



THE HBR LIST

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Breakthrough Ideas for 2007

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Duncan J. Watts

In his best seller *The Tipping Point*, Malcolm Gladwell argues that “social epidemics” are driven in large part by the actions of a tiny minority of special individuals. The idea seems intuitively right—we think we see it happening all the time. Nevertheless, this isn’t actually how ideas spread. It’s better to focus on getting enough plain, ordinary people to sign on.

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* Copresented by *Harvard Business Review* and the World Economic Forum



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Breakthrough Ideas for 2007

Every year, the editors of *Harvard Business Review* have the enviable challenge of putting together the HBR List, tapping our network of authors and sources to find twenty essays that will satisfy our demanding readers' appetite for provocative and important new ideas. For this year's List, we decided to bring those readers into the process. Last May, we posted an invitation on our Web site asking readers to identify the ideas they thought would emerge as breakthroughs in 2007.

The response was gratifying. More than 100 ideas were submitted, from which we picked six for development. One of these, an essay on “conflicted consumers” by the British consultant Karen Fraser, was selected for publication. We will repeat this process for next year's List, and we hope that you, our readers, will participate even more fully.

In the same quest for ideas, HBR has once again joined forces with the World Economic Forum. Last spring, the two organizations hosted a brainstorming seminar in Tokyo at which some two dozen experts from different backgrounds debated which emerging ideas are the most important, generating a number of List candidates in the process. And several of the List essays—marked by asterisks on the preceding page and in the text—were on the agenda of the WEF's annual meeting in Davos, Switzerland, last month.

Given the broad net cast, it's no surprise to find a wide array of authors and ideas represented, including (to name just a few) Geoffrey West of the Santa Fe Institute on the (somewhat surprising) relationship between innovation and organizational size, Siemens CEO

Klaus Kleinfeld and Siemens Medical Solutions president Erich Reinhardt on the convergence of imaging technology and biotech, and the Tokyo venture capitalist Yoshito Hori on the growing entrepreneurialism of Japanese society. We hope you'll find these and the other essays in the List as stimulating as we do.

1. The Accidental Influentials *

In his best-selling book *The Tipping Point*, Malcolm Gladwell argues that “social epidemics” are driven in large part by the actions of a tiny minority of special individuals, often called influentials, who are unusually informed, persuasive, or well connected. The idea is intuitively compelling—we think we see it happening all the time—but it doesn't explain how ideas actually spread.

The supposed importance of influentials derives from a plausible-sounding but largely untested theory called the “two-step flow of communication”: Information flows from the media to the influentials and from them to everyone else. Marketers have embraced the two-step flow because it suggests that if they can just find and influence the influentials, those select people will do most of the work for them. The theory also seems to explain the sudden and unexpected popularity of certain looks, brands, or neighborhoods. In many such cases, a cursory search for causes finds that some small group of people was wearing, promoting, or developing whatever it is before anyone else paid attention. Anecdotal evidence of this kind fits nicely with the idea that only certain special people can drive trends.

In recent work, however, my colleague Peter Dodds and I have found that influentials have far less impact on social epidemics than is generally supposed. In fact, they don't seem to be required at all.

Our argument stems from a simple observation about social influence: With the exception of celebrities like Oprah Winfrey—whose outsize presence is primarily a function of media, not interpersonal, influence—even the most influential members of a population simply don't interact with that many others. Yet it is precisely these noncelebrity influentials who, according to the two-step-flow theory, are supposed to drive social epidemics, by influencing their friends and colleagues directly. For a social epidemic to occur, however, each person so affected must then influence his or her own

acquaintances, who must in turn influence theirs, and so on; and just how many others pay attention to each of *these* people has little to do with the initial influential. If people in the network just two degrees removed from the initial influential prove resistant, for example, the cascade of change won't propagate very far or affect many people.

Building on this basic truth about interpersonal influence, Dodds and I studied the dynamics of social contagion by conducting thousands of computer simulations of populations, manipulating a number of variables relating to people's ability to influence others and their tendency to be influenced. Our work shows that the principal requirement for what we call “global cascades”—the widespread propagation of influence through networks—is the presence not of a few influentials but, rather, of a critical mass of easily influenced people, each of whom adopts, say, a look or a brand after being exposed to a single adopting neighbor. Regardless of how influential an individual is locally, he or she can exert global influence only if this critical mass is available to propagate a chain reaction.

To be fair, we found that in certain circumstances, highly influential people have a significantly greater chance of triggering a critical mass—and hence a global cascade—than ordinary people. Mostly, however, cascade size and frequency depend on the availability and connectedness of easily influenced people, not on the characteristics of the initiators—just as the size of a forest fire often has little to do with the spark that started it and lots to do with the state of the forest. If the network permits global cascades because it has the right concentration and configuration of adopters, virtually anyone can start one. If it doesn't permit cascades, nobody can. What seems in retrospect to be the special influential quality of a particular person (or group) is, therefore, mostly an accident of location and timing.

Although at odds with the dominant interpretation of the two-step flow, our results are actually consistent with a great deal of influentials research—in particular, the finding that influence in any given circumstance depends not only on such personal characteristics as expertise, charisma, and popularity, but also on the details of the circumstance itself. Sometimes people are influential because they are outspoken and gregarious, other times because

An entrepreneurial Japan—which once would have seemed oxymoronic—may ultimately overshadow the much touted start-up cultures in China and India.

they are introspective and reflective. Sometimes they are central members of particular groups, and other times they are peripheral. Sometimes they are innovators, and sometimes they are laggards. There are, in fact, so many ways for people to be influential, and so many kinds of influentials, that it is almost impossible to generalize from one situation to another. What our work clarifies, however, is that such generalizations are difficult not because of insufficient data but because any focus on individual attributes alone overlooks the importance of network effects.

Understanding that trends in public opinion are driven not by a few influentials influencing everyone else but by many easily influenced people influencing one another should change how companies incorporate social influence into their marketing campaigns. Because the ultimate impact of any individual—highly influential or not—depends on decisions made by people one, two, or more steps away from her or him, word-of-mouth marketing strategies shouldn't focus on finding supposed influentials. Rather, marketing dollars might better be directed toward helping large numbers of ordinary people—possibly with Web-based social networking tools—to reach and influence others just like them.

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2. Entrepreneurial Japan

In 2006, Japan experienced an economic revitalization after nearly a decade of deflation, bankruptcies, and sagging profits. The stock market has bounced back, with the Nikkei 225 Index rising to more than 200% of the low it reached in 2003. Office space and labor are scarce. Corporate earnings are at a record high.

Analysts, the media, and the Japanese government attribute this growth to the turnaround of big traditional corporations, such as Toyota, Canon, Nissan, and Nippon Steel, and to industry consolidation, which has created financial giants like Sumitomo Mitsui Banking and JFE Steel. Structural changes implemented by the Koizumi government are often credited with sparking the comeback. But these observers are missing a big part of the

story. Japan's rebound is also being fueled by emerging companies in knowledge-intensive industries—companies led by entrepreneurs in their twenties and thirties. A newly entrepreneurial Japan, something that once would have seemed oxymoronic, may ultimately overshadow the much touted start-up cultures in China and India.

The rise of this new Japan—so different from the “old” Japan, characterized by capital-intensive industries in which big manufacturing companies are run by people who've patiently worked their way up through the organization—has come from a confluence of forces. One is a shift in public perceptions of employment. When the financial giant Yamai-chi Securities collapsed in 1997, people began to question the long-standing assumption that working for a large company meant a job for life. This questioning has led to an erosion of employee loyalty. Young Japanese workers today have no expectation of lifetime employment or career advancement based on seniority; they focus on furthering their careers through switching jobs or acquiring advanced degrees.

