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CENTRALIZED OR DECENTRALIZED—WHICH WORLD WILL THE INTERNET BRING?

Computer visionaries argue that an all-purpose Internet is coming which will positively transform our society. A whole new world will arise, they predict, out of Internet uses of Sun Microsystems' new Java language. Just as personal computers pushed big mainframe computers to the margins, it is said the end result of Java will be for desktop PCs (equipped with sophisticated processors, big memories, and private software that make them expensive) to be discarded in favor of cheap, bare-bones terminals connected to the World Wide Web. Instead of buying their own software, people will just use what they want on the Web. Their work will be processed on the Web. They will play their games and write their letters and calculate their finances online. Windows operating systems and hard drives and the whole culture and economy of decentralized computing will be gone. Instead the world will rely on the Internet to find, shape, and store information.

Conservative intellectual and technology strategist George Gilder insists multimedia computers are going to "usurp phones, televisions, and video game players entirely." They are also, he believes, going to replace TV. For Gilder, "The computer industry is converging with the television industry in the same sense that the automobile converged with the horse; making the boob tube into an active hive of theater, museum, classroom, banking system, shopping center, post office, and communicator is contrary to the nature of the box."

This Internet vision is a striking view of the future. What is perhaps most startling is that it implies we are headed back toward centralization, bigness, and universal reliance on a small handful of uniform languages, companies, standards. The rhetoric at the birth of the PC held that desktop computing had smashed centralization and bigness forever. But then we ended up with a Microsoft-Intel juggernaut controlling 80 percent of the market and killing off competitors (not just the little guys, but even the #2 finishers like WordPerfect, Lotus, and Apple). Now, the computer world's seers tell us we will be going back to the dumb terminal linked to the big brain and info-repository many miles away—in certain important ways back to the world of the central mainframe.

How will this tension between centralization and decentralization shake itself out? Is the Java/Internet/central-server/shared-file model really likely to become dominant? Will it replace today's PC? What factors other than technology will determine whether the Internet eventually usurps competing information and entertainment media? And is reversing the 20-year trend of moving computing power closer and closer to the user a good thing?

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By Douglas Gomery

There are reasons to be skeptical about the idea that dumb terminals and the Internet will replace today's PCs. This would mean that to get even the simplest task done, users would first have to connect to the network and download. There are also security and privacy issues we are a long way from resolving. Will corporate buyers and home shoppers want all their financial information sitting out there on some server? And what about traffic congestion? Already the increased loads on the Internet are slowing access; it will only worsen if millions upon millions of new users try to move 3-D environments and whole movies down the Internet pipe.

Most advocates of the Java-Internet model are senior executives of companies that have lost the PC war to Microsoft. Their desire is to kill the PC as we know it so they can challenge Bill Gates again in some new realm. For them, an industrial shake-up would be a business opportunity.

But establishing mass substitutes for current products is difficult at best, even assuming new technology that provides a superior service at a lower price. Home shopping, for instance, has not replaced the mall, despite a lot of investment and hoopla. Or consider George Gilder's boldest assertion: that the Internet will replace today's TV as the appliance of choice for entertainment and news gathering in American homes. There are stumbling blocks in the way, and they have less to do with technology than with business practices and human psychology.

At the top of the list is ease of use. A key reason for the dominance of the television is that its form and function are so simple. Anybody can extract everything a TV offers without any difficulty. In contrast to TV couch potatoes, however, today's PC users, despite being a highly educated vanguard, cry for help millions upon millions of times per month. How many frustrated customer-assistance calls might Java's Internet-central get?

Internet enthusiasts hope that today's couch potatoes will become an endangered species, that America will cease being a nation of passive, football-watching idiots, and be transformed instead into a selective, knowledge-seeking culture of informed and slender people. One can only wish them well. But as a business proposition this will not be easy to engineer.

To mine a new mass market of networked communications, computer hardware and software companies will have to become good at dealing with millions upon millions of ordinary consumers. None have a good track record navigating such broad consumer markets. Just try reading any computer manual produced by these companies. By contrast, TV broadcasters, cable companies, and the movie studios have experience and know-how when it comes to delivering what consumers want, and keeping them coming back for more.

Most future paying consumers will find it hard to justify the endless delays, disconnects, server errors, and "host unavailable" messages that characterize today's on-line world. Today

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most of us put up with these annoyances because, frankly, we are free riders, paying nothing personally for endless surfing. The bill for most university and corporate use skips the user and goes to his or her institution. In addition, in this wonderful age of early exploration of the Web almost all the best content is itself also free. But that will not last. If and when we have to pay personally, many of us will use the systems much less heavily.

I doubt the rise of the Net will mean the "death" of TV and Hollywood; quite the contrary. Just as we continue to use radio today, even while we use it differently from the way our grandparents did, Americans in the future will draw on a multiplicity of media to communicate, entertain, and inform themselves. The old media will survive, and we will choose among a plethora of new and old communications outlets of which the Internet will be but one part.

To understand the prospects for the information superhighway, think for a moment about how entrepreneurs go about making money with any invention. The key step comes in finding ways to convince the public to regularly part with its money. This is often less glamorous than expected. In 1995, with all the hype about the Web and the Internet, *Forbes* named Hewlett-Packard as its outstanding company of the year. The key to HP's successful rise? Ink and paper. The company has become the dominant seller of computer printers, a business that relies less on selling machines than on selling refills. Taking a page from the book written nearly a century ago by razor baron King Gillette, HP has raked in millions selling disposable ink and toner cartridges. The average business user goes through a cartridge every couple of months, and for a color inkjet printer, Hewlett-Packard sells them for three times what they cost to make.

