 percent.

Table 6: Cost Effectiveness: Transit vs. Telecommuting				
	1980	**1990**	**2000**	**Change 1980-2000**
Transit				
Total workers	6,175,061	6,069,589	6,067,703	-2%
Work trip Market share	6.4%	5.3%	4.7%	-26%
Yearly Subsidy*	$10.6B	$17.7B	$24.7B	+133%
Telecommuting				
Total workers	2,179,863	3,406,025	4,184,223	+92%
Work trip Market share	2.3%	3.0%	3.3%	+43%
Yearly Subsidy	0	0	0	0

Source: US Census, FTA National Transit Database, PublicPurpose.com

*Includes state, local, and federal subsidies

Telecommuting is particularly impressive when one considers that it has a positive impact on such a wide range of issues. It offers key transportation benefits like congestion relief, but that is just the beginning.

The Many Benefits of Telecommuting

A. Congestion Relief

Some hypothesize that telecommuting does not necessarily reduce driving. Perhaps telecommuters make up for fewer work trips by making more non-work trips. Some posit that telecommuters might live farther away from their jobs, and thus, the driving distance avoided during telecommuting days would be offset by the longer commute on non-telecommuting days.

Yet the evidence suggests that telecommuting does indeed reduce auto travel:

> *Most studies of VMT [vehicle miles traveled] and trip reductions from telecommuting show that telecommuters significantly reduce both daily trips and VMT. Not only does commute VMT fall, but noncommute VMT appears to fall in some cases as well. No study that we reviewed showed a significant increase in noncommute travel for telecommuters. Findings across the studies show that the average number of daily trips taken on telecommuting days is anywhere from 27 percent to 51 percent lower than on nontelecomuting days, and VMT is 53 percent to 77 percent lower.*[20]

Commuters cut driving by up to 77 percent on days they telecommute.

We must also return to cost effectiveness for if cost were not an issue we could devise all sorts of plans to reduce driving (Helicopter shuttles, perhaps?). But of course cost is always a constraint, and in recent decades it has grown in importance. It is then crucial to note how favorably telecommuting compares to transit, the most popular non-automobile form of surface transportation, on cost-effectiveness grounds. A University of California, Davis study compared transit and telecommuting on the basis of how well they reduce VMT. Even though the study used a more narrow definition of telecommuting (i.e. home-based workers were excluded), the authors conclude that "telecommuting appears to be far more cost-effective in terms of public sector expenditures."[21]

Still, increasing driving does not necessarily increase congestion. Congestion is less an issue of *how much* driving occurs, and more an issue of *when* and *where* it occurs. For example, we have seen that telecommuting tends to reduce total trips. But what if this were not the case? What if telecommuting prompted so many non-work trips that telecommuters made more total trips? Even under this scenario, telecommuting would help ease peak-period congestion.

Since the work trips telecommuters avoid are concentrated during peak hours, telecommuting helps relax congestion during the period when congestion is most in need of relaxing. In fact, an analysis of Washington D.C. commuting by George Mason University's Laurie Schintler found that traffic delays would drop by 10 percent for every 3 percent of commuters who work at home. Schintler says telecommuting is "one of the easiest things we can do" to reduce traffic delays.[22]

1. Can Congestion Relief Be Maintained?

Even if individual telecommuters help reduce congestion, how can we be sure that other commuters won't spoil these gains? It is true that congestion relief delivered by telecommuting could be at least partially offset by what researcher Anthony Downs has called "triple convergence" (where motorists modify their time, route, and mode of travel to take advantage of less congested conditions) and suppressed demand (where trips that were once avoided due to congestion are now taken).[23] Yet this is not a special vulnerability of telecommuting. It does not matter how congestion relief is achieved, a faster travel time will always be attractive to motorists. Congestion relief brought about through, say, increased highway capacity or more transit service would be just as vulnerable to offsetting effects. Road pricing and higher gas taxes are, perhaps, the only congestion mitigation approaches in which improved driving conditions can be completely maintained.

Further, researchers often overstate the degree to which improved travel conditions erode.[24] They also tend to overlook the economic benefits of increased travel. Of course there are also social benefits because more travel also means more people are meeting with friends and loved ones, going to the beach, the park and so on. Even Anthony Downs does not believe that its existence should dissuade decision-makers from expanding capacity. He points to benefits that policymakers often overlook:

> The triple convergence principle does not mean that expanding a congested road's capacity has no benefits. After expansion, the road can carry more vehicles per hour than before, no matter how congested it is, so more people can travel on it during those more desirable periods. Also, the periods of maximum congestion may be shorter, and congestion on alternative routes may be lower.[25]

Telecommuting can offer the equivalent of more highway capacity, for instead of commuting on the road, some workers "commute" via their laptops.

2. Taking Cars Off The Road

Take a closer look at commuting demographics and it seems that telecommuting would be particularly likely to take cars off the road. Transit patrons generally use transit because they have no other choice. According to the 1995 Nationwide Personal Transportation Survey, 70 percent of transit trips were made by people without access to cars, so if transit service suddenly disappeared it is incorrect to assume that most transit commuters would become single-occupancy car commuters.[26] On the other hand, telecommuters are much more likely to be car owners, so if the option of telecommuting were to suddenly disappear, we can reasonably assume that most telecommuters would simply get back into their cars.

There is also reason to believe that those who choose telecommuting over driving would be less likely to hit the road again if travel times suddenly quickened. If "Alvin" decides to leave his car in the garage and

telecommute to work, he could easily save himself one hour per day. As long as Alvin enjoys telecommuting and finds it to be a good fit with his job, it is going to be difficult to coax him back onto the road. Say some miraculous policy decision cut his drive commute time in half. Driving would still cost him 30 minutes more each day than telecommuting. Telecommuting is difficult to top because it offers what most commuters only fantasize about—the zero-minute commute. People change their commute mode only if what they could get is better than what they currently have. It is difficult to offer a commuter something better than no commute at all.

Telecommuting offers cost-effective congestion relief, but it also offers much more. Its benefits cut across many seemingly unrelated policy areas. In fact, one could argue that the heartiest benefits have little to do with transportation policy per se.

Here we note some of the benefits that telecommuting offers to workers, businesses, and to society at large.

Telecommuting is difficult to top because it offers what most commuters only fantasize about—the zero-minute commute.

B. Benefits to Workers

1. More Time

The most widespread and immediately felt benefit of telecommuting is the extra time enjoyed by the telecommuter. In many cities the time savings of avoiding a day's worth of commuting amounts to roughly one hour (and that does not include the time it takes to get ready for work). What a telecommuter decides to do with that extra time is an individual choice. Eat breakfast with the kids, go to the gym, read the newspaper, or maybe get some extra shut-eye? Some may choose to start the work day earlier and use their "extra" hour later in the day.

Telecommuting offers potentially big cumulative time savings. In most of our nation's large cities, those who telecommute "usually" (three out of five work days) for a year would save five or more calendar days (roughly 15 8-hour work days!). New York City commuters would save the most time—nearly 8 days (23 work days) per year. Even those who would telecommute occasionally have much to gain (Table 7).

Avoiding the daily commute is the most obvious source of time savings, but there are others. After all, roads are not the only places subject to rush-hour traffic. Grocery stores, malls, health clubs, the post office, and countless other places go through periods of high and low congestion. Telecommuting allows workers to find more time savings by reorganizing their lives to take advantage of many different kinds of low congestion periods. Those who shop during off-peak times find it easier to park; they also waste less time standing in the checkout line.

Table 7: Potential Yearly Time Savings of Telecommuting			
City	Roundtrip Commute time (min.)	Usually TC* Time Savings (Days)	Always TC Time Savings (Days)	Occasional TC** Time Savings (Days)
New York	76.6	7.66	12.77	5.11
Chicago	66.4	6.64	11.07	4.43
Newark	63	6.3	10.50	4.20
Riverside, CA	62.4	6.24	10.40	4.16
Philadelphia	58.8	5.88	9.80	3.92
Los Angeles	58	5.8	9.67	3.87
Miami	58	5.8	9.67	3.87
Baltimore	58	5.8	9.67	3.87
San Francisco	57	5.7	9.50	3.80
Washington, DC	56.8	5.68	9.47	3.79
Boston	54.6	5.46	9.10	3.64
Anaheim, CA	53	5.3	8.83	3.53
Oakland	52.6	5.26	8.77	3.51
Long Beach, CA	51.8	5.18	8.63	3.45
Houston	51.6	5.16	8.60	3.44
Seattle	51.4	5.14	8.57	3.43
Stockton	51.2	5.12	8.53	3.41
Mesa ,AZ	51	5.1	8.50	3.40
Santa Ana, CA	50.6	5.06	8.43	3.37
Aurora, CO	50	5	8.33	3.33
Arlington, TX	49.8	4.98	8.30	3.32
Cleveland	49.6	4.96	8.27	3.31
Detroit	49.4	4.94	8.23	3.29
Las Vegas	49.2	4.92	8.20	3.28
Phoenix	49	4.9	8.17	3.27
Charlotte	49	4.9	8.17	3.27
Atlanta	48.4	4.84	8.07	3.23
San Jose	47.6	4.76	7.93	3.17
Memphis	47.2	4.72	7.87	3.15
Dallas	47.2	4.72	7.87	3.15
San Diego	46.8	4.68	7.80	3.12
Jacksonville	46.4	4.64	7.73	3.09
Fort Worth	45.6	4.56	7.60	3.04
Denver	45.2	4.52	7.53	3.01
New Orleans	45.2	4.52	7.53	3.01
San Antonio	45	4.5	7.50	3.00
Portland, OR	44.8	4.48	7.47	2.99
Honolulu	44.6	4.46	7.43	2.97
Austin	43.8	4.38	7.30	2.92
Milwaukee	43.8	4.38	7.30	2.92
Indianapolis	43.4	4.34	7.23	2.89

Table 7: Potential Yearly Time Savings of Telecommuting			
City	**Roundtrip Commute time (min.)**	**Usually TC* Time Savings (Days)**	**Always TC Time Savings (Days)**	**Occasional TC** Time Savings (Days)**
Virginia Beach	43.4	4.34	7.23	2.89
Tampa , FL	43	4.3	7.17	2.87
St. Louis	43	4.3	7.17	2.87
Pittsburgh	42.4	4.24	7.07	2.83
St. Paul	42	4.2	7.00	2.80
Cincinnati	42	4.2	7.00	2.80
Raleigh	41.8	4.18	6.97	2.79
Kansas City	41.4	4.14	6.90	2.76
Nashville-Davidson	41.4	4.14	6.90	2.76
Tucson	41.2	4.12	6.87	2.75
Sacramento	41.2	4.12	6.87	2.75
Minneapolis	40.4	4.04	6.73	2.69
Columbus, OH	40	4	6.67	2.67
Colorado Springs	39	3.9	6.50	2.60
Toledo	39	3.9	6.50	2.60
Buffalo	38.8	3.88	6.47	2.59
Bakersfield, CA	38.6	3.86	6.43	2.57
Fresno	38.6	3.86	6.43	2.57
Lexington-Fayette, KY	38.6	3.86	6.43	2.57
El Paso	38.2	3.82	6.37	2.55
Albuquerque	37.4	3.74	6.23	2.49
Oklahoma City	37.4	3.74	6.23	2.49
Anchorage	36.6	3.66	6.10	2.44
Omaha city,	34.6	3.46	5.77	2.31

* Usual defined as 144 work days per year (60 percent of 240 days)

** Occasional defined as 96 work days per year (40 percent of 240)

Source: Calculated from U.S. Census Bureau, 2003 American Community Survey

2. More Money

Foregoing the work commute does more than save time—it saves money. For example, Southern California telecommuters could save as much as $1200 per year in gas money alone.[27] Other savings, from maintenance costs and potential accidents avoided, are more difficult to quantify, but would likely be substantial. Telecommuters find extra money in other ways. Having more time to cook at home means they don't have to spend as much money eating out. For parents, staying home more often can mean less money spent on daycare. And telecommuters save big on clothing. They don't have to buy a professional wardrobe or maintain it with regular dry cleaning.

