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BUSINESS REVIEW

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College and Graduate School of Business, University of Texas at Austin

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Remote Workers and the Changing Workplace

In the comics, Detective Dick Tracy wore a wristwatch radio to maintain contact with his headquarters and associates while on assignment in the field. On television, Agent Maxwell Smart spoke into his shoe to communicate with Chief and his fellow agents. And everyone knows that *Star Trek's* Captain Kirk could reach Mr. Spock or any other Enterprise crew member on a palm-sized, handheld communicator. All these means of communication once seemed just tools of fictional trades. Today, however, an emerging class of technologies—*personal portable technologies*, or PPTs—affords similar capabilities to real-life workers.

These technologies, which include cellular telephones, laptop and notebook computers, handheld terminals, and portable fax machines, are *personal*, in that they are used by individual workers and *portable* in that they are small, lightweight devices capable of being carried on the worker's person. PPTs support "remote workers," employees who work outside the traditional office setting. In particular, PPTs support mobile workers whose job tasks require them to work in many different places. Mobile workers include salespeople, service workers, consultants, and, in many cases, executives. But use of these technologies is not limited to certain professions. Indeed, PPTs have opened the door for virtually any worker to become a remote or mobile worker.

Workers in the 1990s are increasingly looking for flexibility in where and when they do work. With the proliferation of PPTs, options have dramatically increased. With a laptop computer, "paperwork" such as report writing, forms completion, and letter writing can be done any-

where, anytime. With a cellular phone, "communications work" such as telephone calls, voice mail maintenance, and data entry (in some sophisticated push-button telephone-dial applications) can also be done anywhere and anytime. Combine the two, and the portable office is born. Today, technologies such as radio-based, handheld terminals allow service workers to pick up their next job ticket from anywhere in the field. Cellular telephones make it possible for real estate agents to schedule a visit to a newly listed property while en route. Laptop computers facilitate extremely technical sales presentations by pharmaceutical representatives to interested doctors and nurses. An author can update articles and books on her PPT system while at a research location and transmit the revisions directly to her editors. A sports statistician can update game statistics on his laptop to keep abreast of batting averages and pitches. The applications are endless. But what affects most workers is the possibility of moving his or her own work to the mobile platform.

The Benefits: Mobility, Flexibility, Productivity

Why are workers increasingly opting to work away from their traditional offices? There are a variety of reasons, personal, technical, and managerial. On the personal level, workers are often interested in doing their jobs with as much flexibility as possible. In many cases, remote employees arrange their work responsibilities around their personal or family lives rather than vice versa. Working at a remote location, such as one's home, affords the employee more independence and autonomy: the worker has the chance to work when he or she wants to without someone looking over his or her shoulder. As long as the job or task is completed satisfactorily, the

worker has done “a good day’s work.”

But this increased freedom brings with it an increase in responsibility. The remote worker must be a disciplined self-starter who can work away from coworkers. Tasks must be such that they can be done away from the traditional office. Furthermore, remote workers must put their own structure on their work sessions, which can be difficult if the remote environment has compelling distractions such as phones ringing or children seeking attention. In one case, a remote worker took her laptop computer to the food courts of local shopping malls to work on her reports. She found the constant level of noise easier to block out than the sporadic telephone ringing in her home.

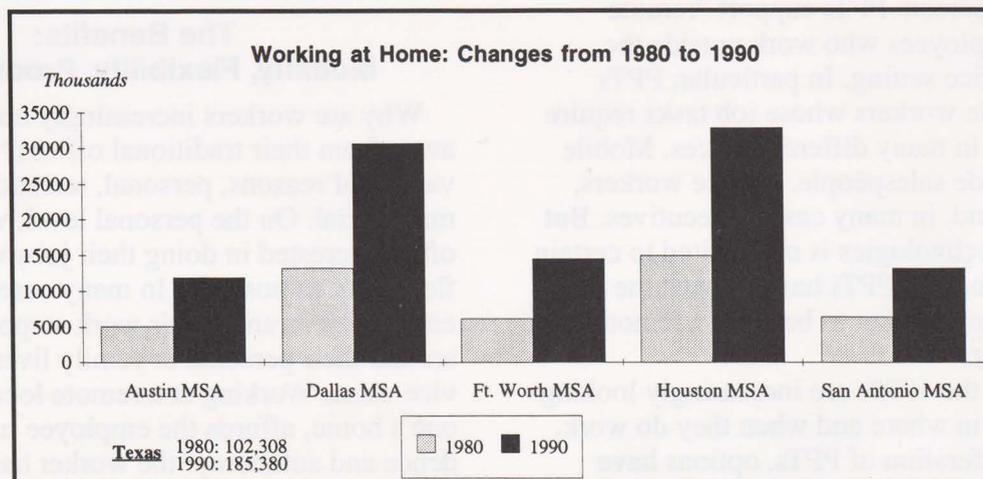
On the technical level, the emergence of newer information technologies offers workers an option to work in their homes, in their cars, at their customer locations—virtually anywhere. PPTs have made it possible for workers not only to work remotely, but to carry the tools of the office with them. In this context, working at home is but one alternative for those who want, or need, to work outside the traditional office. The more productive an employee can be whenever and wherever he or she wants to work, the more work will be done in odd places and at odd times. In fact, many workers are finding they can be more productive with these technologies at a remote location than they were in their traditional office.