The new mentality has in turn changed public perceptions of entrepreneurs, who for the first time are respected—and exciting—role models for ambitious young Japanese. Kenji Kasahara became an instant celebrity at 31 when the company he founded, a MySpace-like social-networking firm called Mixi, went public in September 2006 and reached a market capitalization of ¥229 billion (approximately \$2 billion) within a few days. Hiroshi Mikitani, the founder and CEO of Rakuten, the largest e-commerce company in Japan, has imitated some Silicon Valley entrepreneurs by buying professional baseball and soccer teams.

An entrepreneurial Japan has been further nurtured by, and reflected in, a favorable IPO environment. From 2001 to 2005, 747 Japanese companies—compared with 617 in the United States—went public. Of those that went public in 2005, 96%—up from 94% in 2004—opened their first day of trading above their offering price. Chinese and Korean companies are increasingly looking to float their shares in the Japanese market.

New ventures also benefit from Japanese strengths. For instance, Japan has a highly developed telecommunications infrastructure, including a robust broadband network. Its aver-

Like Harry Potter, the fictional schoolboy wizard who grows older with his readers, brands that mature with their users can prove particularly durable.

age Internet user fees are far lower than those in other developed countries—just six cents per 100 Kbps, compared with 24 cents in South Korea, \$1.77 in the United States, \$1.89 in China, and \$2.77 in Germany. Japan also enjoys the world's highest penetration rate for the mobile Internet, with 90 million mobile phone users, many of whom have 3G handsets.

Perhaps most important, the Japanese economy is still the second largest in the world, representing more than half of the entire Asian economy. Its new ventures can reach critical mass quickly, which gives them an advantage over new ventures in, for example, China and India. Japan's strong base in an array of key technologies and industries—from digital animation to robotics to nanotechnology—creates fertile ground for start-ups in these areas.

When the new Japan is noticed, the attention is often negative. People point to allegations of securities fraud made against the Internet service provider Livedoor, or to insider trading charges brought against the flamboyant financier and shareholder-rights activist Yoshiaki Murakami. But the country's increasing entrepreneurial vitality suggests that in its next stage of prosperity, Japan will be a competitive source of innovation as well as a leading economic power.

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3. Brand Magic: Harry Potter Marketing

The typical brand manager is an ageist. It goes with the territory, because whatever the formal customer segmentation driving a brand strategy, the segments will almost certainly be differentiated by age.

Innéov, a line of nutricosmetics jointly owned by L'Oréal and Nestlé, is a case in point. Its main product, a nutritional supplement called Firmness, targets women aged 45 to 55. One of the Firmness brand manager's greatest worries is that if too many "older" consumers (that is, above 55) are stuck to her brand, 45-year-old potential consumers might get the impression that Firmness is "not yet for them—thank goodness."

Like Firmness, most brands target a specific

age group, either explicitly or implicitly, through the choice of media used to advertise them. To serve customers outside that age group, the company has to create new brands. As customers mature, the company must replace them with younger ones and encourage the previous customers to switch to an allied brand rather than to a competitor.

The big problem with this approach to branding is that it positively discourages customer loyalty—and, as we all know, it's a lot cheaper to keep customers than to find new ones. To get around this problem, we propose that companies like L'Oréal consider a new approach. Instead of seeking to build immortal brands that generations mature into and then out of, they could create brands around a given cohort of customers. As the customers matured, the brands would evolve with them. The aim would be to match the needs of that cohort at any moment in time. We call this "Harry Potter marketing," after the fictional schoolboy wizard who grows older with his readers.

How would it look in practice? Let's assume that instead of targeting Frenchwomen "of a certain age," Innéov targeted women born between 1955 and 1965 and launched a brand called Souplesse (Suppleness) in 2005. Because this customer pool would not change over time, the company could explicitly manage for brand loyalty, responding to the actual preferences of its customers rather than trying to sell them a predesigned set of preferences. This more balanced dialogue would enhance the targeted cohort's emotional bonding with the brand. For example, the brand could continue to capitalize on the fact that many of its consumers grew up in the age of disco or thrilled to the tunes of ABBA.

Various components of the marketing mix would be affected. The proportions of active ingredients in Souplesse would progressively change to take customers' aging into account. The company might want to retain the same celebrity (the French actress Carole Bouquet, perhaps, or the fashion icon Inès de la Fressange) to endorse it for many years, creating further emotional bonding. However, her message about the product's benefits would change over time. When most members of the cohort had reached the age of 55, the emphasis could switch from "attacking the first visible signs of aging" to "providing a complete skin

treatment.” Distribution strategies should take into account the evolution of the cohort’s shopping habits. When the majority of the cohort had reached the age of 65, for instance, L’Oréal might make beauty salons a retail option because older consumers spend relatively more time there.

Unlike traditional brands, Souplesse would face a certain death. For most brand managers, this would be a disaster; but L’Oréal would already have launched other Innéov skin creams for subsequent cohorts. Would this constant churn be expensive? Perhaps. But the continual relaunching and repositioning of age-specific brands is also expensive—and our preliminary work with L’Oréal suggests that Harry Potter marketing would not necessarily be more so. For one thing, evolving Harry Potter brands would presumably profit from greater brand loyalty. Of course, this sort of marketing won’t work in all industries, and it needs to withstand the test of, well, time. But it could be used for food, health care, clothing, and the media. This perspective can help explain why, for instance, Club Med and Gap, whose original successes were each due to a single generation’s strong emotional bonding, have experienced a downturn in their sales.

One last word: A world of cohort-specific brands will probably favor first movers, because if they do their job well, second entrants

will find differentiation difficult. This suggests that fans of Harry Potter should proceed quickly.

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4. Algorithms in the Attic

For a powerful perspective on future business, take a hard look at mathematics past. As computing gets ever faster and cheaper, yesterday’s abstruse equations are becoming platforms for tomorrow’s breakthroughs. Companies in several industries are now dusting off these formulas and putting them in the service of new products and processes.

Procter & Gamble has been restructuring its supply chain with complex “expressive bidding” algorithms—based on 1950s linear-programming equations—that allow suppliers to bid online with bundled offerings of products and service levels rather than with standardized lots. Google’s search engine was possible only because the founders adapted a century-old theorem about matrices to software for ranking Web pages according to links from other sites. Networks like the Web can be expressed as matrices, and a relatively simple calculation gives a ranking of how well each site is connected to the rest of the Web. That formula for automatic ranking—which could be understood and appreciated without a PhD—is one of the most lucrative algorithms ever. The math was there for the taking.

Why should past work, often quite theoretical, be so useful now? Done in the absence of high-speed, low-cost computational capacity, that work put a premium on imaginative quantitative thinking. With today’s high-powered processors and broadband networks, those abstractions can point the way to practical software that leaps over current operational constraints. Disruptive opportunities abound.

“There are huge hidden assets in the operations-research community,” says the MIT professor Richard Larson, a pioneer in probabilistic modeling techniques. “If you gave an army

Panning for Gold on Dusty Shelves

Today’s high-speed, cheap computers have given abstruse mathematical advances immediate practical relevance. With the help of “mathematical entrepreneurs,” companies can now adapt these equations and algorithms to a range of business challenges. Here are some examples:

Formula	Date of Original Development	Original Use	Current Business Application
Perron-Frobenius theorem	1800s	Ranking nodes in a network	Improving search engines; analyzing and customizing communication on Web sites
Monte Carlo random number generators	1940s	Testing scenarios for atomic bomb explosions	Evaluating the riskiness of competing capital projects
Genetic algorithms	1970s	Demonstrating Darwinian principles in mathematical problem solving	Developing products by computationally evolving the design in response to constraints
Simulated annealing algorithms	1980s	Determining the cooling time for tightly packed crystallizing molecules	From scheduling complicated processes to optimizing product placement on store shelves

of 20 grad students the mission to rake through the published literature of the past 30 years, they would find stuff that has untapped business potential worth billions of dollars. There are many clever ideas my students worked on decades ago that in today's networked environment would not be an academic exercise but a real business opportunity."