More money can be found in some unlikely places. Take parking. Employees who do not have free parking privileges at work are more likely to consider telecommuting than those who do and employer paid parking is the most common employment fringe benefit. Amazingly, it amounts to nearly 1 percent of national income.[28]

Certainly, employees see free parking as an attractive perk, but what if they had the opportunity to "cash out" the value of their free parking? It's likely that more employees would choose to take the extra money and work from home (or choose another work trip mode). In fact, case studies from California reveal that the cash-out option reduced driving to work by an average of 13 percent. In one case study driving decreased by 24 percent.[29] Evidence suggests that such programs save companies more money than they cost.[30]

Certainly, employees see free parking as an attractive perk, but what if they had the opportunity to "cash out" the value of their free parking?

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3. Improved Quality of Life

Working out in a less crowded health club saves time—no more waiting to use the equipment you want. But perhaps more important is that it is a more pleasant experience, and perhaps this higher level of pleasantness would make it easier for more people to stick to an exercise program.

We all endure frustrations, large and small. We want to be there when our children come home from school, we want to get to the health club more often, make home-cooked meals more often, and so on. Of course the work commute, with its stop-and-go traffic and surly motorists, is a daily source of stress. Telecommuting does not just save time; done right it let us do more of what we like and less of what we don't.

Sometimes simply reshuffling how and when we do certain chores gives us more control of our lives. Gathering laundry and stuffing it in the washing machine takes much less time than waiting for the clothes to get clean. But after a long day worn-out commuters often don't have the energy to tackle the laundry and even if they do, waiting on the washer and dryer is more of a hassle at night, when many are more interested in getting to bed or relaxing. The result is that laundry baskets bulge, dirty clothes cascade onto the ground, and frustration mounts.
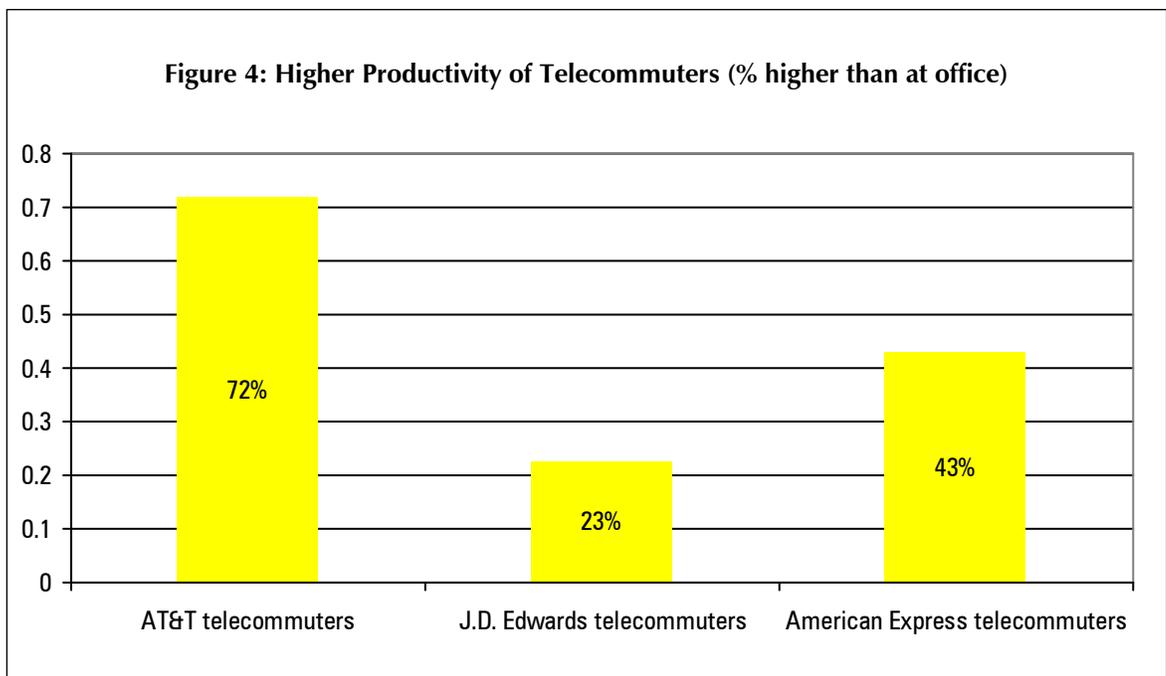
It's often a hassle to do laundry at night, but it can be quite easy to fit it into a daytime telecommuting routine. Telecommuters can take a short break from "office" work, stuff the washing machine, and then return to work while the clothes wash. The same principle can be applied to home-cooking. Some dishes require an oven to preheat and grillers like to marinate their steaks for hours. It takes very little time to click the oven on or to douse steaks with teriyaki sauce, but the completion of these simple tasks often means the difference between a healthy home-cooked meal and another bucket of fast food fried chicken.

Reorganizing simple chores exemplifies how control of one's own schedule improves quality of life. More importantly, it allows parents, who would otherwise be fighting traffic, to get the kids off to school or be there when they come home, to work through lunchtime or use it to get groceries, and generally to plan their workday around their daily lives. Increasingly the challenge to the typical working couple is that no one is around to buy the groceries, do the laundry, let the plumber in to fix the drain, or make sure the kids get on the bus. Workers value highly the simple benefit of being able to schedule their own work time and will work hard to keep a job that allows such a perk.

4. More Opportunities for the Handicapped

Few things boost a person's independence and self-worth like engaging in productive work. And, when it comes to landing and keeping a job, few things are as important as mobility. Access to fast, reliable transportation expands a jobseeker's world, thus expanding employment options. Yet the millions of Americans with disabilities often find their worlds constricted. They have much to offer employees, but often find it difficult to travel back and forth to work. Telecommuting offers a way around these barriers to employment.

The National Telecommuting Institute places disabled workers with at-home employment, and expanded telecommuting opportunities would help NTI and other groups decrease the unemployment rate of the disabled which now stands at 75 percent.[31]

Figure 4: Higher Productivity of Telecommuters (% higher than at office)

AT&T telecommuters	72%
J.D. Edwards telecommuters	23%
American Express telecommuters	43%

C. Benefits to Employers

1. More Productive Workers

Managers often regard telecommuters as low-grade scammers, loafing at home when they should be working hard at the office. Yet in many cases telecommuters are actually more productive than their office-bound counterparts.

- Among AT&T telecommuters, 72 percent report that they get more done at home than at work.[32]

- J.D. Edwards found that its telecommuters were 20 to 25 percent more productive than office workers.[33]

- A survey of American Express telecommuters found that they produced 43 percent more business than office workers.[34]

How Could Telecommuters Be More Productive?

There are many reasons why telecommuting has the ability to increase productivity. Some evidence suggests that telecommuters work longer hours.[4] Telecommuters may find working at home to be more pleasant and people who enjoy what they do are likely to be more productive. Certain tasks are easier to perform in specific environments. If a worker must read a mountain of reports, perhaps a busy office is not the best environment.

Some tasks are best performed at the office; others are better performed in a quiet home on a comfortable couch or perhaps even on a lounge chair in your backyard. That's what Brad Short chooses when he's devising design ideas for Hewlett Packard printers:

> And if he's feeling uninspired, he doesn't hesitate to stop working for a spell. He'll return to his duties later. "Not everyone can be innovative in a very structured, 9-to-5 type office environment," said Short, a lead mechanical-design engineer in HP's printer group. At home, "you stop watching the clock," Short explained. "It now becomes more of a focus on getting the task done."[5]

Short's arrangement highlights another important way telecommuting improves productivity. It forces companies to focus on "getting the task done." Telecommuting changes how managers measure employee performance. In an office setting there is more opportunity for a manager to be impressed by those who spend long hours in the office. Such employees may indeed be working hard, but staying behind a desk for a long period of time is not, in itself, evidence of high productivity. Peak hours for eBay are not at night after most people have come home from work, but between noon and 6pm when most Americans are at work.[6] A recent America Online/Salary.com survey found that the average American worker spends over 2 hours each workday (not including lunch) on activities—from socializing to poking around the Internet—that have nothing to do with work.[7]

A manager who sees a worker spending long days at work may be less inclined to investigate whether those long hours actually result in greater productivity. But remote work focuses the company on outcomes. Instead of being distracted by the ritual of work, it forces the company to go through the valuable exercise of discovering what its core mission really is. Once that core mission is identified, only those activities directed toward that end will be deemed productive.

Telecommuting pushes aside the distraction of process and focuses on results. Managers and employees agree upon concrete projects that need to be completed. If a manager tells a telecommuter to complete a report by 5pm Friday, the telecommuter can arrange his schedule any way he likes. But he better make sure his manager has that report by 5pm Friday. And so it is not just the manager who is now more directly focused on results. For telecommuters themselves, work is less about hours logged and more about tasks completed or goals accomplished.

2. Larger Talent Pool

With telecommuting, hiring decisions are not constrained by geography in the usual way. Telecommuting allows a company to draw employees from a larger talent pool, which makes it easier to hire the best possible workers.

Reason Foundation is based in Los Angeles and if it were a typical operation, the talent pool from which it could hire would be quite small. Since chronic traffic congestion makes traveling in and around the area a chore, even those who live, say, 30 miles away would find it difficult to commute to and from work every day. Yet since Reason makes extensive use of telecommuting, instead of being limited to qualified applicants from the LA area, it can hire talented people to work from their homes from all over the nation.

3. Improved Recruitment, Lower Turnover

Offering the option of telecommuting is an inexpensive way for companies to attract and retain good employees. Roughly two thirds of AT&T managers say that telecommuting is an advantage in keeping and attracting good employees.[39] A Winston Group survey found that over one-third of Americans reported that, if given the choice, they would choose the option to telecommute over a higher salary.[40] An Ohio manager who makes extensive use of telecommuting notes that junior employees work hard to earn the privilege of working at home. Those who do work at home realize that they enjoy a sought-after perk and work hard to keep it.[41]

Higher job satisfaction and lower turnover means that companies do not have to spend as much time and effort in recruitment and training. The Ohio manager points out that other organizations in his field (customer service calls) endure high turnover costs. Yet, among his employees, the shortest tenure is five years and many have worked there for over 20 years.

4. Lower Real Estate Costs

With fewer employees in the office, telecommuting allows companies to save on real estate costs, and those savings can be substantial. Nortel estimates that telecommuting saves $20 million per year in real estate costs.[42] With $25 million worth of foregone real estate costs, AT&T saves even more. Unisys may represent the best case scenario—telecommuting allowed the company to cut office space by 90 percent.[43]

Related to real estate costs are the cost of heating an office, air conditioning, cleaning, purchasing office furniture, maintaining a parking lot or subsidizing parking fees, and so on. Telecommuting can help reduce these costs as well.

5. Lower Absenteeism (and Presenteeism) Costs

Managers have begun to take note of costs associated with "presenteeism"—when workers are on the job but, because of illness or other medical problems, are not fully functional. Presenteeism costs U.S. companies over $150 billion per year, a figure that far exceeds absenteeism costs.[44] It's no surprise that employees who don't feel well are not as productive as they could be.