On the managerial level, changing management control systems have enabled a change in work habits. Thanks to technologies, the number of jobs that can be done at remote locations is increasing. At the same time, managers are

learning more about how to supervise a remote worker, devising new performance measurements, new reward and incentive systems, new evaluation and monitoring procedures, and new communication and coordination mechanisms to work with their employees. For example, measuring performance by frequently observing the worker will not suffice for workers at home. Instead, evaluating the completed task and the time it took to do the job might provide a better assessment of the remote worker’s output. Rewarding performance with a bigger office will not motivate a remote worker. Managers must be more creative in developing compensation plans. For instance, in a field service organization, where pay is capped for the unionized employees, performance rewards might take the form of lunches at a local restaurant or ball game tickets. Operating procedures will also require rethinking. For example, a conference call, rather than a face-to-face discussion, might become the preferred form of meeting between employers and remote workers.

The Costs: More Coordination, More Difficult Communication

With the freedom of working remotely come the costs of coordination and the responsibility for making sure the work gets done. If an employee can work anywhere, anytime, it becomes more difficult for others to locate that worker immediately. Cellular phones only work if the receiving party has the phone powered up. Likewise, electronic mail over a wireless network only receives mail if it is turned on. Remote workers may choose to work at different hours than those in the home office, making telephone



Source: BBR staff, from 1980 and 1990 census tapes.

conversations difficult at best. In other words, what makes one person's life more convenient may become a source of inconvenience for others. Although a remote worker's schedule is more flexible, it might be more difficult for him or her to commit to meeting times that reduce his or her flexibility.

In addition, the increased freedom brings with it a larger responsibility for coordinating and scheduling work. If the work produced by the remote worker must be transported, communicated, or otherwise given to someone else, the fact that the worker is remote can become a barrier to efficient transfers. Scheduling when to work and when not to work further complicates the mix. In a traditional office, an employee can use the excuse that the day is over and the work will have to wait until the next day. However, an employee working on his or her own schedule and location has no such excuse. It is more difficult for those employees to get away from their work, and many who work remotely find this the hardest adjustment of all. For some, working anyplace and anytime means working

everyplace and all the time.

In sum, this personal, technical, and managerial evolution has enabled the emergence and growth of many new work options. But this new freedom brings with it an equally long list of costs and issues yet to be addressed.¹ Every work situation is unique, of course, and many managers believe the difficulty in integrating remote workers into their organizations outweighs the benefits. But the social and economic pressures of providing all workers offices of their own are forcing many organizations to reevaluate their assumptions and to be as creative as possible with their workforce. The use of PPTs and remote workers promises to become a more favored solution as these pressures increase.

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Note

1. Dr. Pearlson is currently concluding a study of field service workers and is actively seeking companies for her next study, an examination of the impact of PPTs on white collar workers.