Economics always trumps technology. Promises are judged and evaluated in the reality of the marketplace, not in the minds of futurists. The various gadgets must actually work together to bring the public something it wants and needs—and is willing and able to pay for. In what consumer markets will the Internet battle be fought? Primarily three: recorded entertainment (movies, TV, games, and music); news (print and broadcast); and information (books, magazines, and libraries).

Of these, the entertainment industry is the most centralized and most able to protect itself. Disney's purchase of ABC/Cap Cities shows that Hollywood can and will keep control over the distribution of its products. And on the creative front, Hollywood has an unchallenged franchise. The studios alone have expertise to create what today's public wants in the form of mass entertainment. And they have a track record of ultimate adaptation. Throughout the twentieth century, with the coming of myriad new technologies ranging from movies with sound and then color to over-the-air TV, then cable and VCRs, Hollywood has domi-

nated and prospered. There is no reason to think Hollywood's power will lessen in the future.

Keep some perspective on Hollywood's deep pockets. Sales of multimedia software on CD-ROM disks are expected to double this year to $1 billion. Pundits predict that revenues from the Internet's World Wide Web will increase from $93 million this year to $1.8 billion by 1999, mostly through advertising. While this growth is promising, these new businesses pale next to the revenue of a single Hollywood studio, with annual sales measured in the billions of dollars.

The news business is also likely to remain a concentrated industry. As with Hollywood, the major news organizations have been re-inventing themselves. At the leading edge, NBC has allied with Microsoft. This and other linkups of news content producers and distributors will prove difficult for any Internet start-up to topple.

The best hope for new entrants lies within the information industry. Production of magazines and books has long been only modestly concentrated, because start-up costs are reasonable. Look for on-line information businesses in this area to expand. But this success will not cause existing publishers to go away any more than the Net will bring the end of TV or newspapers.

As industry warfare rages in the future, one legal matter will be critical—intellectual property rights. What accrues to the creators of information and entertainment products as it becomes easier and easier to gain access to these goods across the Internet? A writer goes to the effort to create a book because he or she can participate in its sales through royalties paid by distributors. But what if the book is on the Internet, free for the taking? Will writers, composers, painters, and filmmakers spend the years necessary to create intellectual property from which they can gain no royalty? Not likely.

Consumers never buy technology for technology's sake. They are seeking access to the ideas and sensations the technology transmits. If the info-highway lacks mechanisms giving creators an incentive to put their mental products on it, the medium's rapid growth will be stifled.

To compensate creators of electronically transmitted content, some argue for a fee charged up front and then waived forever, as with the first sale of books and recorded music at the present. Others would assign every computer-user a code that, when activated, would charge an account, much like long distance telephoning now works. Still others would charge lump sum royalties based on a sampling of use, similar to the way ASCAP and BMI reimburse musicians for music played in restaurants and other public venues. No system is now in place, but one will have to be before much further expansion occurs. It will often take large companies to solve and pay for these distribution and content problems. Small challengers will arise, but in the end it will often be easier simply to sell out.

We should stop thinking about the new communications world in technical terms and start shifting the focus to economics. The Internet in its present form is no model for the future because it is self-consciously non-profit. The Net has worked so well so far because it is an electronic conference table populated by educated people with pioneering spirit, lots of free time, and institutional subsidies that are bound to be reduced once the experimental phase comes to an end. This will not be the population, or the business pattern, of the future. An enduring industry requires a regular revenue stream and the possibility of profits.

It is not likely the electronic world will ever again be as decentralized and open as it has been for the last decade. In the future the info-highway will likely be populated by a handful of large entertainment corporations and a clutch of news producers allied with the telecom companies, plus lots of new entrants on the fast-expanding information side, once the copyright issue is resolved. Some small companies will break through as Microsoft did during the PC boom, but that will be difficult. The info-net will fulfill much of the hope and promise its adherents assert today. But don't expect a new world.

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THE DEATH OF GEOGRAPHY, THE RISE OF ANONYMITY, AND THE INTERNET

A century after the closing of the American frontier, governments are trying to tame the electronic frontier. Most recently, President Clinton signed a bill increasing the penalties for distributing child pornography by computer, and Congress passed legislation banning indecent material on line. These efforts, and others in different parts of the world, grow out of official worries that traditional legal prohibitions don't work in cyberspace. Here's why: the Internet obliterates geography.

Human awareness was once defined by proximity and physical contact. Someone knew only what was close at hand. People 50 miles distant might as well have been a continent away. Technology gradually stretched those boundaries, enabling people to cast themselves and their thoughts over wider and wider areas. State authority expanded—from village, to city-state, to nation, to empire. People migrated. Knowledge and culture spread.

Not everyone applauded the march of progress. A small-town denizen, wrote Sherwood Anderson in *Winesburg, Ohio,* now "has his mind filled to overflowing" by mass-circulation books, magazines, and newspapers. As a result, "the farmer by the stove is brother to the men of the cities, and if you listen you will find him talking as glibly and as senselessly."

Fearing such homogenization, governments sometimes tried to buttress geographic identities against technological in-

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By Stephen Bates