But since illnesses often spread through companies quickly, employees who come to work sick can also drag down the productivity of others. Increasingly, the sick worker who downs gallons of cough syrup and heads to work is no longer regarded as a hero, but a liability. (The British call them "mucus troopers.") More and more managers are recognizing this and urging sick workers to stay home.[45]

Yet there is plenty of gray area between sick and well. Someone in the throes of the flu is clearly sick. But what if that person just has the sniffles? Here telecommuting can help. Although many companies foster a get-to-work-no-matter-what environment, presenteeism research shows that simply being on-site does not make a sick worker fully functional. Those on the verge of sickness would often be better off working from the comfort of their own homes. Telecommuting allows them to be as productive as their condition allows, and staying home will likely quicken their recovery. For example, it would be better for someone feeling under the weather to skip the morning commute and get some extra rest. And, when it comes to getting well, there is no place like home. At home the sick worker can bundle up in with blankets, sip soup, and scuttle about in slippers. In this case, telecommuting also benefits the company at large because it quarantines the sick worker, making it less likely his or her illness will ravage the entire staff.

6. Improved Emergency Management

In the event of an emergency—be it a terrorist attack or the more common act of nature—it pays to have telecommuting capabilities. If employees cannot access the headquarters of a particular business or government agency, that organization can continue operations from remote locations.

Rep. Tom Davis, R-Va, chairman of the House Government Reform Committee, recently highlighted telework's national security benefits. "The decentralization of federal agency functions inherent in a healthy telework strategy can greatly increase the survivability of those agencies in the event of a terrorist attack or other disruptive crisis."[46] Yet, four years after the September 11 terrorist attacks, agencies have been slow to adopt telework.[47]

The security benefits of telework extend beyond government agencies, notes David F. Snyder, chairman of the Northern Virginia Transportation Authority. "Teleworking significantly improves the survivability of the public and the ability of the transportation system to do what it needs to do."[48]

Whether there is a need to evacuate downtown Washington, D.C. or simply contend with a snow emergency, Snyder points out that it helps to have fewer cars on the road.

D. Societal Benefits

1. Improved air quality

Telecommuting can help improve air quality in several ways. First, and most obviously, telecommuting is zero-emissions "transportation." In this respect, nothing else, not even commuting in a hybrid car, can match telecommuting. Certainly, though they avoid work trips, telecommuters still are likely to find other reasons to drive during the day. Some assume that telecommuters might live farther away from their jobs, and thus, the driving distance avoided during telecommuting days would be offset by the longer commute on non-telecommuting days. This may indeed occur in certain situations, but studies find that telecommuting reduces daily trips by up to 51 percent and automobile travel by up to 77 percent.[49]

It is, however, important to appreciate that a disproportionate amount of pollution comes from a small percentage of cars on the road. These "gross polluters" are typically older cars often driven by those of modest means. Telecommuters, on the other hand, are more likely to be rather well off, and therefore we can assume they tend to drive newer, cleaner-burning cars. Taking a clean car off the road helps somewhat, but the air quality gains are not nearly as substantial as if an older, dirtier car were taken off the road.

Then again, in certain cases, even taking clean cars off the road yields air quality gains beyond the elimination of the small amount of pollution those cars would have emitted. Though it is not as important as targeting gross polluters, speed is also a factor in understanding air pollution. Cars idling or stuck in slow moving, stop and go traffic pollute more than those traveling at free flow conditions.

Imagine a freeway lane at rush hour. Cars of all sorts, clean and dirty, create gridlock conditions. From an air quality standpoint, we would prefer to remove the dirty cars, but even removing the clean cars would help get the other cars closer to cleaner free flow conditions. In this case, even removing a zero emissions hydrogen car from a congested strip of freeway would help improve air quality. Many other pollution mitigation approaches would be too costly to justify on grounds that they take clean cars off the road. Yet, because it is so inexpensive, telecommuting can pass the benefit-cost test.

Telecommuting is zero-emissions transportation.

2. Improved Safety

Although highway fatality rates have trended downward for a very long time, highway fatalities still claim over 42,000 American lives each year and motor vehicle crashes are the leading cause of death for Americans age 4 through 34.[50] Telecommuting is not only much faster than conventional commuting, it is also much safer, especially when it allows people to avoid driving in particularly dangerous conditions, such as during rush hour, in severe weather, or when they are fatigued.

3. Energy Conservation

Naturally, less driving means telecommuters burn less fuel. Although it would be difficult to calculate how much gas telecommuters save each year, Boeing shows how just one company's efforts can yield rather impressive results. Boeing encourages its employees to make use of many different trip-reduction strategies, from carpooling to vanpooling to telecommuting. The combined effort means that, each month, Boeing employees drive 6 million fewer miles and save 300,000 gallons of gas.[51]

4. Alternative to Offshore Outsourcing

Many Americans feel anxious about the rise of offshore outsourcing. Lawmakers paid attention to these fears and crafted over 200 bills designed to impede the practice.[52] What is usually overlooked in the debate about outsourcing is how telecommuting, in certain cases, can be an alternative.

Companies use offshore outsourcing for a variety of reasons, but the desire to lower costs is probably the most important. Indeed, offshore outsourcing often does save companies money, but the decision to offshore work also comes with a new collection of problems. Companies have learned that cultural barriers, language barriers, political barriers, and even time zone differences add costs to the decision to outsource overseas.

Outsourcing work to American teleworkers, also called "homesourcing," can lower business costs. Take call center jobs, the occupation so commonly associated with the outsourcing debate. An office-based call center costs employers about $31 per employee hour, while a home-based call center employee costs only $21 per hour—a 32 percent cost reduction.[53] Whether homesourcing is a feasible alternative to offshore outsourcing will depend on many factors, and it's likely that even homesourcing will not often match the cost savings realized by offshore outsourcing. Then again, homesourcing offers new advantages. Language, cultural, and certain other barriers are no longer an issue. Successful companies like JetBlue and Procter and Gamble realize this and have made extensive use of American home workers.[54] We should not expect homesourcing to emerge as a widely used alterative to offshore outsourcing, but for certain companies in certain situations, it is indeed an attractive option.

Telecommuting Offshoots: e-Commerce and Telemedicine

e-Commerce: While the concentration of work trips still spurs the most severe congestion, policymakers must also keep their eyes on the growth of non-work travel. After all, non-work trips make up a large and growing share of total trips:

> Trips for non-work activities are increasing faster than work trips—there is more travel for family and personal errands, shopping, and social and recreational purposes. Work trips have gone from 25 percent of overall travel in 1969 to 16 percent in 2001.[55]

Although this study focuses on work trips, it is worth noting that e-commerce, a relative of telecommuting, has the potential to reduce congestion caused by non-work trips. For example, video stores have long been a major trip generator for retail outlets, but increasingly consumers prefer to order their DVDs online and have them delivered straight to their mailboxes. In fact, the success of NetFlix prompted Blockbuster to offer its own mail order service. Americans are even getting more comfortable with online banking, which likely means fewer trips to the bank. In 2003, 28 percent of Internet users over age 15 used online banking, up 10 percentage points from just two years prior.[56] In just one year (2003 to 2004) e-commerce grew by over 25 percent and now U.S. retail e-commerce generates nearly $120 billion in revenues.[57]

We again confront the issue of whether e-commerce reduces trips or merely releases pent up demand. Perhaps the most likely explanation is that e-commerce does both. And again, most people would probably welcome either effect, for even if the suppressed demand effect is pronounced, e-commerce offers the best of both worlds—more economic activity without more traffic congestion.

Telemedicine: Medical care exhibits a curious dichotomy; it is both remarkably advanced and frustratingly primitive:

In this Golden Age of biology, scientists have unleashed a cornucopia of potent new drugs, designer diagnostics and precision imaging systems. Yet in information technology, medicine relies on the equivalent of an old Commodore 64. Doctors too often track patients the old-fashioned way, with pencil and paper.[58]

The old-fashioned way has severe consequences: Each year adverse drug events (ADEs) add $1.56 billion to $5.6 billion to hospital costs. More importantly, ADEs cause an estimated 372,000 preventable injuries and deaths per year[59]:

Telemedicine improves patient recovery, decreases readmission, and reduces costs (by 80 percent) simply by allowing basic medical checks (weight, blood pressure, blood sugar, etc.) to be performed regularly at home and then transmitted to the central database by phone.[60]

Consider another telemedicine application, "eICU." Frustrated by the shortage of critical care physicians, intensive care specialists Brian Rosenfeld and Michael Breslow pondered how to reduce the high death rates among ICU [intensive care unit] patients. They developed a remote monitoring system—complete with high-resolution video feeds—and real-time patient vital sign data—that allows one doctor to tend to patients in multiple ICUs at once.[61] The doctor needs only a mouse click to move from one patient to the next and the high resolution video equipment allows the remote doctors to visually examine patients. The system does not replace on-site hospital staff—it supplements them. And the extra set of eyes offers more expertise, which means that eICU doctors can spot problems before bedside nurses notice them. Specialists typically go home at night even though, as Rosenfeld notes, "Patients don't get sick only during the day." In this case, telemedicine is a comparatively inexpensive way to offer high-quality, round-the-clock patient monitoring.

During a demonstration at Johns Hopkins, this form of telemedine cut ICU deaths by 50 percent. A Virginia-based health care provider uses the system to monitor beds in three hospitals, and says it saves 90 lives per year.

The telecommuting concept makes physical location less important. It is easy to imagine such developments bringing better medical care to rural areas, and other places in need of intensive care expertise.

Certainly telecommuting and its many offshoots have already brought a wide array of benefits, but what might the future bring? Should we expect telecommuting to stall or continue to grow?

P a r t   5

Should We Be Optimistic About the Future of Telecommuting?

In the past telecommuting supporters have, at times, been guilty of excessive optimism. Some almost made it sound like we should expect the traditional workplace to vanish entirely.

A. Tempering the Optimists

As we look toward the future we should not overstate the degree to which telecommuting will reshape the workplace or the work commute. We should also face the various shortcomings of telecommuting head-on. Doing so will help employees and managers anticipate, and sidestep, potential pitfalls.

Among other concerns, some managers fear that telecommuting will

- Lead to a loss of control.
- Make their operation seem less credible.
- Put company information at greater risk.
- Decrease employee loyalty.
- Hurt productivity.
- Strain communication within the organization.

We have examined how some of these concerns are mistaken assumptions. For example, telecommuting can actually improve productivity and employee loyalty. New, security-boosting technologies can help assuage fears over lost or stolen company information.[62] New technology can also help managers monitor home-based workers by, for example, noting when they log onto and off of their computers or even by counting keystrokes. How much new technologies quell old fears—and whether telecommuting is a net benefit—are issues each manager must ponder. Different managers, facing different circumstances, will naturally arrive at different conclusions. Managers may find themselves in a potentially difficult situation if they discover that some employees have the self-discipline to telecommute, while others do not. Legal issues, union rules, or company policy may make it difficult to offer the telecommuting option to some, but not to others.

Telecommuting may expose certain problems, but it may not necessarily be the cause of them. Take poor workplace communication. Generally speaking it is easier to maintain open communication when one's colleagues are near, but physical closeness does not necessarily guarantee a close working relationship.

Coworkers in adjacent offices are physically close, but they very well may be worlds apart when it comes to communication. Conversely, coworkers in a virtual office can still enjoy close communication. Building relationships takes effort and though telecommuting will likely require more effort, coworkers—whether at the office or working remotely—must make it a point to be communicative. Managers must ensure that communication thrives.

Certain kinds of technology—such as instant messaging—can help telecommuters maintain casual off-the-cuff communication. Spontaneous workplace conversation can improve collaboration and productivity, but there is also a downside. Imagine the worker furrowing his brow trying to come up with a solution to a problem that has vexed him all week. He finally reaches an epiphany, but just as the solution starts to take shape his colleague ducks into his office and asks if he wants to buy Girl Scout cookies from his daughter.[63] Telecommuting skeptics rightly note that remote work can make collaboration more challenging, but they often fail to appreciate that distractions also lurk in the office.

