BusinessWeek online

MAY 13, 2002

SPECIAL REPORT -- THE FUTURE OF E-BUSINESS

How E-Biz Rose, Fell, and Will Rise Anew

As in previous tech upheavals, solid expansion may come now that a shakeout has cleared the tracks

The economy is stuck in the doldrums, thanks largely to the broken promises of technology. Dazzled by seemingly limitless returns, bankers had funded hundreds of companies, all going after the same dubious markets. Heedless, individual investors clamored to get into the stock market, driving share prices to unheard-of levels. Soon, the overheated market crashed, turning the new heroes of business into goats and scoundrels. Now, disillusionment reigns, and nobody knows what's going to happen next.

Sound familiar? Maybe it's not as familiar as you might think. The year is 1850. The place is England. And the new technology is the steam locomotive. In a surprising number of ways, railroads were the Internet of 150 years ago. And not just because rails, like the Internet today, connected people and markets much faster than any previous method of transport. "Railway Mania"--as that short period of British stock market lunacy was called--was every bit as nutty as the Internet bubble. Hundreds of companies, many promoting rail lines between small towns, hawked stock well in advance of construction. It all fell apart in 1847, when railroad shares plunged 85% and hundreds of businesses, even banks, went belly-up.

What happened next is even more fascinating. After the bust, train traffic in Britain leveled off briefly, in 1848, before resuming a steady climb. By 1870, just two decades after the crash, railroads were carrying 322 million passengers a year, more than four times as many as in 1850. For all its pain, the bust cleared the tracks of speculative stock plays and swindles, leaving only the most solid companies to survive. The remaining companies, says W. Brian Arthur, an economist at the Santa Fe Institute, a think tank, went on to produce the industry's greatest growth and greatest impact on business and society.

For a rising chorus of economists and business historians, the railroad's parallels with the Internet are too striking to ignore. Defying the downbeat attitude toward the Net these days, they are making a bold prediction: The same decades-long build-out that marked

the post-crash railroad revolution will play out during the Information Revolution, led today by the Internet. If they're right, e-business may well be poised for its own long, steady build-out for decades to come. "Up to now, it has been pretty hard going," says Andrew J. Ball, president of Webcor Builders, a San Mateo (Calif.) construction company that has struggled for years to link its partners over the Web. "Now is the time when we'll see the real advances."

History, however, is not destiny. For one thing, the Internet is only the latest development in the larger information-technology revolution, so it may not pack the wallop of railroads, electricity, or the automobile. And not all new technologies exhibit precisely the same patterns. Nuclear power, for one, has yet to return from its bust after the Three Mile Island accident in Pennsylvania in 1979. And to be truly pervasive, the Internet will require myriad supporting technologies and regulations to become universally useful. Railroads needed every accessory from the telegraph to toilets, the automobile's spread depended on the federal government funding interstate highways, and personal computers needed packaged software, the mouse, and more. There's no guarantee these helper technologies or government aid will materialize for the Internet.

Most important, industry infrastructure and people's habits take years to change, no matter how compelling a new technology may be. The emerging Net-driven corporate model, which taps networks to coordinate a vast phalanx of partners, is so difficult to operate that even some of its most advanced proponents, such as Cisco Systems Inc. (CSCO), have stumbled. That's why many businesses remain hesitant to take the e-biz plunge. Nearly 90% of 1,026 companies surveyed by Forrester Research Inc. are doing some kind of e-commerce, but far fewer are doing the really big stuff: Only about one-third have supply-chain management projects or are running customer-relationship management programs--the most popular Net-connected projects today. "It will take a very long time before the economywide effects of the Internet come through," says Chris Freeman, emeritus professor at Britain's University of Sussex and author of *As Time Goes By: From the Industrial Revolutions to the Information Revolution*. "It requires a huge process of learning and cultural change."