Take, for example, an algorithm that measures the statistics of any queue. This algorithm can automatically assess performance along a wide range of variables. Larson and his colleagues developed the algorithm in the early 1990s with an eye to improving automated teller machines, but it has gotten little notice otherwise. Now that companies increasingly automate customer-service management, this algorithm is a natural tool for monitoring the quality of repeated processes.

Sometimes the equations come from far afield. Consider the mathematics developed to help physicists determine the optimal cooling time for crystallizing molecules packed together as tightly as possible. Tesco, the British retailer, is working these "simulated annealing" algorithms into software for optimizing product placements on store shelves. Or look at "genetic" algorithms, which were intellectual curiosities when they arose in the 1970s to demonstrate how Darwinian principles of fitness and inheritance could be used to "evolve" solutions to problems. Nokia and a few other companies are exploring them in product development. Nokia starts, say, with a design for a new cell phone, and uses genetic algorithms to evolve the design of the phone's antennae within the constraints of the phone's form factor and battery power. Genetic algorithms in which solutions are evolved can deliver results superior to those from analytic algorithms in which solutions are designed.

This work offers the possibility of major advances, but an equally large opportunity may lie in simply getting more managers to use existing quantitative tools in their decision making. There's no doubt, says the Stanford University professor Sam Savage, that literally millions of business spreadsheets would benefit from the stress-testing of key assumptions with "Monte Carlo" random number generators. To improve the reliability of their individual business plans, Savage observes, managers could even plug into enterprise-wide probability estimates.

Only recently have these academic research tools become part of everyday business practice in fields such as engineering and financial services. The rate at which they are intelligently adopted could be a differentiator in the wider marketplace. Cheap algorithms are like cheap labor and cheap capital—a valuable resource when judiciously employed.

The big-box retailers Wal-Mart and Best Buy, for example, are widely regarded as having superior analytic infrastructures. But they don't just hire the smartest "quants"; they push to make their mathematical tools accessible to others. They substitute on-screen representations and visualizations of data for complex numerical equations. They're constantly rethinking when mathematics should automate a decision and when it should simply assist the decision maker. Applied systematically, these tools may help solve what is perhaps the biggest challenge facing retailing: how to efficiently sift through the mountains of data that are now being collected.

Whether looking for breakthroughs or just trying to improve decision making, companies will benefit from greater sophistication around even simple mathematics. A decade ago, big firms began to realize that they were sitting on a treasure trove of underutilized patents and know-how that could be commercialized for willing buyers. Those "Rembrandts in the attic," as Kevin G. Rivette and David Kline put it in their 2000 book by that name, needed the keen eye of an intellectual property curator to appreciate their value. Similarly, we now require quantitative entrepreneurs to seek out existing equations that meet today's pressing business needs. Technology continues to make that quest faster, easier, and cheaper.

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5. The Leader from Hope

What is hope? Something more than wishful thinking but short of expectation. A rejection of cynicism and dispiritedness. And a state, we believe, quite central to the work of a leader.

Most business leaders, we've discovered in our three years' worth of interviews on the subject, shy away from the word. Perhaps talk of hope comes uncomfortably close to faith

Most business leaders shy away from the notion of hope, perhaps because declaring that one's organization needs hope feels defeatist.

and spirituality—or perhaps declaring that one's organization needs hope feels defeatist. “If I set out to instill hope,” one might wonder, “am I admitting that our situation is next to hopeless?”

Yet work connected to the positive-psychology movement has made hope discussable in new ways. Hope has been shown to be the key ingredient of resilience in survivors of traumas ranging from prison camps to natural disasters. Many studies have shown that people who score higher on measures of hope also cope better with injuries, diseases, and physical pain; perform better in school; and prove more competitive in sports. Our contribution has been to outline the elements of hope—possibility, agency, worth, openness, and connection—in a way that guides efforts to nurture it in the workplace. The first two are central to the definition of hope: People must see that change is possible and how they can engage personally in that change. The remaining elements have to do with how hope is cultivated in organizations: Hopeful work groups are most often composed of individuals whose worth to the organization has been affirmed, who perceive an openness on the part of management, and who enjoy an authentic sense of connection with their colleagues and with the organization's mission. Even so briefly described, these elements suggest why hope can be an energetic force for positive change to a degree that, say, optimism alone could never be.

Our study of effective executives has uncovered many ways in which their decisions, words, and actions make the people they lead more hopeful. Collectively, these practices are the basis of a leadership tool kit for building and sustaining hope. But the most important change comes when a leader is simply more mindful of this vital part of her or his mission. Much can be accomplished in a reflective pause to ask, “Is what I am about to do or say likely to be destructive or accretive of hope?” It is useful to notice how people express a sense that things might change for the better: They often say of some key actor, “He gives me hope” or “She gives me hope.” If you are an executive trying to lead an organization through change, know that hope can be a potent force in your favor. And it's yours to give.

Harry Hutson (harry@puttinghopetowork.com), a business adviser and executive coach, and

Barbara Perry (barbara@puttinghopetowork.com), a cultural anthropologist and management consultant, are the authors of *Putting Hope to Work: Five Principles to Activate Your Organization's Most Powerful Resource* (Praeger, 2006).

6. An Emerging Hotbed of User-Centered Innovation *

A major auto company recently presented its “innovation road map” for the next ten years to a group of journalists and car enthusiasts. As the presentation progressed, it became increasingly clear that some members of the audience were restless. Finally, one listener stood up and said, “Many of us have already built and installed every single one of the innovations you say you are planning to develop in the next ten years. Wake up and smell the coffee! Come out to the parking lot and take a look at what we have developed and installed in our cars!”

The company's engineers and executives weren't sure how to respond. They certainly couldn't say what they felt: “Users should not act like that! They should wait for us to study their needs and develop new products for them!”

In an array of industries, producer-centered innovation is being eclipsed by user-centered innovation—the dreaming up, development, prototyping, and even production of new products by consumers. These users aren't just voicing their needs to companies that are willing to listen; they're inventing and often building what they want.

Breakthrough medical-equipment innovations such as the heart-lung machine and the first automated drug pumps were developed by doctors at the leading edge of practice, not by firms that manufacture medical equipment. Novel food categories like sports energy drinks and gels were developed by sports enthusiasts. This process of users' coming up with products is increasingly well documented, and some companies, at least, are actively trying to take advantage of it. But what about governments?

Governments? What do they have to do with the development of something like a sports gel? Actually, governments have always attempted, in a variety of ways, to affect how firms innovate. Most countries, developing and developed alike, view innovation as vital to their economic growth and well-being and spend varying portions of their national bud-

Today, customers aren't just voicing their needs to companies that are willing to listen; they're inventing and often building what they want.

gets to support it. That support has typically come in the form of R&D grants for scientific researchers and R&D tax credits for manufacturers. This focus on technology push has not attracted much controversy. But recent research shows that the 70% to 80% of new product development that fails does so not for lack of advanced technology but because of a failure to understand users' needs. The emergence of user-centered innovation clearly shows that this near-exclusive focus on technological advance is misplaced.

Denmark is taking this sea change in the nature of innovation to heart. In 2005, the Danish government became the first in the world to establish as a national priority, in the words of a government policy statement, "strengthening user-centered innovation."