Recently, a British study found that persistent office-related interruptions, from emails to instant messages and phone calls, sap workers' productivity leaving them feeling lethargic. The lead researcher, Dr. Glenn Wilson, found that contending with workplace interruptions actually decreased workers' IQ. The effect on IQ was the equivalent of going a night without sleep. According to Wilson:

> *This is a very real and widespread phenomenon. We have found that this obsession with looking at messages, if unchecked, will damage a worker's performance by reducing their mental sharpness. Companies should encourage a more balanced and appropriate way of working.*[64]

Telecommuting can be an obstacle, but with the proper management strategy, the right employees, and the right technology, that obstacle can be transformed into an advantage.

Working from home is one way to avoid workplace distractions. Of course, homes—especially homes teeming with small children—have their own distractions. And telecommuting expert Patricia Mokhtarian also points out that not everyone who can telecommute will want to.[65] Perhaps some find their commute pleasant or at least not irritating enough to prompt deep consideration about working at home. Some might not like the hassle of trying to work effectively in the office some days and at home on other days. Others simply enjoy being with others and sometimes working at home can stir feelings of social alienation. But again, it is up to employees and managers to develop the best matches between task and work environment. Often the best environment will be at the office; other times a remote location may prove a better fit.

Telecommuting can be an obstacle, but with the proper management strategy, the right employees, and the right technology, that obstacle can be transformed into an advantage. That is not to say that obstacles associated with telecommuting can always be overcome. Certain jobs are just not appropriate for telecommuting. Like any tool, it's only useful in certain circumstances. But of course we do not simply discard a tool on the grounds that it cannot accomplish everything we want to do. Telecommuting will be a sensible choice for certain organizations at certain times.

The fact that some telecommuting advocates have sometimes been overly optimistic should not obscure the fact that telecommuting has indeed enjoyed rather strong growth in recent decades. Further, many social and demographic factors suggest that telecommuting's growth may accelerate in the future. Many commute modes

find themselves in conflict with larger social trends; often the trends are a result of an increasingly wealthy society. Pursuing modes that conflict with larger social trends is a risky proposition for it means doing battle against forces that are much more powerful than public policy.

A truly promising mode would be one that not only helps achieve common goals—such as fighting congestion, improving air quality and decreasing highway fatalities—but one that is actually bolstered by larger societal trends. Telecommuting offers that rare mix. Instead of fighting against the current, policymakers can finally go with the flow.

B. Reasons for Optimism

1. Our Nation Is Growing Wealthier.

People in poor societies often spend their entire existence living in a tiny area. But as a society grows wealthier it becomes more mobile. People do more of everything. They engage in more commerce, take more vacations, make more trips to the grocery store, the mall, and the dentist. Greater mobility gives them more opportunity to enjoy the company of their friends and family, to go out to eat, and so on.

Consider that a worker in 1920 had to work 4,696 hours to make enough money to buy a Ford Model T. In the late 90s that same worker would need work less than a third that long (1,363 hours) to buy a Ford Taurus, which in terms of reliability, speed, and safety was a far superior car.[66] Even into the 1950s and 60s it was hard for families to own one car, let alone two or three, and so family members, neighbors, and friends were more inclined to share rides. Even hitchhiking was commonplace. Widespread carpooling occurred long before lawmakers constructed thousands of miles of HOV lanes, showing again that the force of economic necessity is more powerful than public policy.

But as wealth increased, more Americans bought their own cars, and fewer chose to carpool. Today 92 percent of households own at least one car, and approximately 65 percent own two or more.[67] Even approximately 80 percent of households earning less than $25,000 per year own at least one car.[68] The number of vehicles per household has continued to increase, even as household size continues to shrink. Now there are more cars than licensed drivers.[69] With more and better cars, Americans drove more. Since the late 60s vehicle miles traveled has increased nearly threefold, and now stands at about 3 trillion per year (Figure 5).[70]

As they can afford to do so, people will choose better travel options. They will opt for greater convenience, speed, and comfort. This is an obvious point but one that is frequently overlooked by lawmakers and journalists who use terms like "car crazy" or "addiction" to explain why driving is so prevalent. But Americans are not "addicted" to their cars any more than office workers are "addicted" to their computers. Both are merely tools that allow people to accomplish tasks faster and more conveniently than other options. The motorist and the computer user will gladly turn in these tools once something better comes around. And, for those policymakers eager to get motorists out of their cars, this is the crux of their frustration.

Figure 5: Nationwide Growth in Driving

Source: New York State Department of Transportation
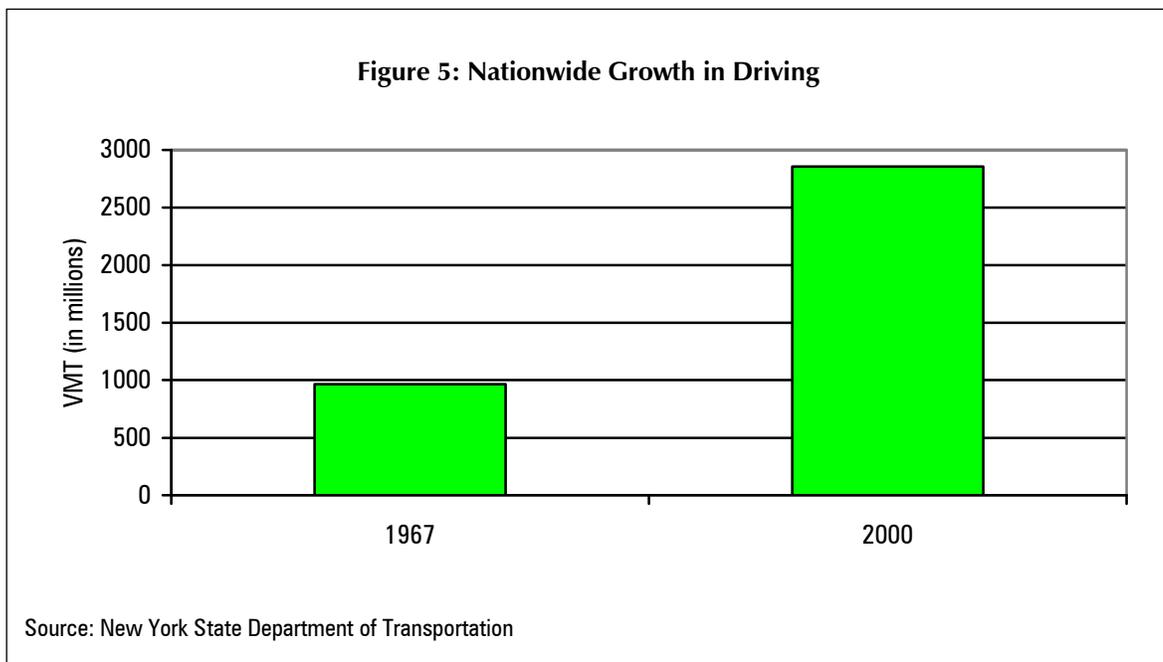
So if policymakers wish to ease the ill effects of driving by getting people out of their cars, they must offer motorists something better than what they currently have. Commuters have shown through their actions that driving alone is the option that offers the most convenience, speed, and comfort. Indeed it is difficult to compete with the car, which apart from 24-hour door-to-door delivery, offers an increasing array of creature comforts from air conditioning to heated seats to satellite radio. Even with mounting gridlock auto commutes are still much faster than transit commutes, about twice as fast on average.[71]

Telecommuting is uniquely suited to compete with solo driving.

Commuters have also discovered that it is difficult to coordinate with others to form carpools. Carpool partners must live and work near each other. The two must also go to and from work at roughly the same time of day. And even if those requirements are met, carpoolers face additional inconveniences. What if one person in the pool has to stay at work late or pick up a sick child from school? And what may seem like minor aspects to policymakers—enjoying some private time or having free reign over the stereo—are very important to commuters. Carpooling compromises these simple pleasures.

Driving alone is clearly a mode of wealth, and as the only other wealth mode, telecommuting is uniquely suited to compete with solo driving. No matter how much leg room a sedan has, it will never have more legroom than someone's home office. No matter how many features a car boasts, it can never compete with the array of features a house offers. No matter how fast driving alone might be, it will never be faster than avoiding the trip entirely. Telecommuting offers many additional benefits, such as more free time and money saved on gas and auto repairs. Indeed virtual trips are the natural extension of increased mobility. While they are online or on the phone, people can "go" almost anywhere.

2. Telecommuting-Enabling Technology Continues to Improve.

Most of us realize that technology has improved over the years, but since its improvement is a product of gradual evolution, we rarely step back and appreciate just how revolutionary the gains have been. And while new and better ways of creating and communicating emerge constantly, we have not had to sacrifice more to enjoy better technology. The opposite has happened; the cost of technology has dropped dramatically:

> *The IBM-370-168 mainframe circa 1975 sold for $3.4 million; a personal computer today with an Intel Pentium chip currently retails for around $1,000 and is at least 100 times faster.*[72]

As amazing as that anecdote is, it is quite outdated even though the book that references it was published fairly recently (2000). Today's consumer can buy a computer that is hundreds of times faster and half the cost of the models that were available just five years ago. A prominent tech leader recently predicted that $100 personal computers could be available in just three years.[73] The rise of laptops makes it even easier for people to work from remote locations. Laptops have improved—they've gotten faster, have longer lasting batteries, offer wireless features—even as they have dropped in price. In just the past year, laptop prices have fallen 17 percent and for the first time ever their sales topped desktops.[74]

The same pattern of falling prices and improving performance can be seen elsewhere. The first cell phones cost thousands of dollars, but today companies give them away for free. Today we can transmit data across town or across the world instantly and at almost no cost.
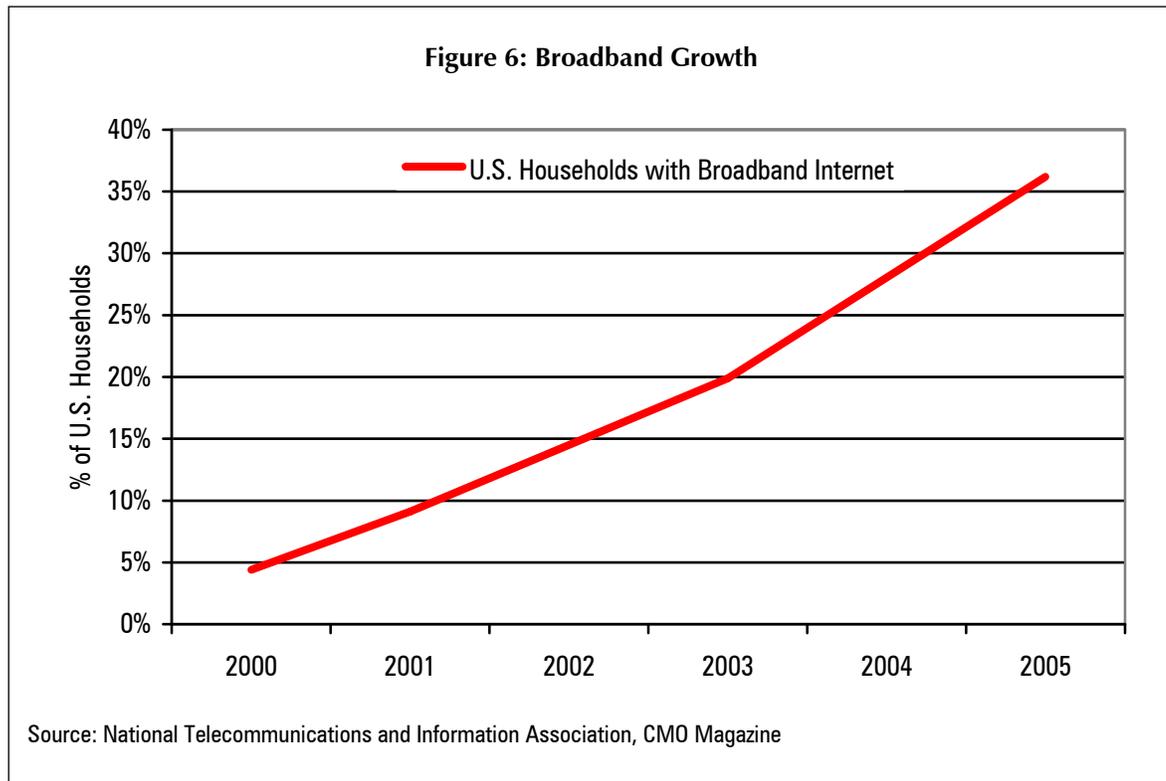
Table 8: Sending a Page of Text: How Long Does it Take and How Much Does it Cost?				
	Delay for 1 Destination	Delay for 100 Destinations	Cost for 1 Destination	Cost for 100 Destinations
Pre-Railroad Mail (1840s)	252 hrs	260.3 hrs	$0.25	$107.17
Railroad (1850s)	48 hrs	56.3 hrs	$0.03	$85.17
Telegraph (1850s)	0.083 hrs	8.3 hrs	$7.50	$750.00
Email (2000s)	~0	~0	~0	~0

Source: Thomas W. Malone, *The Future of Work* (Boston: Harvard Business School Press, 2004).