For that reason, the next phase of e-business will be nothing like the dot-com era. For all its insanity and subsequent pain, that frenzy--like others in history--served a valuable purpose: The infrastructure for e-business was created with amazing speed. But the new era's motto is no longer "Get big fast." And it certainly isn't "Get rich quick." Instead, the new mantra is almost puritanical: "Work hard now." And it's not the financiers, whose momentum-driven reign on the Net has come to an end, who are writing the checks. With venture capitalists avoiding Internet business plans as if they were month-old herring, it's up to the folks who actually buy the stuff to drive it into widespread use.

Indeed, the e-biz build-out, if and when it comes, will be relatively slow, marked by further ups and downs. It isn't that innovative new technologies and ideas won't continue to bubble up. It's just that they won't produce upstarts with bottomless budgets and limitless goals. Much of the work will be aimed, instead, at helping existing companies

use the Internet to cut costs, serve customers better, and open new markets. And because the new Net style will have to coexist for some time with old methods, the ultimate payoff in lower costs and greater productivity may still be many years away.

For both remaining dot-coms and traditional companies embracing the Net, that means a long period of developing and deploying the gritty stuff. There's much work to be done, from installing thousands of access points for wireless networks to hashing out arcane data-interchange standards and rolling out broadband links to the masses. "Everybody knows where this is going to end up: Business goes electronic," says Christian A. Larsen, CEO of online mortgage broker E-Loan Inc. (EELN) "Now, it's really about putting our heads down. We've got a lot of wood to chop."

The notion that e-business is due for a comeback may sound daft. After all, many of the dot-coms are dead and gone. E-business leaders such as Amazon.com Inc. (AMZN) and Cisco face continuing doubts about their business models. Many traditional titans that bet on e-business, from Levi Strauss & Co. to ChevronTexaco Corp. (CVX), stumbled in their online efforts. Even the term "e-business" is so discredited that General Motors Corp. (GM)--which incessantly plugged its e-GM unit from 1999 until folding it into its info-tech department last fall--now insists on calling its continuing e-business efforts "digitization." Growls James A. Champy, author of *X-Engineering the Corporation: Reinventing Your Business in the Digital Age* and chairman of Perot Systems Corp.'s (PER) consulting practice: "We're in a big stall."

Yet the lessons of history indicate that this holding pattern may not be permanent. It turns out that the similar dynamics of railroads and the Internet aren't simply an odd coincidence. According to Venezuelan economic researcher Carlota Perez, author of the upcoming *Technological Revolutions and Financial Capital: The Dynamics of Bubbles and Golden Ages*, the same pattern holds for three other tech-driven economic movements as well: the Industrial Revolution of the late 1700s in England, the age of cheap steel and electricity in the late 1800s in the U.S. and Germany, and the automobile and mass-production era starting about 1910. After a gestation period of a decade or more, the new technology usually sparks a boom followed by a sudden bust, leading to widespread doubts.

Today, says Perez, "the world is once again at a crossroads where explanations and guiding criteria are sorely needed." And that's where her work and Freeman's provide some possible answers. What typically follows these uncertain periods, in fact, is several decades of sustained build-out, in which the technology drives the entire economy and becomes essential to business and society. The key to seizing the opportunities is patience, say Perez and Freeman: Despite the rapid rise and collapse of the bubble, the cycle can take at least 50 years to play out from initial breakthrough to maturity.

The Internet's cycle may well prove shorter, since some economists think the Net's impact won't match that of the Industrial Revolution or the railroads. But it is clearly the latest technology to seize the banner of the Information Revolution--and perhaps the most

powerful force yet, thanks to the instant, infinitely adaptable global connections it makes possible. Consider the longevity of the IT revolution's previous standard bearer: the PC. After Apple Computer Inc. (AAPL) popularized the device in the 1970s, the IBM PC sparked a mid-1980s boom. Overcapacity led to a wrenching shakeout in 1985, which killed countless PC and component makers. But after the bust, PC sales dipped only slightly. Then, in the next 15 years, they shot up eightfold, to 131 million units in 2000--creating such new giants as Microsoft (MSFT), Intel (INTC), and Dell Computer (DELL)--before falling 4% last year.