Like other countries, Denmark had traditionally followed a strategy of technology push. But, as a relatively small country with relatively few resources, it had also been resigned to not winning in the research-investment game. By championing a new innovation paradigm, the Danish government is encouraging numerous methodological flowers to bloom—from programs that improve manufacturers' understanding of users' needs (through ethnographic research, for example) to techniques for identifying user-developed innovations that manufacturers can produce. Successful approaches will be studied in Danish business schools and shared with interested Danish firms.

One such initiative is the Danish User-Centered Innovation Lab, established in 2005. Hosted by Copenhagen Business School and staffed by professors from both CBS and the Aarhus School of Business, the lab is following an approach pioneered at the Massachusetts Institute of Technology a decade ago. As a government-supported partnership between faculty experts at Danish business schools and innovative firms such as Bang & Olufsen, LEGO, and Novo Nordisk, it comes up with new innovation methods that are then tested in partner companies.

Denmark is the first country to bring government innovation policies into line with modern understandings of how innovation really works. If this paradigm shift is successful, many other nations will certainly follow.

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7. Living with Continuous Partial Attention

We all know the phenomenon: You're in a conference room, and all the people around the table are glancing—frequently and surreptitiously—at the cell phones or BlackBerrys they're holding just below table level. They may be checking their e-mail, looking to see who is trying to reach them on muted incoming calls, sending text messages, scanning stock quotes, making dinner reservations—or, more likely, doing several things at once. Such activities don't only draw participants' attention away from the business being conducted at the table; they also compete with one another—sometimes even generating small alerts that suddenly appear and then dissolve on the screen, silently begging, "Look at me!" This constant checking of handheld electronic devices has become epidemic, and it illustrates what I call "continuous partial attention."

Although continuous partial attention appears to mimic that much discussed behavior, multitasking, it springs from a different impulse. When we multitask, we are trying to be more productive and more efficient, giving equal priority to all the things we do—simultaneously filing or copying papers, talking on the phone, eating lunch, and so forth. Multitasking rarely requires much cognitive processing, because the tasks involved are fairly automatic.

Continuous partial attention, by contrast, involves constantly scanning for opportunities and staying on top of contacts, events, and activities in an effort to miss nothing. It's an adaptive behavior that has emerged over the past two decades, in stride with Web-based and mobile computing, and it connects us to a galaxy of possibilities all day every day. The assumption behind the behavior is that personal bandwidth can match the endless bandwidth technology offers.

Continuous partial attention in itself is neither good nor bad. Like many things, it's fine up to a point—but in excess it can cause harm. In a study of the use of BlackBerrys, Gayle Porter, an associate professor at Rutgers Univer-

sity, concluded that addiction to these devices, in the form of constant checking for messages, is deeply entrenched. TNS Research, in a study commissioned by Hewlett-Packard, found that people who attempted to deal with a barrage of messages while working experienced a temporary ten-point drop in IQ over a day's time.

Furthermore, in this sleep-deprived, interruption-driven, always-on world, our ability to focus is compromised. In trying to process a never-ending and ever-widening stream of incoming data, we can put off decisions indefinitely or even burn out.

Not surprisingly, there are signs of a backlash against the tyranny of tantalizing choices. The yearning for a calmer existence has led people to adopt tools—from iPods to TiVo to Google's spare interface—that reduce information overload and support discernment. Instead of seeking out venues in which to make ever more connections with others, to the point of overtaxation, people are seeking refuges, such as yoga and meditation classes or "quiet cars" on trains, in which to make a few meaningful connections.

As businesses respond to this backlash—as they consider management styles and marketing messages that effectively meet people's needs for relief from continuous partial attention and the sensory overload it creates—they can differentiate themselves by offering what their employees and customers increasingly crave: discriminating choices and quality of life.

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8. Borrowing from the PE Playbook

To survive the economic downturn at the start of the decade, corporations took dramatic steps to reduce costs and improve productivity. As a result, their operating leverage skyrocketed, and when the economy rebounded, corporate profits quickly followed. Since the amount of capital required to sustain organic growth represents a small portion of the cash now coming in, most of these profits are going straight to the balance sheet.

A cash mountain used to be considered a good thing—savings for a rainy day or a war chest for future acquisitions. Today, it's a mixed blessing, and the possibilities for spending the cash wisely are much reduced. For one thing, profitably emptying a war chest isn't as easy as it once was. Private equity firms are hunting for big corporate deals and using their financial leverage to bid up the prices of acquisition targets—effectively pricing "strategic buyers" out of the market. But keeping the cash in the bank isn't an option. Not only does it generate embarrassingly low returns for investors, but it can make a company more attractive to PE firms. With those firms now able to complete transactions of \$50 billion or more, this applies even to large corporations once considered immune to buyout. Industrial firms are the most susceptible, but no sector is off limits, as the privatization of SunGard (software and IT services) and HCA (health care) demonstrate.

Giving the cash back to shareholders in the form of dividends isn't a very attractive alternative: It effectively signals that management has run out of promising new growth ideas, which will inevitably affect the share price. Some companies resort to share repurchases, but these create value only if the company is undervalued by investors—which is the exception, not the rule. Of course, companies can always use the cash to pay off debt. But since the after-tax cost of debt is lower than the cost of equity, paying off debt increases value only when a company is overleveraged—that is, has taken on so much debt that it is at risk of going under. In today's markets, most companies are underleveraged.

What Does It Take to Create \$1 Billion in M&A Value?

Private equity firms create value in acquisitions by being very selective, and smart corporate buyers would do well to imitate them. Small M&A deals tend to create the most value per dollar invested. But small deals involve a lot more work: Deal makers have to close 80 of them, as opposed to just seven very large deals, to make a billion dollars—which means sifting through thousands of potential deals.

Smaller deals create more value...

Average deal size	\$50M	\$100M	\$500M	\$1B	\$3B
Value creation (per \$ invested)	25¢	20¢	15¢	10¢	05¢

...but take more work

Number of deals	80	50	13	10	7
Active pursuits	160	100	26	20	14
Active appraisals	320	200	52	40	28
Starting pipeline	3,200	2,000	520	400	280

Conscious deliberation, however long and careful, can be a surprisingly crude and ineffective tool.

So what can companies do to profitably rid themselves of this embarrassment of riches? Like it or not, acquisition really is the only option, but to exercise that option effectively, would-be buyers are going to have to take a few leaves from the PE playbook. To begin with, they're going to have to spend a lot more time looking at potential deals. PE firms create value in acquisitions by being very selective. Research shows that for every deal a PE firm completes, it screens 40, appraises four, and actively pursues two (see the exhibit "What Does It Take to Create \$1 Billion in M&A Value?"). Corporate buyers cast smaller nets: Whereas PE firms reject 39 deals for every one they complete, most corporations would struggle to come up with more than four or five targets in the M&A pipeline.

In addition to strengthening their M&A pipelines, companies experienced in making smaller deals should be prepared to leverage their cash mountains in order to acquire companies of equal or greater size. With their strong balance sheets, they should be able to borrow heavily in advance of transactions; they can then use the proceeds from divestitures within their portfolios and those of their acquisitions to pay down the debt quickly. In this regard, the advent of PE firms is actually a blessing, because they are prepared to acquire businesses that commercial buyers won't touch. As a result, the market for companies is much more liquid than before, making it easier to execute mega acquisitions that are contingent on subsequent smaller divestitures.

Finding profitable outlets for excess cash can be challenging. Making acquisitions has always been tough, but in today's market, as private equity players compete for many deals, success is even harder. The smartest companies will incorporate the best practices of PE firms in order to hunt more like them and will take advantage of the liquidity they create in order to hunt with them.