Broadband access is crucially important to the growth of telecommuting. It is no surprise that those with high-speed Internet access are more likely to telecommute. High-speed access makes conducting business from home faster (50 times faster than dial up), which also makes it easier and more convenient. Apart from enabling more telecommuting, broadband access also makes it unnecessary to ship software in trucks—with a few mouse clicks the product arrives via the Internet.

This year the Internet celebrates its (unofficial) 10th birthday. In just one decade, it has transformed from a mysterious novelty to a tool that average Americans rely on every day. Americans are not only getting online in ever-increasing numbers, more and more of us have access to broadband (Figure 6). Five years ago only 4.4 percent of American households had broadband.[75] Today most of those who use the Internet at home have it.[76] Over 36 percent of American households (42.3 million) have broadband.[77] By 2008, analysts expect broadband to spread to over 56 percent of households (69.4 million total households).[78]

We must also appreciate that figures for 2000 likely understate the extent to which telecommuting is practiced today. After all, just five years ago, few Americans had experience with broadband. Today it is regarded as one of the most important telecommuting-enabling technologies. And a recent move by the FCC will make our nation's telecom policy friendlier to innovations that will quicken the spread of broadband.[79]

Figure 6: Broadband Growth

Source: National Telecommunications and Information Association, CMO Magazine

Improved technology has made physical location less important. If you can enjoy all or most of the benefits of conducting a meeting via conference call or teleconference it becomes less necessary for business associates to drive to a central location. If it's just as fast and cheap to send an instant message as it is to saunter into a colleague's office, meeting at headquarters becomes less important. If desktop computers are cheap more people will be able to own two or even upgrade to a laptop they can take anywhere. Constantly improving technology will continue to give more people more opportunity to telecommute more often.

Constantly improving technology will continue to give more people more opportunity to telecommute more often.

3. Telecommuting-friendly Jobs Are Becoming More Prevalent.

The United States has undergone some major labor market shifts, first away from an agricultural-based society, and more recently away from a goods-producing economy, toward a service-producing economy (Figure 7). The technology boom was essential to the creation of the modern service economy, which increasingly values information and knowledge above physical skills.

Figure 7: Americans Increasingly Work in Services

U.S. Non-Farm Employment by Industry as Percentage of Workforce

Percentage of Workforce

Year	1919	1930	1940	1950	1960	1970	1980	1990	2000	2002
Service producing	53%	59%	59%	59%	62%	67%	72%	77%	81%	82%
Goods producing	47%	41%	41%	41%	38%	33%	28%	23%	20%	18%

■ Goods producing ■ Service producing

Source U.S. Census Bureau
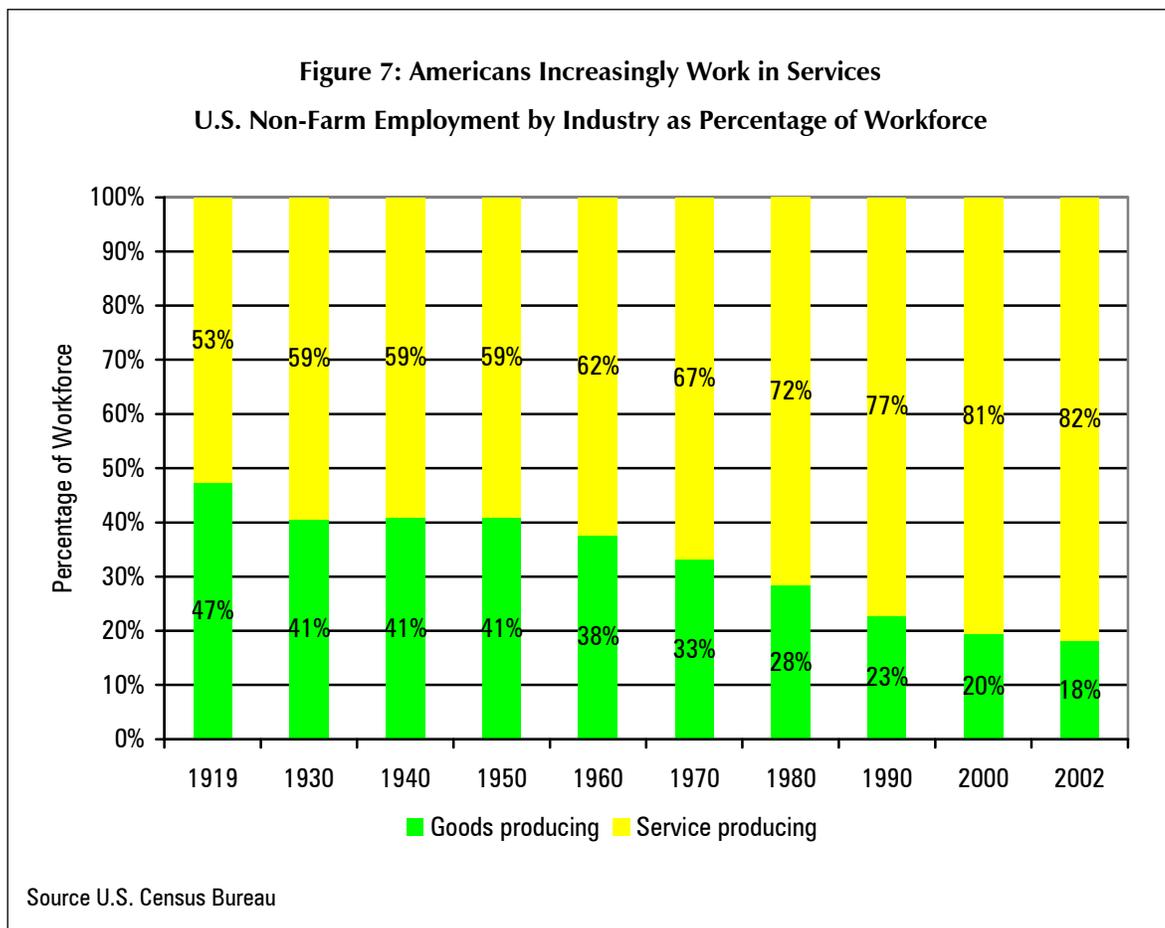
Note that the above figure, though dramatic, understates the degree to which our society has changed, because it does not include farm employment. Just a century ago, farming employed roughly 40 percent of America, but now its share of the workforce is less than 1 percent.[80]

Likewise, other types of jobs that require physical strength or manual dexterity are becoming less common. The good news is that high-end knowledge jobs that require creativity, reasoning, and people skills are growing (Table 9). Today's information-based economy allows workers to use their brains more and their backs less. Two decades ago management and professional specialty jobs accounted for about a quarter of all jobs; today they account for over a third.[81]

As today's workers trade more in information and knowledge, physical location becomes less important. Certainly many service jobs, from doctors to hairstylists, still require provider and client to share the same physical space, but for more Americans it is not necessary to travel to a centralized location to access the tools of their trade. It would be impossible for a factory worker or a logger to telecommute, but today large portions of a great many jobs can be accomplished with a handful of tools: a computer, high-speed Internet access, and cell phone. And, of course, workers can use these tools from almost anywhere. Imagine that roughly half a million people make their living selling items on eBay.[82]

Table 9: Employment Gains (1992-2002)		
Jobs Requiring Creativity, Reasoning and/or People Skills		
Occupation	**Employment Gains**	**Percent Change**
Architects	+ 60,000	+ 44
Photographers	+ 49,000	+ 38
Financial Services Sales	+ 248,000	+ 78
Designers	+ 230,000	+ 43
Electronic Engineers	+ 147,000	+ 28
Medical Scientists	+ 22,000	+ 33
Jobs Requiring Physical Strength and/or Manual Dexterity		
Occupation	**Employment Gains**	**Percent Change**
Farm workers	- 182,000	- 20
Timber cutters	- 25,000	- 32
Fishing workers	- 14,000	- 27
Sewing machine operators	- 347,000	- 50
Typesetters	- 34,000	- 62
Butchers	- 67,000	- 23

Source: W. Michael Cox and Richard Alm, "A Better Way: Productivity and Reorganization in the American Economy," Federal Reserve Bank of Dallas, 2003 Annual Report.

As today's workers trade more in information and knowledge, physical location becomes less important.

Telecommuting opportunities can even emerge in jobs that seem to be naturally at odds with the practice. As explained above, the growth in telemedicine allows doctors to diagnose patients from remote locations. Even some of our manufacturing titans have shifted to more telecommuting-friendly pursuits. General Electric generates most of its income, not from selling appliances, but from selling financial services. Likewise, General Motors makes more money from the auto financing business than from selling cars.[83]

As the knowledge economy expands more of us will work in occupations that are better suited to telecommuting. The Bureau of Labor Statistics expects IT jobs to experience the most rapid growth, accounting for eight of the top ten fastest growing occupations (Figure 8). For more of us, the product of our labor is not a physical thing, but an idea, and ideas, unlike cars or other manufactured products, are weightless and well-suited to electronic transmission.

Figure 8: Projected Growth by Occupation 2000-2010)

Occupation	Growth
Computer software engineers, applications	100%
Computer support specialists	95%
Computer software engineers, systems software	90%
Network and computer systems administrators	83%
Network systems and data comm. Analysts	78%
Desktop publishers	68%
Database administrators	66%
Personal home care aides	62%
Computer systems analysts	60%
Medical assistants	56%

0%   ▢ IT related Jobs   ▪ Non-IT Jobs

Source: Bureau of Labor Statistics, *Occupational Outlook Handbook*

4. Employment Centers Are Decentralizing.

Workers once left the fields to find better lives in the cities. Today more and more have decided that they can find better lives in the suburbs. People often head for the suburbs to enjoy the accoutrements of wealth: larger single-family homes, a backyard, safe streets, good schools, and so on.