All this suggests that the Internet--which wasn't widely used on a commercial basis until 1995--has years to go before its ride is over. The latest data, in fact, show continued growth, even after dot-com shares started to crash in April, 2000. The number of Internet users worldwide is still rising--by 48% in 2000 and 27% in 2001, to more than 500 million people today, according to researcher IDC. And even as venture funding of Net companies fell 71% last year, IDC says Internet trade between businesses rose 73%, to $496 billion, and online retail spending rose 56%, to $112 billion, in the worst retail year in a decade. Even perennial cash incinerator Amazon.com turned its first-ever net profit in the 2001 holiday quarter.

Yet with e-commerce accounting for less than 2% of all trade, it's clear that the Net is still in the Model T stage. The build-out to come will take a winding path, often in fits and starts, as people, companies, and governmental organizations adapt their work and lives to take advantage of the new technologies.

First on the build-out agenda are myriad supporting technologies that make the Net easier to use. The electric ignition, for instance, banished the auto's cumbersome hand-crank starter. Likewise, broadband connections eliminate the dial-up-and-wait of modems, providing instant access that prompts people to meld the Net into their daily lives. "Technology has to be comfortable," says Arthur. Some new innovations promise to free people from mundane tech tasks altogether. As cheaper and smaller computers find their way into everything from air conditioners to factory robots, those devices can communicate directly with each other over the Internet. Wal-Mart Stores Inc. (WMT), for instance, is experimenting with radio-frequency identification tags--tiny chips that soon will cost only a few cents. These let computers track products as they move from truck to warehouse to store--replacing repeated human scanning of bar codes.

The real imperative for the next few years, though, will be adapting new technology to people and their work, rather than forcing people to adapt to it. The emergence of packaged software made the PC easier to use by freeing people from having to learn programming. Similarly, so-called Web services are emerging that could make the Net a much smoother experience by essentially turning software into a service available online. Travel site Expedia.com, for example, recently introduced online alerts that find you via computer, cell phone, or pager if your flight is delayed, then let your family know when you'll land.

As the technology opens up new vistas, even greater changes will be needed. In a constant give-and-take with the new technologies, people and organizations inevitably must change how they do things to tap into the opportunities. That was how leaders in previous tech revolutions leaped ahead. In the late 1700s, for instance, pottery entrepreneur Josiah Wedgwood pioneered productivity-boosting ideas in factory organization and the division of labor--not only building a company that endures to this day but spurring a wholesale change in manufacturing.

In the Information Age, the Net is accelerating the rollout of a new model: the networked corporation. Embodied by such leaders as Dell and Cisco, these corporations outsource whatever can be done better by someone else. But--ideally, at least--they keep an eye on what partners are doing by sharing information across entire supply chains linked over the Net. Dell, for instance, uses the Web to stay in touch with everyone from chipmakers and disk-drive producers to customers large and small. Keeping close tabs over the Net allows Dell to maintain just four days' worth of inventory, down from 32 days in 1995.

Yet this model is incredibly tough to execute. The evidence: Few corporations so far have fully embraced it. And some that have done so have a lot to learn. Cisco, for instance, missed a severe downturn in its business in late 2000 because its system didn't recognize that customers had double-ordered as a way to guarantee deliveries of much-needed networking gear, which was in short supply. That led to losses and Cisco's first layoffs. The lesson here is that companies need to alter old processes and encourage their partners to do the same. It's always this way with tech revolutions, says author Perez: "Each involved profound changes in people, organizations, and skills in a sort of habit-breaking hurricane."

Consider the case of Boise Office Solutions. The office products subsidiary of paper giant Boise Cascade Corp. (BCC) has moved successfully to the Net. Some 30% of its $2.5 billion in annual sales are online, and that's expected to rise to 45% this year. The result: savings of at least $585,000 a year so far, and each percentage point rise in online sales is expected to add $100,000 in additional savings. But Web sales created huge upheaval in the call-center operation, says David A. Goudge, senior vice-president for marketing at Boise Office Solutions. If the Web-sales estimates are even 1% off, the call-center unit suddenly can be way overstaffed--or understaffed--in turn forcing the call-center manager to change how the unit is run.