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9. When to Sleep on It

Have a difficult decision to make? You should engage in long and careful deliberation, right? Not necessarily. Psychological research shows

that conscious deliberation, however long and careful, can be a surprisingly crude and ineffective tool, because the conscious mind has a very limited processing capacity. Most people cannot, for example, compare three organizations differing on 14 dimensions. That is simply too much information for the conscious mind to take in and handle all at once.

Of course, if this limited capacity led executives to use only the best and most relevant information, the situation would be fine. But it doesn't. People who mull over their decisions typically get the relative importance of the various pros and cons very wrong. In one recent experiment I helped conduct, we studied experts' predictions for World Cup soccer matches. We found that the longer our participants thought about their answers, the more likely they were to include irrelevant information (which city will host the game) at the expense of relevant information (track records of the teams playing). And the more information they factored in, the less accurate their predictions became. The logical conclusion from this and similar experiments is that conscious deliberation leads to sound decisions only when a very limited amount of information is involved.

Luckily, there is another way to make difficult choices: Don't think hard about the decision, and after a while your unconscious mind, which is known to have a far greater processing capacity than your conscious mind, will tell you what you should do. Such an unconsciously generated preference is usually referred to as intuition or a gut feeling—a conviction that one alternative is better than another, even when we can't verbalize why.

The notion of trusting your intuition is, of course, far from new; but what was unexamined until now is whether extensive unconscious thought can make intuition more reliable. Thus, my colleagues and I conducted experiments to test the power of the unconscious mind as a processor of information. We gave our subjects information pertaining to a choice—for example, which of four apartments was the most attractive, or which of four cars was the best. They had three options: They could make a choice immediately; they could take time for conscious deliberation; or they could figuratively sleep on it—that is, engage in unconscious thought. The subjects who chose the third option were first given infor-

mation about the decision in question and then given information about an unrelated task, to occupy their conscious minds while their unconscious minds processed the relevant information.

When the unconscious thinkers were asked to choose one of the alternatives, they made better decisions, almost without exception, than the subjects who decided immediately or those who consciously deliberated. Their decisions were better from a normative perspective (more rationally justifiable), from a subjective perspective (more likely to produce post-choice satisfaction), and from an objective perspective (more accurate, as in predictions of soccer-match outcomes).

The moral? Use your conscious mind to acquire all the information you need for making a decision—but don't try to analyze the information. Instead, go on holiday while your unconscious mind digests it for a day or two. Whatever your intuition then tells you is almost certainly going to be the best choice.

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10. Here Comes XBRL

When the U.S. Securities and Exchange Commission last September announced a \$54 million project to accelerate the implementation of XBRL, a new information standard for financial and business reporting, the event hardly seemed like a landmark for companies. The advantage for investors—an enhanced ability to electronically download, analyze, and compare company information submitted to the SEC—got top billing. The SEC chairman, Christopher Cox, briefly noted that adopting the new standard—which is voluntary for SEC filings, at least for now—would also make it easier and less costly for companies to comply with his agency's requirements. But that's just the beginning.

What has largely been overlooked is that XBRL (Extensible Business Reporting Language) will make it much easier to generate, validate, aggregate, and analyze business and financial information, which in turn will im-

prove the quality, timeliness, completeness, and comparability of the information that companies use to make decisions. The new language will allow them to strengthen and ensure the reliability of their internal controls, thereby lowering the cost of maintaining these pervasively manual compliance processes. It will make ERP (enterprise resource planning) systems much more flexible and easier to upgrade or change, dramatically cutting the investments needed to maintain these beasts. And by significantly reducing the amount of effort needed to change and integrate business reporting systems, XBRL will make digesting acquisitions, shedding businesses, reorganizing, and adding new products and business units far less difficult.

All this undoubtedly sounds too good to be true to managers who are rightfully jaded after decades of false promises that the next IT silver bullet is (this time, really!) just around the corner. So what makes XBRL different? Unlike all past technological developments, it doesn't come in a wide variety of proprietary flavors, like ERP systems, operating systems, and customer relationship management systems, to name just a few. XBRL is an open-source standard that was developed by an international public consortium of nearly 500 organizations from 27 countries, including companies, investors, analysts, auditors, regulators, and aggregators of financial data, such as Standard & Poor's. (For more background, see www.xbrl.org, the standard's official Web site.)

In more technical terms, XBRL is the application of XML (Extensible Markup Language, on which the Internet is built) to business reporting. It uses an electronic tag, very much like the bar code on a physical product, to explicitly define information so that it can be easily read by a variety of software applications. XBRL also articulates the relationships among different pieces of information, offers formulas for calculating ratios, provides references to accounting standards and other relevant sources, and can even translate information into different human languages. These attributes mean that processes that now have to be manual because of the difficulty of getting different proprietary applications to work together can be made more automated and streamlined.

Another reason to treat XBRL seriously is that, although its taxonomies are still not fully

developed, it is already advancing rapidly throughout the world. More than 8,200 financial institutions in the United States have had to submit their quarterly call reports (risk-oriented filings) in this language to federal banking regulators since the fall of 2005; they are already reaping benefits in the form of lower compliance costs, higher-quality data (for both regulatory and internal purposes), better analytical procedures, and more useful benchmarking data. Meanwhile, some two dozen companies—including Bristol-Myers Squibb, Ford, General Electric, Microsoft, PepsiCo, and United Technologies—have been filing 10-Ks and 10-Qs in XBRL as part of a voluntary SEC pilot program. The SEC's project to revamp its EDGAR (electronic data gathering, analysis, and retrieval) database and to invest in the development of XBRL taxonomies for all industries where they don't exist promises to accelerate adoption across the United States.

Initiatives are also under way in Australia, China, the European Union, India, Japan, Korea, Singapore, and many other places. The European Union's central bank has developed an XBRL-based model for implementing the Basel II framework for risk management. Banco de España, Spain's central bank and the leader of the EU effort, is already applying XBRL in a number of ways, including efforts to fight money laundering. In order to attract more international investors by increasing the transparency of reported information, the Korea Stock Exchange has worked with its 20 largest companies to file information in XBRL. Wacoal, a Kyoto-based maker of lingerie, has used XBRL to enhance its ability to aggregate operating information from the 24 proprietary IT systems used by its businesses in 23 countries. Wacoal needed six months and \$50 million to implement the system—a sixth of the time and a third of the money that would have been required for a traditional ERP solution it had considered.

The bottom line: XBRL's benefits go far beyond faster and cheaper compliance. Late adopters beware.

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11. Innovation and Growth: Size Matters *

Executives talk about their companies' "DNA" and roles in "business ecosystems," but the analogy to living organisms is more than metaphorical. Like the mathematical laws governing how organisms' metabolism, growth, evolution, and mortality depend on size, there are rules that appear to govern the growth, performance, and even decline of cities and other social organizations. Although we can't yet predict how specific cities or companies will evolve, we've found general mathematical relationships between population size, innovation, and wealth creation that may have important implications for growth strategy in organizations.

In biology, different species are in many ways scaled versions of one another. Bacteria, mice, elephants, sequoias, and blue whales may look different, but most of their fundamental characteristics, including energy and resource use, genome length, and life span, follow simple mathematical rules. These take the form of so-called power-law scaling relationships that determine how such characteristics change with size. For example, metabolic rate increases as the $3/4$ power of mass. Put simply, the scaling law says that if an organism's mass increases by a factor of 10,000 (four orders of magnitude), its metabolic rate will increase by a factor of only 1,000 (three orders of magnitude). This represents an enormous economy of scale: the bigger the creature, the less energy per pound it requires to stay alive. This increase of efficiency with size—manifested by the scaling exponent $3/4$, which we say is "sub-linear" because it's less than one—permeates biology. These ubiquitous scaling laws have their origin in the universal properties of the networks that sustain life, such as the cardiovascular and respiratory systems.

