

Cybertrust: An Economic Imperative

by Richard Wilhelm

Trust may be the most underestimated asset in commerce. Almost all transactions involve some potential for misrepresentation, noncompliance, or fraud. To deal with those risks, parties to commercial transactions rely upon elaborate contracts, arrange to monitor performance, or turn to litigation.

These methods all work, but they are all costly. Mutual trust, when it exists, is a far better and more efficient alternative; it substantially lowers transaction costs, and it can offer a big competitive advantage. One World Bank study, using a regression analysis covering the 1980s, suggests that a 10 percent difference in the degree of generic trust among the citizens of a nation is reflected in a 0.8 percent variance in that country's rate of economic growth. With average annual growth worldwide in the range of 1 to 3 percent during the same period, it is easy to see the payback in building trust.

Everyone, of course, is counting on the Internet to spur economic growth. The Congressional Budget Office in 2001 predicted that the U.S. economy would grow at 2.1 percent annually over the first decade of the new millennium; U.S. government economists now estimate that commerce on the Internet will account for about half of this expected increase. Optimistic, perhaps, but it's clear nonetheless that trust in cyberspace is *paramount*.

Indeed, a recent study by IBM confirmed what many of us intuitively know to be true: Internet usage growth will depend heavily on the willingness of "companies and citizens to accept the greater anonymity and associated possibilities for opportunism inherent in Web-based transactions."

Any critical public infrastructure (and what else is the Internet?) requires a minimum level of public trust and confidence to function. Yet, in order to effectively transfer any large portion of our traditional commerce into cyberspace, we need to construct virtual equivalents for the complex and subtle mix of convention, policy, procedures, instinct, culture, and law that is employed when we exchange products and services for money or trade in financial instruments.

Technologies like electronic signatures — digital constructs that use cryptography to bind assertions of fact to transaction data — will be part of that vision. It is a mistake, however, to equate trust management with rigorous identity checks, or to elevate the importance of technical potential over that of management policy. Alternative modes of authentication — verifiable assertions of a person's role, eligibility, credit, and reputation — might be less intrusive but achieve the same goal.

Today's e-commerce environment — in which either the buyer or the seller is often at a severe disadvantage in terms of reliable information — is unstable. To successfully expand e-commerce beyond

today's beachheads, merchant pioneers must establish new norms to make the terms and context for online transactions more visible. The technical challenge is daunting; the idea of changing societal attitudes is even more so. Trust building in the context of e-commerce has less to do with the mechanics of a transaction than it does with the cultural mind-set and the information flow that allows each of the parties involved to reach a decision to execute a specific transaction.

Such trust building will not be easy. The proportion of Americans who believe that "most people" are trustworthy has fallen to just over 30 percent, about half of what it was in 1960, when the proportion of Americans willing to trust almost any other American was 55 percent, according to the DDB Needham Life Style Survey.

In other parts of the world, levels of trust vary widely. The World Bank says that 65 percent of Norwegians express a willingness to trust their fellow citizens, but in poverty-plagued Brazil, only 3 per-

cent of those surveyed felt they could presume that most Brazilians would not seek to take advantage of them.

We must bring to cyberspace "social capital," the notion popularized by the political philosophers James Coleman and Francis Fukuyama. Social capital represents the matrix of behavioral norms and reciprocal expectations that allow any social network to function. These informal constraints provide the essential context within which societies can establish formal institutions, procedures, and rules of law. The core of social capital's process is self-restraint, a willingness to forgo potential advantage.

What will we have to do to embed trust in the design of 21st-century electronic commerce? The full implications of the question are only beginning to draw the attention they deserve. Reengineering the real world may be beyond us, but creating an explicit and effective capacity for managing trust in commerce online — however complex — is well within our capabilities. +

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R&D Through Open Innovation

by Henry Chesbrough

Since the days of Thomas Edison's Invention Factory, new product innovation has been the engine of long-term growth and a buffer in times of economic weakness for world-class companies. Yet even respected research powerhouses like British Telecom, Siemens, and Fujitsu are today finding it more difficult to

make their innovation investments pay. There is too much piling up on the shelf, and there are too few breakthroughs that lead to new markets and higher growth. In short, R&D labs once prized for their independence and proprietary research find they're having a terrible time extracting value from their own work.