To help managers and employees deal with all the turmoil, Boise brought in consultant Peppers & Rogers Group to teach them how to deal with constant change. "We're handling nitroglycerin," says Goudge. "Don't underestimate the change in management needed to calm people down." He has that right. According to Forrester Research Inc., 40% of companies that adopted programs to manage the inevitable change in processes when they installed online purchasing systems reduced their costs. In contrast, only 3% of companies that didn't do so saved money.

Indeed, the people factor is usually a tougher problem than any technical difficulties. Online alcoholic beverage marketplace eSkye Solutions Inc., for instance, ran smack into the status quo, even though founder J. Smoke Wallin knew his stuff: He was the scion of a family that ran Indianapolis distributor National Wine & Spirits Inc. Both distributors and buyers liked the system's speed, but "these are busy people, and at the end of the day, the old system was easy," says Wallin. Last year, eSkye began selling software to manage online beverage procurement. Even so, he says, business is slow: "The biggest hurdle going forward will be getting people to change their behavior."

Most of the time, making such changes will simply take sheer dogged persistence. Gilbert Papazian II, CEO of South San Francisco (Calif.) produce distributor Lucky Strike Farms, was pitched by more than 30 dot-com produce marketplaces. At first, he threw them all out because they didn't know his industry. But Rob Bonavito, CEO of iTradeNetwork, kept coming back, begging Papazian to teach him the business. Papazian kept making suggestions until the dot-com finally developed a useful online system for produce buyers and sellers to streamline their transactions, reducing paper and fax transactions. Says Papazian: "Once I started using the system, it was great."

Still, some companies and industries simply don't want to adapt, often out of fear they will lose control of their business. The music industry, for instance, is waging war against everyone from file-sharing purveyors such as Napster and Kazaa to PC makers Apple and Gateway (GTW), which build machines that can download music and copy compact discs. Indeed, Hollywood's success in persuading the courts to clamp down on new technologies points up yet another brake on technology: law. In past tech revolutions, regulation often lags both technology and organizational change. In the PC era, it took the courts years to decide that software, and even the code embedded in chips, should be protected by copyright laws. But as Andrew S. Grove, chairman of chipmaker Intel Corp. says, useful "technology always wins in the end."

That's more likely to happen in the Internet's case once companies realize the Web is a tool to improve business processes--not a business unto itself. Citigroup (C) blew more than $1 billion between 1998 and 2000 on e-Citi, a separate division charged with making the company a leading Net player. But the services never gained traction. One reason: e-Citi customers couldn't use Citibank teller machines. Last fall, Citi folded e-Citi back into the mother ship. Since then, Citi's online customer base has shot up 80%, to 10 million.

The rewards of e-business--along with all its wrenching change and hard work--are considerable. Already, a group of economists polled by the Brookings Institution last year estimated that the Internet is adding one-fourth to one-half a percentage point to productivity in the U.S. alone. Even one-third of a point over the next decade would add roughly $1,500 a year to the average American's annual income by the year 2010,

according to Brookings economist Robert E. Litan. And the studies Litan cites don't measure convenience, greater choice, time savings, and other benefits.

Such numbers also fail to measure the transformative changes sweeping across business. There's a risk in assuming that current measures of benefits tell the whole story. Says Paul Saffo, a director at Institute for the Future, a Silicon Valley research group: "Applying metrics on this is like putting road signs on sand dunes." Fact is, for all the uncertainty today, the Internet and the network business model already are the common sense of commerce--even if not all businesses yet choose or know how to apply them. "I think the Internet is like electricity," says Dell CEO Michael S. Dell. Maybe that notion isn't common sense quite yet. But if history is any guide, it will be one day.

By Robert D. Hof in San Mateo, Calif., with Steve Hamm in New York