Social organizations, like biological organisms, consume energy and resources, depend on networks for the flow of information and materials, and produce artifacts and waste. So it would not be surprising if they obeyed scal-

By almost any measure, the larger a city's population, the greater the innovation and wealth creation per person.

ing laws governing their growth and evolution. Such laws would suggest that New York, Santa Fe, New Delhi, and ancient Rome are scaled versions of one another in fundamental ways—as, potentially, are Microsoft, Caterpillar, Tesco, and Pan Am. To discover these scaling laws, Luís Bettencourt at Los Alamos National Laboratory, José Lobo at Arizona State University, Dirk Helbing at TU Dresden, and I gathered data across many urban systems in different countries and at different times, addressing a wide range of characteristics including energy consumption, economic activity, demographics, infrastructure, intellectual innovation, employment of “supercreative” people, and patterns of human behavior such as crime rates and rates of disease spread.

We did indeed find that cities manifest power-law scaling similar to the economy-of-scale relationships observed in biology: a doubling of population requires less than a doubling of certain resources. The material infrastructure that is analogous to biological transport networks—gas stations, lengths of electrical cable, miles of road surface—consistently exhibits sublinear scaling with population.

However, to our surprise, a new scaling phenomenon appeared when we examined quantities that are essentially social in nature and have no simple analogue in biology—those associated with innovation and wealth creation. They include patent activity, number of supercreative people, wages, and GDP. For such quantities the exponent (the analogue of $3/4$ in metabolic rate) *exceeds* 1, clustering around a common value of 1.2. Thus, a doubling of population is accompanied by more than a doubling of creative and economic output. We call this phenomenon “superlinear” scaling: by almost any measure, the larger a city's population, the greater the innovation and wealth creation *per person*.

Organismic growth, constrained by sublinear power-law scaling derived from the dynamics of biological networks, ultimately ceases, with the equations predicting what size organisms will reach. In contrast, our equations predict that growth associated with superlinear scaling processes observed in social organizations is theoretically unbounded. This would seem to bode well for organizations. Unfortunately, however, the equations also predict that in the absence of continual major innova-

tions, organizations will stop growing and may even contract, leading to either stagnation or ultimate collapse. Furthermore, to prevent this, the time between innovations (the “innovation cycle”) must decrease as the system grows.

Though our research has focused on cities, the social and structural similarities between cities and firms suggest that our conclusions extend to companies and industries. If so, the existence of superlinear scaling that links size and creative output has two important consequences: First, it challenges the conventional wisdom that smaller innovation functions are more inventive, and perhaps explains why few organizations have ever matched the creativity of a giant like Bell Labs in its heyday. Second, it shows that because organizations and industries must apparently innovate at a continually accelerating rate to avoid stagnation, economizing by reflexively cutting R&D budgets and creative staffs may be a dangerous strategy over the long term.

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12. Conflicted Consumers

Your data indicate strong customer satisfaction: Repeat purchase levels are high, and many customers have been with you for years. Good news, right? Well, appearances can be deceptive.

There may well lie buried in these data a “stealth” segment of apparently loyal customers who have ethical concerns about your company and are poised to switch as soon as a viable alternative emerges. In other words, they buy your product but they'd rather not. I call such customers “conflicted consumers,” and my research shows that more of them are out there than business leaders and their market research teams may realize.

In a survey of more than 1,300 consumers in the United Kingdom, nearly one in four said they bought products and services from companies whose ethical reputation they deemed poor or very poor. Their concerns ranged from the exploitation of workers to corporate environmental practices to the marketing of harmful products. Among the 40 international companies that were included in the survey,

McDonald's had the highest proportion of conflicted consumers: 8% of the company's customers expressed dissatisfaction, primarily with the perceived effect of its products on children's health.

Conflicted consumers are an intriguing bunch. Although they worry that they are making the world a worse place by buying a particular product, they are distinct from hard-core ethical consumers, who either "go green" or go without. Conflicted consumers are simply ready to switch to a brand they perceive as more ethical. Why wait? Usually because they don't believe a convenient alternative exists—yet. And they don't believe that withholding their business would have any effect on how the company operates. Sometimes consumers (typically parents looking for domestic peace) override their own concerns and stick with a company because their families like the product.

Though they are good customers for the moment, their doubts may feed a powerful if latent resentment toward a brand. Their desire for an ethical choice represents a huge amount of potential energy in the marketplace, which can take the form of something more subtle, widespread, and damaging than an old-fashioned product boycott.

Conflicted consumers talk to others about corporations' track records. In fact, 44% of the consumers polled in the survey had spoken about corporate ethics with friends, family, or colleagues in the previous month. And though

companies increasingly look to word of mouth as a way to bolster their brands, more than 33% of such conversations negatively portrayed the company or brand discussed. Wireless access to the Internet, which allows conflicted consumers to research opinions about products and services right up to the moment of purchase, will only amplify their misgivings.

Although some companies see little need to pay attention to the preferences of "ethical types" who will never, they believe, buy their products, my research indicates that the distinction between ethical types and "our customers" is blurring, and that the majority of consumers, in one way or another, need to have their concerns addressed.

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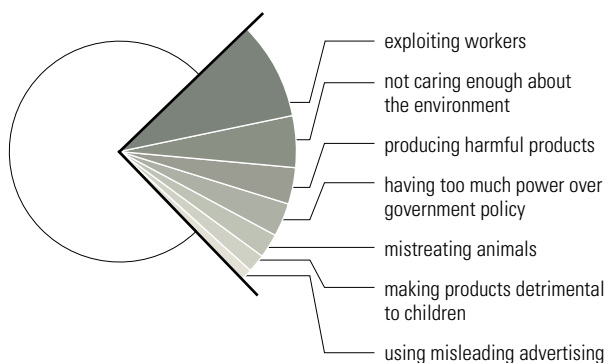
13. What Sells When Father Knows Best

The comedian Dick Cavett once quipped, "If your parents never had children, chances are you won't either." It's a funny thought, but it gets at something real.

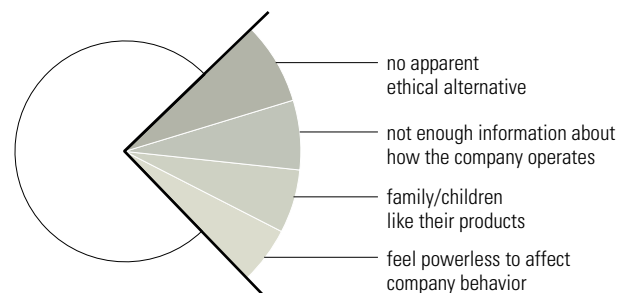
People who are social, religious, or political conservatives tend to have more children, and that fact has profound implications for culture, for politics, and for business. In the United States, for example, fertility rates are 12%

Holding Their Noses

Almost one in four consumers buy from companies they see as unethical for:



These same consumers stay with those companies for one of several reasons:



Source: Fraser Ethical Index survey of 1,363 adults in the UK

Patriarchy always makes a comeback, because its adherents put more genes and ideas into the future than do their secular counterparts. This process is already well under way in the United States.

higher in states that voted for George W. Bush in the most recent presidential election than in the more liberal and secular states that supported his opponent. Indeed, if the John Kerry states seceded and formed a new nation, its fertility rate would be just 1.8 children per woman—13% below the level needed to replace the population.