Employment and Unemployment Rate by Metropolitan Area

Area	Total nonagricultural employment (thousands)			Total employment (thousands)			Unemployment rate
	May 1994	May 1993	Percentage change	May 1994	May 1993	Percentage change	May 1994
Abilene	50.6	50.1	1.0	55.1	54.5	1.1	5.3
Amarillo	86.3	83.2	3.7	102.6	98.4	4.3	4.1
Austin-San Marcos	469.7	453.4	3.6	547.2	523.0	4.6	3.6
Beaumont-Port Arthur	152.2	149.0	2.1	168.7	163.7	3.1	9.8
Brazoria	72.7	70.2	3.6	100.2	95.9	4.5	7.0
Brownsville-Harlingen	91.5	86.0	6.4	108.7	101.7	6.9	11.1
Bryan-College Station	63.1	61.3	2.9	67.6	65.0	4.0	3.4
Corpus Christi	142.0	139.5	1.8	157.7	154.1	2.3	9.1
Dallas	1,526.9	1,465.2	4.2	1,579.9	1,500.9	5.3	5.3
El Paso	229.1	224.1	2.2	252.9	244.8	3.3	9.8
Fort Worth-Arlington	626.4	611.2	2.5	757.6	733.5	3.3	5.5
Galveston-Texas City	85.7	83.9	2.1	117.3	113.6	3.3	7.9
Houston	1,688.1	1,659.7	1.7	1,816.4	1,770.7	2.6	6.6
Killeen-Temple	85.5	82.7	3.4	100.5	96.6	4.0	5.3
Laredo	55.4	52.7	5.1	60.6	57.4	5.6	8.6
Longview-Marshall	81.0	77.6	4.4	92.5	88.4	4.6	8.1
Lubbock	104.7	102.5	2.1	113.9	110.8	2.8	4.3
McAllen-Edinburg-Mission	120.3	112.4	7.0	157.3	145.9	7.8	14.2
Odessa-Midland	91.6	90.7	1.0	108.4	106.7	1.6	7.7
San Angelo	40.0	38.9	2.8	47.6	46.1	3.3	5.0
San Antonio	589.2	573.7	2.7	661.4	639.1	3.5	4.7
Sherman-Denison	37.4	37.1	0.8	43.0	42.2	1.9	6.3
Texarkana	47.9	48.4	-1.0	52.3	52.1	0.4	9.2
Tyler	68.2	66.0	3.3	76.8	74.0	3.8	5.5
Victoria	33.7	31.8	6.0	40.4	37.9	6.6	6.0
Waco	87.1	85.3	2.1	91.7	89.0	3.0	5.2
Wichita Falls	54.2	52.6	3.0	59.5	57.7	3.1	5.4
Total Texas	7,686.5	7,465.1	3.0	8,741.6	8,444.2	3.5	6.3
Total United States	113,403.0	110,804.0	2.3	122,946.0	119,201.0	3.1	5.9

Sources: Texas Employment Commission and U.S. Department of Labor, Bureau of Labor Statistics.



An Internet Primer (continued)

Internet. Every conceivable kind of information is available. Many of the on-line institutions have their own databases of interesting and useful information. The Internet has become a way to find that information quickly and at relatively low cost. Libraries share their holdings catalogs, businesses offer specialized data, and research organizations provide their findings. These resources can be accessed using:

- *Archie*, to find a specific file or files relating to a topic;
- *FTP* (File Transfer Protocol), to send or retrieve files;
- *Gopher*, menu access to Internet resources;
- *World Wide Web*, to find on-line information by following facts or texts from one link to another;
- *Mosaic*, a graphical user interface to the Internet;
- *WAIS* (Wide-Area Information Server), to search for appropriate databases and then for information within them; and
- *Telnet*, to attach to any other Internet computer one is authorized to use to run programs, search databases, or just log on to a personal account.

Cost is a major motivation to use the Internet, with e-mail rapidly becoming the preferred means of business communication. Some companies are exploring a broader use of the Internet, including doing business with suppliers and managing internal information. *CommerceNet*, backed by a broad coalition of Silicon Valley's largest companies, is a new business-to-business network that permits companies and individuals

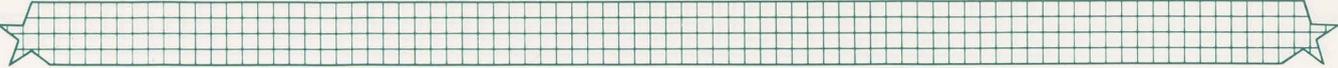
connected to the Internet to buy and sell goods, look up and exchange information, and collaborate on projects. EDGAR, the Securities and Exchange Commission's electronic database of financial data, has been on the Internet since early 1994. It now contains filings from only a few thousand companies, but by 1996 should include all documents the SEC requires publicly traded companies to file. Based on current use, it is estimated that users will retrieve almost 500,000 documents from the database during its first year of operation.

It has been estimated that the administrative cost of trade between companies in the United States amounts to \$250 billion a year. New tools are being developed specifically for use by private companies, including a version of Mosaic that will make it easier to transmit critical information. With the advent of easy-to-use tools and better security features, the Internet is steadily becoming a conduit for commercial business. All of this has implications for the future growth and development of the Internet.

The National Science Foundation estimates that 58 percent of the U.S. Internet addresses now belong to users who acquired them through private employers or commercial service providers, with the rest belonging to college and universities, governments, and other organizations. This suggests that a shift in usage to the private sector is well under way.

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An Internet Primer

The Internet is a giant network of computers linking thousands of sites in more than 130 countries. Internet users number 15 million, with over a million added to the user base each year. The network includes colleges and universities, military and research organizations, for-profit businesses, nonprofit organizations, and commercial services. Internet is not really one network, but rather a web of computer networks that speak the same transmission language, Transmission Control Protocol/Internet Protocol (TCP/IP). The Internet was originally intended to serve the research and academic communities, but more recently, people in business and government, as well as casual computer enthusiasts, have been traversing this web, searching among the millions of pages of electronic data for the information they need.