Policymakers often fail to appreciate just how powerful the trend toward decentralization is.[84] It is not merely a fixture of upstart metropolitan areas like Phoenix and Orlando; from Los Angeles to New York it is occurring even in the largest and most densely populated areas. Nor is decentralization uniquely American. It is happening worldwide, in Paris, London, Tokyo—nearly every major metro in the developed world is decentralizing (Figure 9).[85]

Figure 9: Booming 'Burbs (Percent Change in Population 1965-2000)

Source: Demographia.com
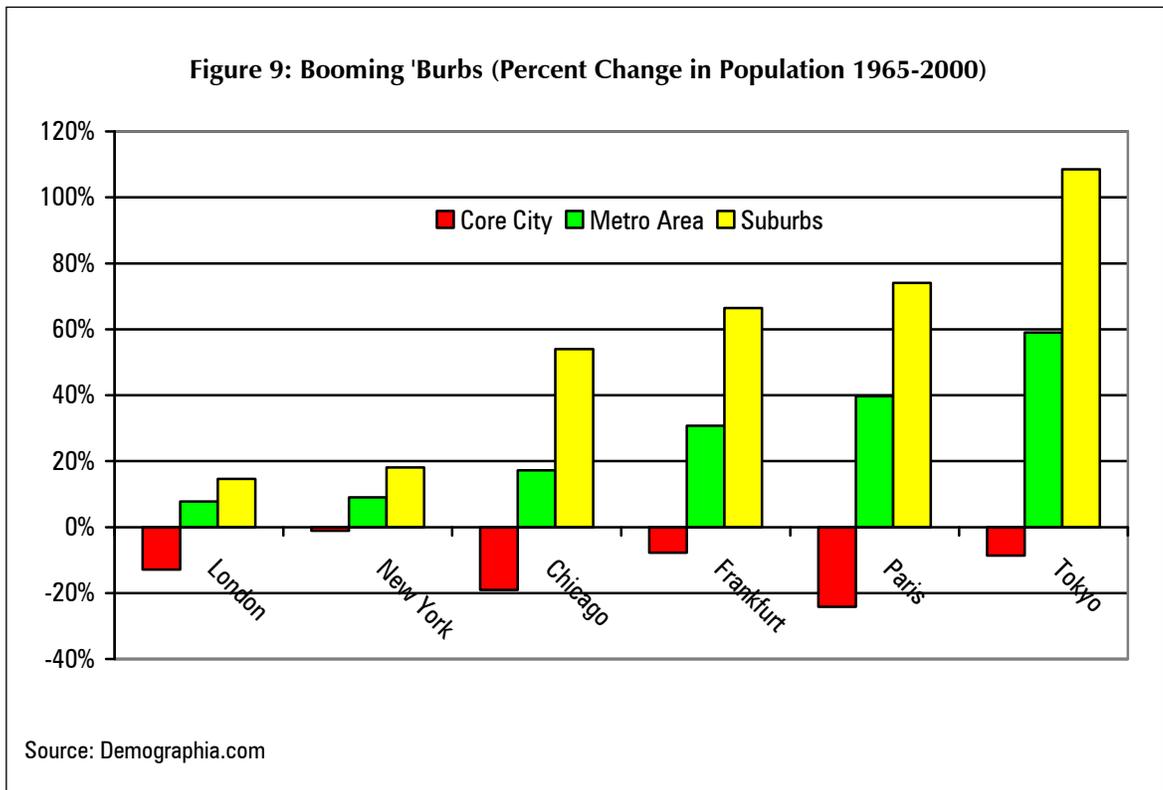
Employment has decentralized alongside housing. The term "central business district" grows ever more misleading as CBDs decline in importance and give way to a multitude of employment clusters. As urban scholar Joel Kotkin points out:

> *In 1969 only 11% of America's largest companies were headquartered in the suburbs; a quarter-century later roughly half had migrated to the periphery.*[86]

Between 1969 and 1999, U.S. private employment grew at a rate of 2.25 percent, yet growth was far from uniform. Suburban areas were much more likely to top the national average, while areas in the urban core were much more likely to fall below it. Job growth was fastest (3.09 percent) in suburban counties of mid-sized metropolitan areas (1 to 3 million population). The slowest growth (1.25 percent) occurred in the urban counties of large metropolitan areas (over 3 million population).[87]

Decentralization has upended traditional commuting patterns. Today's commuters are increasingly likely to travel from one suburb to another or embark upon "reverse" commutes (from the city to the suburbs). Cites rarely exhibit the kind of hub and spoke features that made it relatively easy for transit to take workers to and from the central business district.

The rise of decentralization does not necessarily aid telecommuting, but since it is so difficult for certain other commute modes to adjust to this demographic shift, at-home work becomes more feasible by comparison. Consider that *most* (52 percent) commuters do not go directly to and from work, but stop along the way to pick up kids, drop off dry cleaning, buy a latté or to complete any number of errands.[88] The countless origin and destination points make it even harder to coordinate carpools or design transit systems.

Often policymakers have responded by zoning for and subsidizing high-density development near transit stops, yet,

> Even in rapidly growing areas, new urban developments and new land use comprise only a fraction of the overall urban fabric. Thus, even dramatic changes to new development patterns would have to be maintained for decades before they could significantly reshape metropolitan land uses and, in turn, overall travel origins and destinations.[89]

The experience of these foreign cities shows that decentralization marches on, even in the face of significantly higher gas prices and much more extensive public transit service. Policymakers who hope new rail lines will reverse or even slow this juggernaut should take note of the experience of these foreign cities. Modes of wealth, like telecommuting, are better equipped to keep pace with our evolving society.

Modes of wealth, like telecommuting, are better equipped to keep pace with our evolving society.

5. People Are Personalizing More Aspects of Their Lives.

Now more than ever people have more ways to personalize their products, their environments, and their lives. Satellite radio, iPods, and iMusic are booming because they let music fans break from bland radio programming and explore their personal tastes. Tivo and satellite TV do the same for television, and the rise of blogs represents the personalization of information. The Scion brand is so popular largely because it encourages drivers to personalize their cars. Home improvement stores have expanded by catering to those who enjoy crafting their living space to suit their particular tastes. With the average supermarket stocking over 700 varieties of fruits and vegetables, personalization has even struck the salad bowl.[90]

Since people enjoy personalizing so many other aspects of their lives, it is only natural that they would want to personalize the activity that accounts for most of their waking hours. Katy Mann and Pamela Sotnick show just how personalized the work environment can get. The data storage equipment company Network Appliances hired these two women to fill one sales position, and that suits them just fine. Neither woman wanted to work a full week because they wanted to spend more time with their young children. They came up with a most creative arrangement, one that includes a single phone number, a single email address, and dual-sided business cards. Mann works Mondays and Tuesdays, Sotnick takes Thursdays and Fridays, and they alternate Wednesdays. Although their company had never allowed for such personalization, managers were won over when the duo topped all other employees with $24 million in sales.[91]

Since people enjoy personalizing so many other aspects of their lives, it is only natural that they would want to personalize the activity that accounts for most of their waking hours.

Like other versions of the flexible workplace, telecommuting allows workers to personalize their work environment. Telecommuting requires workers to learn about themselves, to discover which environment suits them best. Some people function better with an afternoon nap, which is of course easier to take at home

than in the office. Those with chronic pain might value the opportunity to do stretches and other kinds of therapy in the privacy of their own home. Some people like the buzz of the office; others prefer the quiet of home. Still others might prefer a mixture of the two. Sun Microsystems iWork program tailors at-work arrangements to fit each employee's tastes.[92] Telecommuting is not a matter of trading the office for the home office. It is a matter of making that trade *some* of the time.

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Telecommuting is not a matter of trading the office for the home office. It is a matter of making that trade *some* of the time.

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6. Workers Like Telecommuting.

Obviously telecommuting would be a tough sell if telecommuters didn't like it, but jobseekers look favorably upon companies that offer telecommuting. The option of telecommuting helps Sun Microsystems attract and retain talented employees.[93] A Winston Group survey found that over one-third of Americans said that, if given the choice, they would choose the option to telecommute over a higher salary.[94]

Younger workers are increasingly likely to be friendly to telecommuting. Unlike their parents and grandparents, they have grown up with high-speed Internet access. They are familiar and comfortable with new technology, and they are heavily represented in tech companies that are friendly to remote work.

Still, some suggest that telecommuters might tire of working from home. Indeed some studies have discovered drop-out rates that range from about 30 to 40 percent.[95] Of course this also means that the great majority did not stop telecommuting. Further, the reasons for dropping out are particularly telling. Workers rarely stop telecommuting because they do not enjoy it. Rather other factors play a much larger role in the decision to return to the office. The worker may have changed jobs and found the new job to be unsuitable to telecommuting. Often workers are pressured—explicitly or implicitly—by managers who are wary of the practice.[96] A survey of the Defense Logistics Agency found that three-fourths of the 22,000 employees wanted to be able to telecommute more often, but they often encountered resistance from managers.[97]

For telecommuting supporters, the tough sell is not necessarily the worker, but the worker's boss. Even so, there is reason to believe that managers will warm to the practice. For example, DLA management now embraces telecommuting as a way to improve worker satisfaction and productivity and to keep and retain good employees.

Strong societal trends continue to make telecommuting a viable option for more people. But other factors threaten to stymie the spread of telecommuting. What are these barriers to increased telecommuting?

P a r t   6

Barriers to Increased Telecommuting

Telecommuting has grown in recent decades and there is reason to expect the practice to continue to grow. But telecommuting would enjoy even greater growth if certain barriers were toppled or at least lowered.

There are three formidable barriers to increased telecommuting: technology, perception, and public policy.

A. Technology Barriers

If it is slow, expensive, and difficult to communicate with coworkers and clients, to access company computer networks, to download files and send email, then workers are less likely to telecommute. Likewise, managers would be less likely to encourage workers to telecommute since technological troubles would hamper their productivity. A survey of AT&T employees found that slow access to corporate systems was the most significant barrier to telecommuting, followed by difficulties with downloading large files and applications that don't run well at home.[98] Technological barriers can quickly frustrate telecommuting enthusiasm.

Yet technological barriers are becoming less formidable all the time. Broadband can assuage many of the annoyances cited by the AT&T employees and broadband is spreading. The percentage of American households with broadband has grown eight-fold in just five years and home use of broadband has already surpassed use of dial up. New technologies can often address old technological barriers to telecommuting. Telecommuters can now, for example, access their work computers from home.[99] Some technologies like teleconferencing—once regarded as more trouble than they're worth—have made impressive improvements in recent years.

As technological barriers to telecommuting recede in importance, other barriers become more significant by comparison.

B. Perception Barriers

Telecommuters are often more productive than office workers. Telecommuting can cut recruitment and training costs, absenteeism and presenteeism costs, as well as real estate and building maintenance costs. Telecommuting is good business and yet managers are slow to embrace the practice. A recent survey found that 80 percent of non-telecommuting employees report that their employers would not give them permission to telecommute.[100] Public-sector managers may be even less likely to offer the telecommuting option.[101] Yet some agencies have even been threatened with losing funds if they do not make telecommuting more

available to employees, leaving managers to figure out how to offer telecommuting without losing control of the employee.[102]

Many managers are simply not aware of telecommuting, or if they are, they do not appreciate its productivity benefits. Many still regard telecommuters as loafers and it is easy to see why this perception exists. Managers often find it difficult enough to inspire employees to be productive when they are in the office each day. If the worker is at home, it is only natural to expect oversight—and thus performance—to suffer even more.

New technologies allow managers to monitor telecommuters' work habits, but again we confront the issue of process versus results. No matter the physical location of the employee, it is better for managers to focus on results and give employees more freedom to discover what sort of process makes them most productive. Any good organization is already deeply interested in results, but many do not monitor results as well as they could. It's likely that even those organizations that do a good job of monitoring results could benefit from refining and reinvigorating their performance-monitoring efforts.

Telecommuting forces organizations to focus on defining their core mission and measuring results.