To increase the return on their R&D, successful innovators are

finding they must complement their in-house R&D with external technologies and offer up their own technologies to outsiders. R&D at large companies is shifting from its traditional inward focus to more outward-looking management — open innovation — that draws on technologies from networks of universities, startups, suppliers, and competitors.

Until recently, private R&D labs wouldn't have dared try open innovation; R&D was viewed as a vital strategic asset and, in many industries, a barrier to competitive entry. Research leaders like DuPont, Merck, IBM, GE, and AT&T did the most research in their respective

industries; it's not a question of "make or buy." However, the open innovation approach poses new management demands. For one thing, companies need to think differently about how opening labs to outsiders can create opportunities for technology exchanges that lead to revenue. Internal R&D produces intellectual property that other companies in the web of open innovation may covet. In 2001, IBM earned \$1.9 billion in revenue from patent licensing and royalties on its software, chips, and systems, for example.

The perspective of internal R&D must also change: from depth to breadth and integration. Whereas old-school research labs took new

modeling and simulation tools.

Industries that have been slower to catch on to open innovation should take these leaders' cues. Large toy manufacturers, for example, complain that they are in a mature business, with low growth in overall toy sales. They overlook the fact that breakthrough toys still hit the shelves. Many blockbusters have come from smaller shops, rather than the large toy companies. Why? The big toymakers constrain their search by insisting that any new toy bring in \$100 million or more in its first year. Even such leading toys as Barbie and Hot Wheels would have failed to bring in a comparable amount when they were introduced in 1959 and 1969, respectively. An insistence on large initial sales condemns the toy manufacturers to merely extending existing brand franchises, or acquiring at a high price new toys successfully launched by smaller innovators.

Contrast that process with the one followed by video-game developers, which routinely look outside for ideas. Some successful games are based on popular brands, such as John Madden Football or Star Wars. Developers hunt for hot properties to license and turn into new games. Other successful titles, such as the *Grand Theft Auto* series, were coded by small groups of developers (such as Rockstar Games) that were later acquired by larger companies (such as Take-Two Interactive Software Inc.) that could provide distribution and marketing.

As the toy industry illustrates, the principle of open innovation isn't limited to high-tech industries. In fact, any company spending 5 percent of sales on R&D and looking to get higher revenue growth would likely benefit from shifting its

Opening labs to outsiders creates opportunities for technology exchanges that lead to revenue.

industries — and earned the most profits as well.

The change is striking. Most of the premier industrial research laboratories of the 20th century have retreated from their historic mission of independent scientific discovery because of the low yields they're experiencing. According to *Forbes* magazine, the last household-name product launched by DuPont's 100-year-old Experimental Station (dubbed the Ex Station) laboratory, which created products used to make everything from leisure suits to parts that protect NASA spacecraft, was Stainmaster fabric protection — in 1986.

Slowing innovation from within large companies doesn't mean internal R&D should be disman-

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technology from basic science to finished product, open innovation labs need to develop technologies that embrace and extend existing intellectual property — even those that are "not invented here." DuPont now partners with biotechnology firms to develop such products as Sonora, a polyesterlike fiber made from corn and a genetically engineered bacterium. Automobile manufacturers don't try to reinvent the wheel; they collaborate with suppliers and research organizations to stay on top of such new technologies as fuel cells and continuously variable transmissions. Automakers still do internal R&D, but their in-house teams work on integrating the technologies they see emerging, using advanced computer

R&D to a more open stance.

But the key to change isn't simply finding partners; it is embracing a management philosophy that reorients an enterprise's innovation activities away from the search for "Eureka!" moments. Instead of building R&D laboratories far away

from others to protect the ideas inside, innovators today are locating new facilities next door to universities to gain faster access to ideas. The winners create value when they combine their ideas with those of others, and when others use their ideas. +

influential lawmakers. If it passes, a model used today by the FDA shows how such a patient-safety databank can be implemented.