What is now the Internet began in the late 1960s as an experiment to test the possibility of creating a disaster-proof nationwide computer system through which scientists and the military, regardless of location, could share messages and data. Initial users found that they could send messages to and share files with other users almost instantaneously. If any connection broke, traffic could be rerouted through other channels. It was found that this provided reliable communication that was also relatively easy and cheap.

From the mid-1970s to the 1980s, other networks that used the same technology began to work together or *internetwork*, sending information across special high-speed telephone lines, with the original network as the core. By the 1980s, this internetwork, which would become known as the *Internet*, reached not only across the country, but around the world. No one person or institution runs the Internet; rather, groups of volunteers set standards for its operation. The federal government pays less than 3 percent of the Internet's operating costs with individual institutions and groups providing the rest by operating their own host computers and maintaining the various links of the network.

Getting Started

There are several ways to connect with the Internet. A user can be directly connected to one of the networks that constitute the Internet. Most

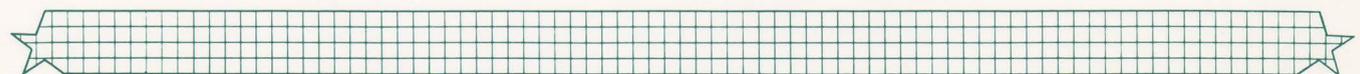
colleges and universities, and increasing numbers of companies, have direct Internet connections. A direct connection assures the institution complete control over access, including which tools are available to users. Another access method is through a dial-up provider who supplies the user with an account through which to access the Internet. The user dials in to the provider's computer, which is attached to the Internet. Dial-up providers may charge a monthly fee or an access charge and may also charge for connection time. Finally, commercial services, such as CompuServ, Prodigy, GENie, Dow Jones with MCI Mail, and America Online, in addition to their own services, offer gateways to electronic mail exchange with Internet users and may also provide other Internet options to subscribers. These services typically charge a monthly fee and an additional hourly fee for use of services. Other services provide *SLIP*, Serial Line Internet Protocol, accounts through which the user can connect directly to the Internet. These services require a high-speed modem and the use of public domain software for access to all Internet resources.

Getting connected is the easy part. Maneuvering the network is more difficult; the Internet was built by and for sophisticated computer users. However, this is slowly changing with the introduction of simpler tools. For example, with *Mosaic*, a relatively new Internet tool, users can retrieve information by pointing and clicking a mouse instead of typing commands. Mosaic has quickly become a de facto standard for maneuvering the network, signaling a trend toward more user-friendly tools.

Internet Services

Communication via electronic mail is one of the Internet's most popular features. Indeed, e-mail is the most widely used of the Internet offerings. It works like regular mail, except it's faster and cheaper. Each site on the Internet has a unique name and every user at each site has an individual address to use to send or receive mail. Through variations on individual e-mail exchanges, users can join any of the thousands of topic-oriented discussion groups known as *Listserv* discussion groups or read postings to *Usenet* newsgroups, which are similar to electronic bulletin boards.

Information access is another attraction of the



Announcements

"Indemnification of Environmental Liability: An Endangered Species?" has been released as a new title in the BBR's **Research in Use** series. Patrick L. Brockett, Linda L. Golden, and Paul R. Aird argue that certain legislation and judicial rulings have caused insurance companies to withdraw from the market for environmental liability insurance. In the paper the authors offer suggestions of ways to restore incentives for insurers. The first two authors are professors in UT's Graduate School of Business; the third is risk manager of projects for Bechtel Corporation. To request a copy of the paper, call (512) 471-1616.

Per capita income data by county and metropolitan area for 1992 have been released by the Bureau of Economic Analysis of the U.S. Department of Commerce. County figures appeared in the July issue of the Bureau's **Texas Economic Indicators**; metropolitan area data, the June issue. To order those issues, call (512) 471-1616.

The third edition of the **Natural Fibers Fact Book** will be ready for release in August. This collection offers statistical data on cotton, wool,

mohair, oilseeds, and textiles, with particular emphasis on Texas production, quality, end use, and trade data. Tables and charts offer the most current data available. The price is \$18 plus tax. Also available by subscription is the **Natural Fibers Electronic Newsletter**. To order the fact book or get information about the newsletter, call (512) 471-1616 or fax (512) 471-1063.

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The Bureau of Business Research serves as a primary source for economic and demographic data on the state of Texas. An integral part of UT Austin's Graduate School of Business, the Bureau is located on the sixth floor of the College of Business Administration building. Our e-mail address is: bbr@utxvm.cc.utexas.edu.

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