This link between fertility and conservatism is found not only in the United States but in Europe, Israel, the rest of the Middle East, and elsewhere. There is a strong correlation between adherence to traditional Christian, Judaic, or Islamic values and high fertility. And as an increasing share of all children is descended from people whose conservative values have led them to raise large families, we see the emergence of societies in which the patriarchal and highly pro-natal values of the Abrahamic religions are dominant.

So what caused the rise of liberal secularism in the first place? Patriarchy, as it has traditionally manifested itself, requires a man to marry a “respectable” wife and to take responsibility for the children she bears him. In part because of these obligations, traditional patriarchy is unappealing to many men. Similarly, many women take issue with the roles a patriarchal society prescribes for them. When broad swaths of the population come from something other than a conservative upbringing—as they did in the 1960s and 1970s—patriarchy’s constraints on personal freedom can seem excessive to men and women alike. Then gender roles relax, birthrates fall, and patriarchy goes into retreat.

But patriarchy always makes a comeback, because its adherents put more genes and ideas into the future than do their secular counterparts. This process is already well under way in the United States. For example, among American women just now passing beyond reproductive age, nearly 20% are childless and almost as many have only one child. Consequently, a relatively large share of the next generation is descended from a comparatively narrow and socially conservative segment of society that places a high value on reproduction. Today we see a culture in which social conservatives and the religious-minded play a far greater role than they did forty years ago.

How can business leaders profit from—or at least prepare for—this trend? Businesses that

have relied on sex to sell products, or whose products otherwise distract young people from the straight and narrow, should perhaps think twice about brazenly touting, say, sexually explicit or violent films and video games, which could provoke boycotts or outright bans. Rock and hip-hop; licentious celebrities; rootless, childless urban professionals; and other such fixtures of today’s marketing campaigns could come to be seen as relics of a decadent past.

Meanwhile, as occurred in the nineteenth century (a similarly conservative period), the political left will probably shed many of its current causes and campaign for a “family wage” sufficient to allow a man to support his children. Employers will find it harder to lure women out of the home and into the workplace, simply because so many of them, having absorbed the pervasive cultural norm, will embrace motherhood and home life. Already the percentage of American women with small children and jobs outside the home is declining.

The new patriarchal family will value products and services that allow fathers to stay home as well. One example is eBay, which drastically lowers the barriers to running a home business. A combination of nanotechnology and biotechnology may allow millions of households to produce large amounts of the food, energy, and manufactured products they currently acquire from the global economy, thus restoring the traditional home-centered economic basis of the patriarchal family.

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14. Business in the Nanocosm

The scientific and technological revolution that may occur as a result of nanotechnology has been much discussed. Generally unappreciated so far, but of potentially much greater impact, are the sociocultural and business implications. Nanotechnology may change society over the next few decades just as much as information technology has over the previous few—and in ways that are still hard for our minds to grasp.

Nanotechnology is distinguished from other forms of technology, past and present, by the infinitesimal size of the materials involved

Nanotechnology, like nature, assembles objects atom by atom, following a design that calls for only what is needed.

(less than 100 nanometers wide) and by its method of operation. Conventional manufacturing carves or distills a purpose-suited device from a mass of raw materials. Nanotechnology, like nature, assembles objects atom by atom, following a design that calls for only what is needed: a place for every atom and every atom in its place. This method of constructing objects (which themselves do not have to be small) will reshape the future not only of manufacturing but also of distribution, retailing, and the environment.

Because conventional manufacturing begins with large and unformed inputs, it needs scale, and economies of scale push factories to become larger and more centralized. If, however, manufacturing is “additive” (assembling products atom by atom) rather than “subtractive” (distilling them from a mass of materials), factories can be quite small—small enough to be no more than a set of tiny machines and production blueprints—and can be operated almost anywhere. The marginal production costs of these factories should approach zero, and their production processes should create no pollution or waste.

These developments also challenge accepted notions of the economic place of durables—products with a shelf life independent of their utilization. At present, much economic activity amounts to providing “permanent” solutions to ephemeral problems. Thus, the plastic cover placed on a Starbucks cup solely to prevent the purchaser from spilling the scalding contents is of no use whatsoever to a stationary consumer once the brew cools off. Thanks to nanotechnology, however, many products would endure no longer than the need that gave rise to them.

Industrial or business-to-business markets are likely to embrace this technology first, given their quest to reduce costs throughout the value chain, which they could accomplish by eliminating several of its links. Already what are called synthesizers, assemblers, or automated fabricators have been developed to create items, such as prosthetics, using nanotechnology’s additive approach. In the next few decades, we may see the domestic, user-friendly successors to these machines—personal manufacturing units, or PMUs—become standard home appliances.

Consider this scenario: In preparing for a dinner party the following day, a couple decides to create a new set of dishes. They sit

down at the console of the family PMU (essentially a keyboard, a display screen, and a manufacturing chamber containing the atoms to be assembled). Working with design software (the manufacturing blueprints), they input the instructions and watch as the atoms in the chamber are organized into plates, bowls, and cups. Since the number of atoms used to manufacture the dishes is the same as the number composing them, all the costly steps—extraction or collection of raw materials, transportation, transformation, waste disposal—that currently precede a product’s use or consumption are eliminated.

Ever since Adam Smith laid out their essential characteristics, market economies have been understood to rest on specialization: Individuals are producers of one thing and consumers of everything else. In what is sometimes called the nanocosm, by contrast, consumers could become the sole producers of finished products of all kinds. Consequently, they would continually evaluate whether to make or buy. We are all aware of the decentralizing and personally empowering effects of PCs and the Internet. By making individuals largely self-sufficient, the nanocosm would push these effects to the extreme, in essence creating a Robinson Crusoe economy.

Nanotechnology would thus hasten the trend away from manufacturing prowess and physical assets (hardware) as sources of competitive advantage. Obviously, the vast number of companies that offer durable or even disposable items would be at risk—as, ultimately, would those handling inventory and logistics or offering after-sale customer service, maintenance, and repair. In short, the ability of end users to perform for themselves functions now performed by other economic agents would wipe out large segments of the value chain.

Competitive advantage would lie in knowing the customer and designing the manufacturing blueprint and software. We might also anticipate the emergence of a new entity, midway between the traditional make-and-sell, command-and-control organization and the more modern sense-and-respond, adaptive organization. This new entity would function as a systems integrator, focusing on “menu design,” component acquisition and assembly, and efficient coordination of the activities and interactions of the market-savvy designer, the PMU maker, the PMU operator, and the pro-

vider of the atomic building blocks.

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15. Act Globally, Think Locally *

Here's a paradox of our age: The more global the economy and your business, the more important location and physical proximity become. Yes, issues of location—the choice of a factory site, for example, or the tailoring of a marketing message to a region—have always been of strategic importance. However, the conventional emphasis has been on how location affects a company's costs and revenues. In today's knowledge-based economy, we need to reevaluate the very concept of location.

Advances in communication technology have enabled—indeed, require—companies to tap into local information that they can use throughout their businesses. Managers increasingly understand the importance of drawing on diverse sources of information, especially from outside the organization, to spur innovation. For example, ideas that used to emerge from a company's central lab may now be offered up by researchers far from the home office—or by a lone inventor living in a village halfway around the world. Thanks to the Internet and companies' global information systems, businesses can acquire such ideas from out-of-the-way places relatively easily and cheaply. For that reason, though, companies must discover and quickly incorporate good ideas from these diverse sources before their rivals do. In fact, they have less time than ever before to take new ideas to market.