An organization must constantly focus and refocus on defining its core mission. With workers buzzing about the office it can be tempting to avoid giving this practice the sort of attention it deserves. When managers are surrounded by the rituals of work, it may be easier to assume that the results of work will come. Telecommuting forces organizations to focus on defining their core mission and measuring results. Going through this process will likely make an organization more productive, thus adding to the already substantial list of potential benefits offered by telecommuting. In certain cases union rules or other factors may make it difficult to judge an employee on measurable productivity grounds alone. And judging outcomes in our service-oriented economy can be challenging at times. Telecommuting will work best where outputs or outcomes are easily measured, and not where performance risk is more outside the control of employees.

Researchers have pointed to other perception barriers that impede telecommuting growth. For example, employees are often apprehensive about staying home because they do not want managers to suspect them of loafing and some worry that telecommuting could actually hurt their prospects for advancement. These employee worries are not misguided perceptions. If an employee's manager frowns upon telecommuting—either overtly or indirectly—it is reasonable to assume that working from home would be harmful to that employee. Recall that telecommuting surveys find that the decision to stop telecommuting has little to do with an employee's distaste for the practice and more to do with unsupportive managers.

The perception barrier has been created largely by managers and employers themselves. Once they express to their employees that they support the practice, apprehensive employees will take another look at telecommuting. Once word spreads that telecommuting boosts bottom lines, there will be little need for arm twisting from government bodies or researchers touting the larger societal benefits. Managers will embrace the practice because they realize it is in their interest to do so.

C. Public Policy Barriers

It is odd that public policy so often hinders telecommuting and home-based work, particularly since elected officials are some of telecommuting's most enthusiastic supporters. Today political barriers to telecommuting can be found at every level of government. Before embarking on costlier projects, public officials should remove or lower such barriers.

1. Zoning Ordinances

Most zoning codes were enacted decades ago and they rarely undergo comprehensive updates. Contrast this with the society that must abide by these codes. Society itself does not stay still; it is constantly evolving and inflexible zoning codes often trip up a dynamic society. Forty years ago it would have been difficult to foresee the extent to which demographic shifts, such as women's large-scale entrance into the job market, would reshape society. Likewise, planners could not have anticipated the personal computer, the Internet, or many other tools that have made working at home easier for more people.

Today zoning codes hamper the growth of telecommuting, by, for example, strictly limiting the types of activities allowed in residential districts. Some provisions limit how many packages may be delivered to a home office. Others limit the ability to receive clients or to use the home office as a base from which, for example, a salesperson travels to meet clients.[103]

Recommendation: Relax zoning codes to allow for more home-based work. This approach conforms to the principles of mixed-use development, popularized by New Urbanism. Supporters of New Urbanist design should also be encouraged by research that suggests that telecommuting per se does not expand sprawl.

2. Minimum Parking Requirements

Since we park for free for 99 percent of our trips, most Americans fail to consider the high cost of free parking.[104] Although we usually don't realize it, we do pay for free parking. Ironically, it's only in our role as motorist when we do not pay:

> *Initially, developers pay for parking. Providing all the spaces necessary to meet minimum parking requirements in zoning ordinances raises the cost and reduces the density of development. The cost of parking is then shifted into higher prices or lower values for everything else—so everyone pays for parking indirectly. Residents pay for parking through higher prices for housing. Consumers pay for parking through higher prices for goods and services. Employers pay for parking through higher office rents. Workers pay for parking through lower cash wages. Property owners pay for parking through lower land values.[105]*

Minimum parking requirements collectivize the cost of parking. Since they do not pay for parking directly, motorists have little incentive to economize.

Recommendation: Eliminate minimum parking requirements and allow market forces to reflect the true cost of parking. Instead of adhering to rather arbitrary regulations that often order more parking spaces than necessary, developers would have greater flexibility to build only the number of parking spaces that are truly

needed. Employers would be more likely to adopt parking cash-out programs and employees would be more likely to take the extra money and telecommute instead of driving to work.

3. Tax Law

Tax law can hinder telecommuting in many ways.

a. Income Tax

Tax collection has not evolved as quickly as the workforce it regulates, and newly emerging work arrangements—for example when an employee works for a company headquartered in a different state—invite more confusion.

The interstate telecommuter now faces the possibility of double taxation, since each state may claim the right to tax the telecommuter's income. In a 4-3 decision, the New York Court of Appeals recently ruled that a computer programmer who works for an in-state employer has to pay New York state income taxes on 100 percent of his income even though three quarters of the time he works from Tennessee. The programmer argued that he should have to pay New York taxes on only one quarter of his income, since that represented the amount of time he spent in New York.[106] Fortunately for him, Tennessee has no income tax, but that could change and he could face double taxation. Those interstate telecommuters whose home states do have income taxes face a stickier situation.

Other states may regard the New York decision as precedent-setting and more telecommuters could face the prospect of double taxation. If such policy were to spread it would significantly hamper the flexible and mutually beneficial arrangements that employees and employers have devised. With out-of-state employees less likely to work for employers located in high-tax states, those employers might be more likely to look to offshore outsourcing or simply shed the position.

Cities like New York and Pittsburgh, which have their own income taxes, exacerbate the problem even more. Some people who work from home but occasionally meet clients in different cities have been forced to buy business licenses in multiple cities.[107] A new bill in Congress would base taxation on the physical location of the worker.[108] If it becomes law the computer programmer discussed above would be subject to New York state income tax only for the amount of work actually done in New York (25 percent) and Tennessee would retain the right to tax the remainder of his income.[109] Reforming state income tax laws would have a particularly significant impact in areas with high numbers of interstate telecommuters, such as the New York-New Jersey-Connecticut area and the Charlotte and Portland metropolitan areas.

b. Internet Access Tax:

The Internet Tax Freedom Act of 1998 imposed a moratorium on taxing Internet access. The moratorium is set to expire in 2007, although a new bill would make the moratorium permanent.[110] Internet users and providers have enjoyed the absence of access taxes. Providers have developed new services—from dial up to faster dial up to broadband and wireless—and Internet users have enjoyed falling prices.

Some legislators are not swayed by the innovation that the tax moratorium helped spur. Some even regard the absence of a tax as a tax break.[111] Naturally, telecom providers—who are heavily taxed—have cried foul. Still, telecom regulatory policy is not worthy of replication. The federal government imposes a 3 percent

excise tax on communication services (first enacted to pay for the Spanish-American War of 1898) and the combined burden of local, state, and federal tax adds an additional 8 to 34 percent to monthly bills.[112] Only alcohol and tobacco are taxed more heavily than telecom and just the compliance costs alone are formidable. Since so many jurisdictions tax telecommunications services, a nationwide provider must submit over 60,000 tax returns each year.[113]

If legislators are concerned about maintaining a level playing field, taxing Internet access like phone access is not the only option. Legislators could point to the success of the Internet access tax moratorium and suggest lowering phone taxes. After all, FCC regulations that force telephone companies to subsidize phone service for schools, libraries, the poor, and people who live in rural areas do little to expand service to those who lack it. And when such programs do increase telephone subscription, they do so at a steep cost—between $1,500 and $11,000 per year per each new subscriber.[114]

Yet legislators are typically eager to find new sources of revenue and are particularly reluctant to give up established sources. But if they would make more extensive use of competitive sourcing and privatization— which typically yield savings of 30 percent —legislators could provide quality services and still lower taxes.

c. Voice-over Internet Protocol (VoIP) Phone Service:

The issue of VoIP, or phone service that is provided over the Internet, provides another example of how inconsistent telecom regulatory policy is. The Internet access tax moratorium does not apply to VoIP, yet it still remains to be seen whether VoIP providers will be subjected to the same battery of regulations that traditional telecom companies face. A 2004 FCC decision barred states from imposing many telecom regulations on Internet phone providers but states like California and Minnesota are bent on fighting it.[115]

d. Sales Taxes:

Governments often do not collect sales tax for online purchases. Since there are nearly 8,000 different state and local sales taxes, the Supreme Court has ruled that slapping interstate merchants with every sales tax would severely hamper commerce among the states.[116] Typically what occurs is an online business collects sales taxes on purchases made by in-state customers only. For example, L.L. Bean is located in Maine and so it collects Maine sales taxes on purchases—online, walk-in or otherwise—that occur in Maine.[117] The company does not have to collect sales taxes when a customer from another state purchases a product online, but a recent court ruling may change this arrangement, at least in some areas.

In June an appellate court set a precedent that could allow California to impose sales taxes on Internet retailers, even if those retailers are not headquartered in California.[118] If such policy becomes more widespread the cost will be much greater than the added cost to the consumer. Simply complying with the many different sales taxes would drive up the cost of doing online business. Since non-work trips comprise a large and growing portion of total automobile trips, policies that make e-commerce less attractive may compromise the Internet's congestion-relief potential.

Recommendation: Legislators should not let the desire for more revenue retard the development of the Internet, VoIP, or even traditional telecom. Onerous taxes drive up the cost of service and make it harder for telecommuters to enjoy high-speed Internet access. The Internet access tax moratorium should be made permanent and state and local legislators should work together to make income taxes and other taxes lower and less complex. Tax neutrality among businesses is an important consideration, but it should be achieved by

lowering taxes, not raising them. Laws that make online services unnecessarily expensive make the tools of telecommuting unnecessarily expensive and the result is that fewer people will telecommute.

4. Telemedicine Licensing

As with so many other aspects of telecommuting and telework, states are trying to determine how to regulate telemedicine.[119] Some states have entered into compacts for, say, nursing services. Under these arrangements, a nurse with a license in one state may practice in other states covered by the compact without obtaining additional licenses. Yet other states have not been as accommodating. Instead they insist that out-of-state telemedicine practitioners obtain in-state licenses.

Recommendation: Medical licensing laws should not restrict interstate competition. Telemedicine gives patients—especially patients in remote areas—more health care options and policy should allow consumers to shop from among many providers. In the United States, medical professionals go through a thorough licensing process, no matter the state. Policy should allow anyone licensed in any U.S. state to practice telemedicine in any other state. Short of that arrangement, more states should enter into reciprocal compacts.

5. Workplace Safety and Health Regulations

In 2000, the Occupational Safety and Health Administration (OSHA) attempted to expand its authority into home offices. Although the attempt ultimately failed, it raised suspicions regarding future government efforts to regulate home office environments. As telecommuting continues to grow and as workers and employers continue to craft arrangements that suit their particular preferences there could very well be another attempt to regulate home offices. Often employers are already suspicious of telecommuting. If they were liable for the conditions of home offices, they would be even less likely to support at-home work.[120] Even the fear that this might occur could dissuade some employers from championing the practice.

Recommendation: Elected officials should pass legislation that ends the regulatory uncertainty and makes it clear that OSHA-style regulations will never be allowed to enter the home office.

Part 7

Conclusion

Lawmakers speak glowingly of telecommuting, yet policy often hampers its progress. When dynamic practices like telecommuting and e-commerce interact with an inflexible regulatory apparatus there are bound to be unpleasant unintended consequences. It's clear that governments had an easier time, for example collecting income tax revenue, when more people lived and worked in the same jurisdiction. Yet our increasingly mobile society has forever changed the way people work and how they buy and sell goods and services. In the future the workplace and the marketplace will become even more dynamic and personalized and policy should accommodate this evolution.

We are now entering a crucial period for telecommuting policy. Recent court decisions and pending legislation will have a significant impact on how telecommuting and e-commerce progress. At a time when congestion is mounting and policymakers struggle to find cost-effective ways to cope with it, let us hope they consider all the good telecommuting has already done—for congestion relief and beyond. Let us also hope that they consider the good it could do in the future.

Managers have perhaps an even more important role to play. Even with current and pending policy threats, they could help boost the ranks of at-home workers tremendously simply by granting more of their employees the telecommuting option. Here much of the task at hand is simply spreading the word. Once more managers and employers appreciate the bottom-line benefits of telecommuting, there will be little need for researchers and public officials to browbeat them into embracing the practice.

