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SURVEY: THE REAL-TIME ECONOMY

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Computers of the world unite

Jan 31st 2002
From The Economist print edition



The real-time economy is coming, but it will take time—and it will raise problems of its own

REMEMBER Black Monday? On October 19th 1987, the Dow Jones plunged 23%, wiping hundreds of billions of dollars off share values. The crash was blamed on the big brokerage houses' automated trading programs, which magnified a bad day into a calamity. To avoid a repeat, American regulators introduced "circuit breakers" which, among other things, can cut off the direct connection between the big brokers' computers and the trading floor of the New York Stock Exchange.

Will the real-time economy one day need such "circuit breakers", to avoid the risk that all those automated computer systems monitoring the state of business will have a similar magnifying effect? Or should there even be some sort of tax to slow down information flows, analogous to the one proposed by James Tobin, an American economist, to rein in speculative cross-border capital movements?

Economists chuckle at these questions, in particular the second. More information is almost always better for markets, they say. Certainly a strong dose of realism is required. The comparison with the financial markets goes only so far. Unless someone invents a teleporter or matter duplicator, rendering much of the economics of scarcity obsolete, the physical economy will always lag behind the flow of information.

Moreover, the real-time economy will take time to materialise in full. If the history of IT is any guide, real-time technology such as web services will probably first disappoint before it starts making a clear difference. Much work will also be needed to prevent poor information to flow in real time, a phenomenon experts call "GIGO" (garbage in, garbage out). But the pace of change will be determined mainly by how fast the economic institutions adapt. "They have been created over several hundred years. No technology will change them immediately," argues Irving Wladawsky-Berger, one of IBM's leading strategists. Technology, he says, creates new possibilities that people then explore over time. It took firms a generation to learn how to make the best use of electricity—for example, to realise that there was no need to group machines around the power source, as with steam.

So far, even in the computer industry, which is not handicapped by a long history, there are only a few firms that could be said to be operating in real time, or are at least well on their way there. One is Dell, a Texas-based PC maker. When a customer orders a Dell computer online, the information is quickly fed through to the firm's suppliers. At the end of its third quarter the company held only four days' stocks, less than a tenth of the amount kept by its best competitors. Cisco is another poster child of the "new economy". The networking-equipment giant is able to close its books in a day, and outsources most of its manufacturing.

Yet these examples also show how far the economy still has to go before becoming real-time. Dell asks most of its suppliers to hold eight to ten days' stocks in hubs that are within two hours' drive from its assembly plants. Cisco, for its part, got hit a year ago by a classic "bullwhip effect" and had to write off \$2.5 billion in stock. Its order books did not reflect the real demand. Because of long lead



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IBM posts a press conference with Irving Wladawsky-Berger, one of its leading strategists. Dell is regarded as a real-time economy leader. The Association for Computing Machinery details the UBS Warburg accident (and other computer-associated disasters).

times, customers ordered more than they needed to, as a sort of insurance policy. When the economy slowed down abruptly, these orders evaporated, and Cisco got stuck with components already ordered from suppliers.

Cisco's mishap shows that even the best technology offers no protection against bad management decisions. Yet the firm's rivals, such as Lucent Technologies and Nortel, are in much worse shape. And such problems will only speed up the trend towards real time, because they boost the economic argument for it. After it hit the wall, Cisco increased its IT investment, for example by hooking up the suppliers to its contract manufacturers so they can see the order pipeline and adjust their output accordingly. A recent study, sponsored by Cisco and carried out by reputable economists, estimated that if all public and private organisations in America fully adopted Internet-based technologies, they would save up to \$1.4 trillion.

Less risk, or more?

If this ever came to pass, how would it change the economy? Until a year or two ago, it was widely believed that IT would make the economy more fluid, smoothing out the business cycle. More information would allow manufacturers to anticipate demand more accurately and avoid getting stuck with excess stocks, which in turn would reduce, if not eliminate, the variations in stock levels that used to send the economy on harsh downward swings. Alan Greenspan, the chairman of the Federal Reserve, in a speech in June 2000 put it this way: "Information technologies, by improving our real-time understanding of production processes and of the vagaries of consumer demand, are reducing the degree of uncertainty and hence risk."