Known as the Adverse Event Reporting System (AERS), this national database was developed for the FDA in 1998 by Booz Allen Hamilton. It is the centerpiece of the FDA's safety surveillance program for drugs and therapeutic products. Prior to the creation of AERS, the FDA primarily used paper records to keep track of adverse drug reactions reported by pharmaceutical companies, health-care providers, or consumers. Because the data wasn't automated, it was virtually impossible for the FDA to analyze and correlate the information.

AERS automatically codes adverse reaction terms using an international coding schema; critical adverse event reports are routed directly to the appropriate FDA staff's electronic inboxes; flexible query tools let the agency identify

Patient Safety's Data-Driven Prescription

by Heather Burns and Charles Beever

Although the United States spends more per capita on health care than any other country, as many as 98,000 Americans die each year from preventable medical errors during hospitalization, according to a 1999 report by the National Academy of Sciences' Institute of Medicine. In 2002, a study by the Harvard School of Public Health and the Kaiser Family Foundation found that 35 percent of physicians and 42 percent of the public said they had experienced errors in their own or in a family member's care.

Beyond the serious societal toll of medical mistakes, there are far-reaching consequences for the American economy and corporations. The price associated with these errors in lost income, disability, and health-care expense is as much as \$29 billion annually, according to the Institute of Medicine. Preventable medication errors alone are estimated to increase hospital costs by about \$2 billion nationwide.

Medical errors have become so alarming to companies that the

Leapfrog Group, a coalition of more than 100 large U.S. employers and insurers, representing about 33 million health-care consumers, is supporting federal legislation to lower health-care mistakes by requiring hospitals and physicians to report errors in patient care to a centralized database.

In a related development, the U.S. Food and Drug Administration (FDA) announced in March 2003 that it will require bar codes

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on all medications, allowing health-care workers in hospitals to closely track the medications they administer to patients. The supermarket-style bar-coding system can also significantly reduce prescription and transcribing errors.

Although the federal legislation supported by Leapfrog never made it out of committee in either the Senate or the House in the last Congress, it has strong backing from

potential drug risks and explore various drug safety hypotheses online; and tools, screens, tables, and reports present adverse event data in summarized or detailed formats. The output from AERS may lead to further epidemiological studies, regulatory action to improve product safety, correspondence with health-care professionals alerting them to the proper use of the drug, or the reevaluation of an approval decision.

There are many ways that the existing AERS framework could be expanded to support a patient safety reporting system. Literature pertaining to medical conditions, and collaboration with medical associations that are establishing treatment protocols in their fields, can help a governing organization set guidelines for standards of care. These guidelines can then be coded in a database that is continually updated with information from health-care providers and hospitals describing their actions — and the results — during patient encounters. (Patients' names would be withheld to protect confidentiality.) The databank could automatically modify standard treatment guidelines when certain protocols proved to be more successful. Errors would be highlighted and analyzed; data would then be available to health-care providers via computer.

Patient safety has become such a high-priority issue that companies are not waiting for legislation or the development of a national database to do something about it. To elimi-

nate medical errors, the General Motors Corporation, the largest private purchaser of health care in the U.S., is providing physicians with Palm PDAs that have a preinstalled drug database and prescription-writing program. Physicians can access current information about thousands of drugs and receive alerts about drug interactions. And drug giant Pfizer Inc. has launched a program to print bar codes on packaged pills that identify the medicine, its dosage, its lot number, and its expiration date. The main purpose is to ensure that patients get the right medicine in the right strength.

Just a few years ago, the issue of patient safety wasn't on the agenda for most policymakers and health-care experts. But skyrocketing costs linked to medical mistakes have changed this; suddenly it's in everyone's financial and social interest to act before the costs in dollars and lives are completely out of control. The timing couldn't be better because proven technology finally offers a way to track patient safety and respond quickly to mistakes. +

strategic choice for distressed companies is to *undifferentiate* their products, so that it is easier for customers who feel nervous about the company's future to switch or replace their product with those from another maker.