Technology has done its part to spread it and America's workers have shown they are open to it. Now it is up to our leaders in politics and business to allow telecommuting to reach its full potential.

About the Author

Ted Balaker is the Jacobs Fellow at Reason Foundation, a national public policy think tank that promotes government efficiency and market-based reform. Reason Foundation is headquartered in Los Angeles, but most employees telecommute from various locations across the United States. Except for "Bicycle," Balaker has practiced every commute mode listed by the Census Bureau. He has relied mostly on walking and public transit and has more recently turned to carpooling and then to a mix of solo driving and telecommuting.

Balaker addresses a variety of subjects, but has a special focus on transportation, urban policy, and employment issues, such as offshore outsourcing and telecommuting. Balaker's recent policy studies include *Offshoring and Public Fear: Assessing the Real Threat to Jobs* (co-author Adrian T. Moore) and *Virtual Exclusive Busways: Improving Urban Transit while Relieving Congestion* (lead author Robert W. Poole, Jr.).

Apart from policy studies and Reason Foundation outlets, Balaker's work has been published by the *Investor's Business Daily*, *The Washington Times*, *Orange County Register*, and *Playboy*, among others. He has appeared on many television and radio programs, including *The CBS Evening News* and various National Public Radio programs.

Prior to joining Reason, Balaker spent five years with ABC Network News producing pieces on issues such as government reform, regulation, addiction, the environment, and transportation policy.

Balaker is currently writing (with Samuel Staley) *The Road More Traveled: Improving Mobility and Reducing Congestion in American Cities* (Rowman & Littlefield 2006).

Appendix

Reason Foundation's Virtual Office

Reason Foundation is headquartered in Los Angeles, but that can be misleading. Although some employees work at headquarters, 85 telecommute nearly all the time. They work remotely from locations all over the nation, from San Francisco to Ohio to Washington, D.C. Here some of them describe their experiences with telecommuting.

Kerry Howley, Assistant Editor, *Reason* Telecommutes from Washington, D.C.

The pros include flexibility and time efficiency (I don't waste time commuting.) On the other hand, it can be hard to self-motivate and avoid distractions. I also think that the value of an office isn't just in the workplace but in the casual banter between co-workers… having ideas batted around.

I think the ideal is to have an office space available, but optional. That way you can avoid deadening office fatigue but have a well-defined place in which to get work done.

Robert W. Poole, Jr., Director of Transportation Research and Co-Founder of Reason Foundation Telecommutes from Plantation, Florida.

I've been a full-time telecommuter for more than two years now. I love it, and would never go back to fighting traffic.

Compared with commuting to the office, I am saving 60-70 minutes per day. Near as I can figure, the saved time is divided between additional work time and additional personal reading time (science fiction and public policy books.

I think my productivity as a full-time telecommuter is significantly higher than it was when I was in the office each day. I escape the numerous distractions and interruptions that always took advantage of my being physically present.

I do miss the miscellaneous chit-chat with co-workers, which sometimes led to good ideas and contacts. It's hard to say if email makes up for this; it does to some extent, but is probably not a perfect substitute. But that's the flip side of avoiding the numerous distractions of the office. On balance, I think the trade-off is very positive for productivity.

Samuel R. Staley, Director of Urban and Land Use Policy Telecommutes from Bellbrook, Ohio

I never go to the office. Telecommuting has completely divorced geography from work product and productivity for me.

The key advantages are: it's easier to focus on specific projects without being interrupted. I have huge flexibility with my work schedule (particularly important to me while my children are young and still like having me around); and my productivity and value added to the organization are based on output and performance.

The key disadvantages are: I don't have regular interaction with most people in the organization; it's more difficult to create synergies across programs and projects; and sometimes it takes longer to identify and resolve issues cropping up from miscommunication. For example, if we provide comments on a paper or essay and we have a question about the comments, we can't simply go into the office next door to resolve it.

Still, I can't see myself ever working in an office environment again.

Related Reason Foundation Studies

Robert W. Poole, Jr. and Ted Balaker, *Virtual Exclusive Busways: Improving Urban Transit while Relieving Congestion,* Policy Study No. 337, September 2005: reason.org/ps337.pdf

Robert W. Poole, Jr. *Easing California's Transportation Crisis with Tolls and Public-Private Partnerships*, Policy Study No. 324, January 2005: reason.org/ps324.pdf

Ted Balaker and Adrian T. Moore, *Offshoring and Public Fear: Assessing the Real Threat to Jobs*, Policy Study No. 333, May 2005: reason.org/ps333.pdf

Samuel R. Staley and Lynn Scarlett, *Market Oriented Planning: Principles and Tools*, Policy Study No. 236, November 1997: reason.org/ps236.html

William D. Eggers, *Performance Based Contracting: Designing State of the Art Contract and Monitoring Systems*, How-to-Guide No. 17, May 1997: reason.org/htg17.pdf

Endnotes

1   Patricia L. Mokhtarian, Ilan Salomon, and Sangho Choo, *Measuring the Measurable: Why can't we agree on the number of telecommuters in the U.S.?* (Davis, California: Institute of Transportation Studies, University of California, Davis, August 2004).

2   Ibid, p.p. 3-4.

3   Analysis of 2001 National Household Travel Survey data by Bumsoo Lee at the University of Southern California via email to author from Professor Peter Gordon of USC, April 15, 2005.

4   The debate about using "Work at Home" workers as telecommuters extends beyond the issue of home-based workers. For example, a very small percentage of at-home workers are not paid. Of course, these definitional issues are not limited to at-home workers. For example, the Census counts those who commute via taxi as "transit" commuters and transit commuting typically involves another mode, such as walking or driving. It is the rare transit commuter who can get to work solely by transit.

5   See for example:

     Margaret Walls and Elena Safirova, *A Review of the Literature on Telecommuting and Its Implications for Vehicle Travel and Emissions* (Washington, D.C.: Resources for the Future, December 2004).

     United States Census Bureau, *Working at Home: 2000*, Table 1-2:
     http://www.census.gov/population/cen2000/phc-t35/tab01-2.pdf

6   Bureau of Labor Statistics, *Work at Home in 2001*, March 1, 2002.

7   United States Census Bureau, *Journey to Work: 2000*, March 2004.
     http://www.census.gov/prod/2004pubs/c2kbr-33.pdf

8   American Community Survey, 2003.
     http://www.census.gov/acs/www/Products/Profiles/Single/2003/ACS/Tabular/010/01000US3.htm

9   Work at home figures may further undercount the number of telecommuters because, for example, such figures do not account for part-day telecommuters.

10   "Cyberstates 2005," American Electronics Association, Washington, D.C., April 26, 2005.

11   Press Release, "Census Bureau Releases Information on Home Workers," *U.S. Census Bureau News*, October 20, 2004.

12   American Community Survey, *2003 Multi-Year Profile for the United States:*
     http://www.census.gov/acs/www/Products/Profiles/Chg/2003/ACS/Tabular/010/01000US3.htm

13   2004 American Interactive Consumer Survey, conducted by The Dieringer Research Group, September 2, 2004. According to the survey, the number of employed Americans who performed any kind of work from home, with a frequency range from as little as 1 day a year to full time, grew from 41.3 million in 2003 to 44.4 million in 2004, a 7.5 percent growth rate.

14   Journey-to-Work 2000. For breakdown by area, see Nancy McGuckin and Nanda Srinivasan, *Journey-to-Work Trends in the United States and Its Major Metropolitan Areas: 1960-2000* (United States Department of Transportation, Washington, D.C., June 30, 2003).

15 Ibid.

16 Ibid.

17 If municipal WiFi plans continue to gain support, this may amount to a telecommuting subsidy of sorts in the future. But most governments considering such plans would not provide the service themselves but bid it out to a private contractor. This would contain costs. There is also the issue of the home office tax deduction. Accountant Michael Snell of Michael R. Snell & Associates argues that this should not be considered a subsidy since we do not consider other costs of doing business as such. Even if we put that issue aside it is still difficult to determine if telecommuting receives more than it gives. In 2002 sole-proprietorships that generated revenue claimed roughly $5 billion in deductions. Of course that figure does not tell us how much money the Treasury "lost" from this deduction and Snell argues that the government may actually make money from telecommuters. The self-employed who work from home often end up paying more in taxes because the home office deduction is often smaller than deducting rented office space. Salaried employees who work from home (and whose employers do not provide office space) may claim an office-at-home deduction, but the average tax savings is typically small (probably around $200 per year on average). Moreover, such deductions are a red-flag to the IRS and since they often invite audits, many who could claim the deduction do not. And say a company expands use of telecommuting and cuts back on office space. The employees that are now telecommuters can now claim a deduction, but the company also has a smaller deduction because it has less office space. The aggregate deductions of the new telecommuters are probably roughly offset by the deductions the company lost. Again, since salaried telecommuters are often likely to pass up that deduction, government coffers may well expand thanks to telecommuting.

18 United States Department of Transportation, "Federal Subsidies to Passenger Transportation," December 2004. http://www.bts.gov/programs/federal_subsidies_to_passenger_transportation/html/figure_02.html

19 *Highway Statistics 2002*, U.S. Department of Transportation, Federal Highway Administration.http://www.fhwa.dot.gov/policy/ohim/hs02/index.htm.

20 Walls and Safirova, *A Review of the Literature on Telecommuting and Its Implications for Vehicle Travel and Emissions*. Even a study in which telecommuters did have longer commute distances found that total commute distance traveled was still lower among telecommuters. See Patricia L. Mokhtarian, Gustavo O. Collantes and Carsten Gertz, *Telecommuting, Residential Location, and Commute Distance Traveled: Evidence from State of California Employees* (Davis, California: Institute of Transportation Studies, University of California, Davis, June 2003).

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23 Anthony Downs, *Traffic: Why It's Getting Worse, What Government Can Do* (Washington, D.C.: Brookings Institution, January 2004). http://www.brookings.edu/comm/policybriefs/pb128.htm

24 Robert Cervero, "Are Induced-Travel Studies Inducing Bad Investments?" *Access*, November 22, 2003.

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26 1995, *Nationwide Personal Transportation Survey*, U.S. Department of Transportation, Federal Highway Administration.

27 Based on $2.56 for a gallon of regular gasoline, a 22 mph car, and a round-trip commute of 44 mi/day (the average telecommuter commute distance based on a 2002 Southern California Association of Governments survey).

28 Donald C. Shoup, *The High Cost of Free Parking*, (Chicago: Planners Press, 2005).

29 Ibid, p. 264.

30   Ibid. p. 265.

31   Jean Chatzky, "There's no place like (an office at) home," *MSNBC.com*, March 21, 2005.

32   2000 AT&T Employee Telework Survey.

33   Robert D. Atkinson, Shane Ham, and Brian Newkirk, *Unleashing the Potential of the High-Speed Internet*, (Washington, D.C.: Progressive Policy Institute, September 2002).

34   Ibid.

35   Atkinson, Ham, Newkirk, *Unleashing the Potential of the High-Speed Internet*, pp. 24-25.

36   Ed Frauenheim, "At tech firms, time again for flextime?" *CNET News*, November 15, 2004.

37   W. Michael Cox and Richard Alm, "Off the Books," *Reason*, August 2002.

38   "U.S. workers say they waste 2 hours a day," *Associated Press*, July 11, 2005.

39   2000 AT&T Employee Telework Survey.

40   Positively Broadband Campaign, Survey of 1000 adults conducted by the Winston Group, April 2002, http://www.positivelybroadband.org/library/downloads/17505_final_whitepaper.pdf.

41   John Novak of the Ohio Utility Protection Service, speaking at the "NEO Telework Summit: Can Northeast Ohio go to work by staying home?" Sponsored by Cuyahoga Community College and the Center for Regional Economic Issues, May 9, 2005.

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