Yet two events have cast doubt on the idea that more information will smooth out those swings. First, there was the abrupt and unexpected downturn early last year, which landed Cisco and other firms with a lot of excess stock. The culprit may well have been the very same information that makes supply chains more efficient: firms are able to act in closer alignment. To quote another speech of Mr Greenspan's: "The result is not only faster adjustment, but one that is potentially more synchronised, compressing changes into an even shorter time frame."

The second event was September 11th. Security measures in the wake of the terrorist attacks on New York and Washington, DC, grounded cargo planes, prevented freight ships from docking and stalled trucks at borders, seriously interrupting supply chains in America. Having slimmed down their stocks and begun relying on just-in-time delivery, some manufacturers were forced to shut down their assembly lines. A better information flow, it appears, can make the economy more vulnerable to events in the real world.

A better information flow, it appears, can make the economy more vulnerable to events in the real world

None of this is necessarily an argument against technology. It is probably true that the faster information flows through the economy, the more abrupt any adjustments will be. However, this does not only mean sudden downturns, but also suggests faster recoveries. Manufacturers would certainly do well to bolster their "safety stock". But the latest supply-chain-management software can in fact help companies deal with shocks such as those terrorist attacks. Dell, for instance, was able to reconfigure its supply chain quickly, whereas Compaq missed out on shipping 300,000 PCs in the weeks after the attacks.

Unintended consequences

Yet both the sudden downturn and the events of September 11th were a warning that real time has its hazards. As companies increasingly connect and as they automate more and more of their business processes, they create systems that might develop lives of their own, with sometimes unexpected consequences. Everybody's economic health will become increasingly dependent on the smooth functioning of technology. Luckily the Y2K bug proved harmless, but a software virus, released intentionally, could wreak havoc in the networked economy.

Proponents of the real-time enterprise argue that running a business will become more akin to "flying by wire" or "systems management", a comparatively little-known branch of the IT industry providing technology for monitoring disparate computer systems and networks. If business bosses become more like pilots or systems managers, then the same sorts of precautions that are used in those fields are called for, says Bob Yellin, vice-president of technology at Tivoli, a unit of IBM and one of the leading systems-management firms. For example, the control systems of American fighter planes are set so that pilots cannot kill themselves by turning too abruptly. Similarly, systems-management software includes algorithms that can detect unusual patterns in data traffic, and

mechanisms to shut computers down if they run amok.

There are bound to be accidents in a largely automated real-time economy, as UBS Warburg, a European investment bank, discovered to its cost. Last November a simple typing error left it at least \$50m out of pocket. The morning that Dentsu, one of the world's biggest advertising companies, went public on the Tokyo stock exchange, a UBS Warburg trader mistakenly entered a "sell" order of 610,000 Dentsu shares at ¥16 each—instead of 16 Dentsu shares at ¥610,000. Although the trade was cancelled two minutes later, the bank's computers had already sold several thousand shares which it had to buy back at market price.

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And to yield its full benefits, the technology needs to be used properly. Just look at a simple example of a feedback control system: anti-lock braking systems, known as ABS. They were supposed to make driving safer by keeping the wheels from skidding. Yet they never lived up to expectations, mainly because drivers used them incorrectly. In the same way, if managers tweak their supply chains too much, they might create a new kind of bullwhip effect.

Yet it would be wrong to conclude that the introduction of new information technology should be slowed down or even blocked altogether. Its drawbacks are not inherent in the technology itself, but arise from the way it is used. Not least, it is worth asking to what extent we want computers to run our lives. In many ways information technology, and particularly the Internet, have made life and work much easier. But innovations such as fax, e-mail and cellphones have also allowed work increasingly to intrude on people's privacy. In an event-driven real-time company, this is likely to get worse, not better.

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