Customers see risk in buying from companies they think have a chance of going under. Indeed, when a company is perceived to be unstable, a product's uniqueness may be just the reason a company loses customers and market share. The more compatible a product is with competitive offerings, the more likely the distressed company will be able to keep its customers until the storm has passed.

Part of the reason customers defect during unstable times is psychological: People want to pick winners. The DeLorean sports car lost its cachet as the firm began to face bankruptcy. But customers are also smart. They see risk in getting locked in to a product line for which after-sale service might become more difficult to obtain (try bringing in a DeLorean for service today). Switching to another provider's product might also be expensive.

Mobile phone operator Nextel Communications Inc. understood the dilemma. The carrier has always had a unique long-range walkie-talkie feature to differentiate its service from other operators' offerings. This capability, which is enabled by Motorola Inc.'s iDEN technology, made Nextel's handsets incompatible with the cellular networks of other mobile carriers. By 2000, Nextel's debt load had grown, and its stock price faltered. Amid industry consolidation and takeover rumors, analysts began to doubt that subscribers would continue to

Undifferentiate Your Way out of Debt

by Gyöngyi Lóránth and Stefan Arping

Rising corporate debt looms threateningly around the world, and highly leveraged firms rightly focus on maintaining liquidity. Often this takes more than cutting costs to stay afloat, however. Companies in this predicament (and face it, there are a lot of them today) must also revisit key strate-

gies — in particular, product marketing. Financial distress scares customers, and if customers go away, revenues dry up, and liquidity concerns can quickly become cash flow crises.

Although Management 101 suggests that corporations should differentiate their products from competitors' offerings and erect barriers to switching once a customer is on board, we believe the better

embrace the company's go-it-alone strategy. Bigger telecom vendors with deep pockets and a global reach began to pursue Nextel's core business customers.

Nextel had to convince the world it would be around for the long haul. So the company introduced a line of phones that would work on more standardized networks as well as on iDEN. Nextel

to another product. That risk is enough to prevent potential customers from buying a product if they don't believe the company will survive.

Baan, a developer of enterprise resource planning (ERP) software, began to face financial difficulties in 1997–98. ERP software is a major capital investment, and vendors compete fiercely to sell licenses for

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demonstrated that it could continue to compete with its bigger brethren and that it wasn't simply a takeover target, as some of its smaller competitors had become. Partly because Nextel took a step toward undifferentiating its offering, the anticipated drop in subscriber revenues never happened. In fact, Nextel continues to enjoy among the lowest subscriber churn rates in the industry and is considered one of the stronger mobile phone operators today, despite its debt load.

Had Nextel gone bankrupt, subscribers would have been inconvenienced, but the overall expense of switching mobile phone operators would have been tolerable. Not so with other debt-laden companies. Those that make it difficult to switch from their products to their competitors' products, because of high purchase costs, proprietary technologies, or long service contracts, make matters worse for themselves, because customers see twice as many risks and costs: If the debtor goes under, its customers not only are stuck with a loser's product but also must pay dearly to switch

their big-ticket systems. Once a customer chooses an ERP system, it is essentially locked in, because dumping one proprietary ERP system to install another is an expensive, multiyear proposition. Baan's troubles forced it to rethink the way it went to market. The company launched a joint venture with JDA Software Group Inc., a smaller player in the ERP market, and implemented several compatibility arrangements, including interfaces that allowed customers to easily connect with competing ERP applications. Baan, now a division of Invensys PLC, deliberately reduced customer lock-in to assure customers that they would not be left stranded.

Undifferentiation does not mean a company is giving in to bankruptcy; it's a step toward reducing the effect of perceived insolvency on existing and potential customers. Keeping a hold on that customer base reduces the chances that a financial crunch will turn into a crisis. Daring to be the same, not different, is the discipline that debt imposes on struggling companies. +