The importance of location in a knowledge-based economy isn't only about far-flung places; it's also about those places right outside your door. That's because another way of tapping diverse sources of knowledge is to draw on people and organizations in your vicinity. Unlike the explicit knowledge that can be gathered and transmitted digitally from anywhere in the world, tacit knowledge—which is difficult to codify and, consequently, has great value—can be shared only through repeated interactions, which are usually face-to-face. This, obviously, requires physical proximity. Even in the digital age, the many interactions

that take place in the open and flexible networks linking a company, its suppliers, and its professional-service providers are more effective and efficient within physically proximate regions. Think of the decentralized social networks that fostered both competition and cooperation in Silicon Valley, making it a fertile seedbed of innovation. At the very least, a personal encounter is usually required to start a meaningful discussion that will lead to clear decisions and useful outputs. Once the physical meeting takes place, meetings in virtual space can follow—but the reverse order often doesn't deliver results.

In the early 2000s, many Japanese manufacturing firms moved their production plants to China in order to take advantage of lower labor costs. Over time, they realized that some activities, such as exchanges between the production-engineering and manufacturing departments, weren't proving effective—for example, the desired product specifications couldn't be achieved—when the departments were physically separated. There was just too much subtle back-and-forth that needed to occur in person. Partly because of this, some of the companies have moved some of their manufacturing processes back to Japan.

It isn't always easy to know which activities have to be close together geographically. Figuring it out can involve considerable trial and error, as well as constant review to determine when the scope of tacit knowledge—and therefore the necessity of interaction—changes.

Companies today need both global reach, in order to spot useful local ideas and incorporate them into strategy, and physical proximity, in order to effectively tap sources of tacit knowledge and thus sustain competitive advantage. For both, location matters.

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16. Seeing Is Treating

Health care often advances hand in hand with technology. When several technologies can be leveraged simultaneously, the possibilities for real breakthroughs in care multiply. That's occurring today with the convergence of imaging technology and biotechnology—enabled by

advanced health care information technology—which promises to radically change diagnosis and treatment for many chronic diseases. Like other technological convergences in our digital and granular world, this one will redefine industry boundaries and inextricably link distinct businesses.

Clearly, early detection of disease saves lives by allowing for more treatment options. Imaging technology now enables a radiographer to see small growths and nodules in, for instance, a patient's liver or lungs. But imaging is performed only if clinically indicated; no patient without symptoms would be prescribed an exam. For this reason, the full potential of early detection can be realized only when in vivo imaging technologies are combined with in vitro laboratory diagnostics. The challenge today is to determine whether patients are at risk for cancer; to regularly screen them if so; and, if growths are discovered, to precisely determine which are potentially cancerous and what type of cancer they could become.

That's where biotechnology comes in: It allows us to go deeper into disease discovery and faster into treatment. Traditionally, doctors determined a nodule's potential for malignancy from its shape and then performed an invasive and often painful biopsy—which sometimes required hospitalization and created delays in treatment. Thanks to molecular diagnostics research, tests of a patient's blood or tissues can reveal risks for and perhaps determine the presence of prostate and other cancers, thus pointing the physician toward monitoring, investigation, or treatment. Researchers can also create molecules that will attach themselves only to specific tumors; when these molecules are combined with a marking agent, advanced imaging technology can use them to discover which tumors are growing, how large they are, and even their precise location.

Biotechnology's real promise lies in the increased potential for combining diagnosis and treatment. The biomarkers just described could, for instance, have a serum attached, or could be used to switch off the tumor's angiogenesis receptors, stopping growth in its tracks. In a similar way, radiation therapy could be carried directly to the tumor, minimizing damage to adjacent healthy tissue. Intelligent IT tools would help physicians compile and manage the data gathered through all these tests to improve patient care and safety.

Such high-tech methods of diagnosis and treatment would not necessarily be simpler than current methods, but they would have a higher success rate and would certainly be easier on patients. And because patients would be cured earlier, before they needed specialized care, survival rates would improve and health care costs would be reduced. In short, the convergence of imaging and biotechnology can improve the quality of health care, the delivery of health care, and the operational and financial performance of both health care providers and medical technology companies.

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17. The Best Networks Are Really Worknets *

An unruly nebula of concepts is floating around the business world right now—social webs, open innovation, customer-created content, and more—all exploring one big question: Now that we see the power of human networks, how can we use them to produce value? Applications ranging from InnoCentive, Eli Lilly's network for solving scientific riddles, to Internet Based Moms, a Web site where work-at-home moms can seek and share advice on starting Internet businesses, prove the point that many heads are better than one. But up to now, network-building efforts have been hit or miss. Our desktops are littered with passwords to communities that no longer exist.

It's too early for a general theory of human networks, but some practical guidelines have emerged from the first few years of experience. Fundamentally, the key to getting payback on investment in a network is to think hard about exactly what kind of value you want the network to create. In other words, you must put the *work* in "network" first.

Networks lend themselves to at least five basic tasks. They can *scan* the horizon, as the Global Business Network does, for events and patterns with implications for corporate strategy. They can help to *solve* problems: InnoCen-

tive does this by posing problems to a far-flung population of scientists. A network can *innovate* for its own benefit. Members of the Polycom User Group, for example, seek new ideas for using Polycom’s conferencing products by interacting with other users and by sharing best practices. Networks can be used to exert *influence*: It was only when researchers experiencing errors with the Pentium microprocessor banded together that Intel took the issue seriously. And a network can efficiently *allocate* resources. The staffing company Aquent uses its substantial network to match marketing and communications professionals with projects that need them.

Because networks perform diverse functions, they require diverse forms. By first defining the most important work you want your network to perform—scan, solve, innovate, influence, or allocate—you’ll be able to design your “worknet.” (See the exhibit “Designing a Worknet” for an analysis of how two networks were constructed to serve their purposes.)

Defining the work first will help point you to the talent your network needs to do its job. It will also guide you in engineering the exchanges among the network’s members. No one willingly devotes time and energy to an endeavor without seeing benefits in return; in a well-designed network, the benefits being exchanged are not just economic but also informational and emotional. These three forms of exchange need to be balanced so that both the host and the member feel they have made a fair transaction. That balance may vary greatly for members of different kinds or in different roles. The teenagers who were participating in the worknet of one consumer-products company were there to gain insider status; the professional sociologists and anthropologists were there to learn; and the sponsors were looking for more-effective selling messages.

Designing an appealing experience for members is another important step in constructing a sustainable network. This, too, can be guided by the network’s function. For example, will the work be best accomplished through physical interactions, virtual interactions, or a combination of the two? Networks have a particular intensity and rhythm; for any given network to persist, its sponsor must manage this heartbeat continuously.

The right time to decide on and implement the technology of the network—something often mistakenly treated as the first step—is only after the work has been defined, the right kinds of people identified, and the nature of the exchanges and experience carefully considered. After all that, it may be evident that the appropriate “technology” is not Internet-based; a series of events or some other enabler of ongoing communication might be better.

The steps in designing a valuable network have a logical sequence, but note that a bad bet at any point in this five-horse parlay can ruin the entire venture. The founders of Facebook, a network to enable students to make and manage their social contacts, learned this lesson in the summer of 2006, when they moved to allow nonstudents access to the network in order to create the possibility of greater ad revenues. Core members considered this an invitation to stalkers and staged a revolt.

Usually, network initiatives screw up less spectacularly. In classic “build it and they will come” fashion, networks are launched as

Designing a Worknet

Both Facebook, a site for socializing students, and Procter & Gamble’s Vocalpoint, which promotes word-of-mouth marketing among moms, are successful, but their purposes are served in very different ways.

	Define the Work	Identify the Talent	Engineer the Exchanges	Design the Experience	Assemble the Technology
	Decide on the purpose: scan, solve, innovate, influence, allocate...other?	Ensure the right diversity of knowledge, disciplines, cultures, demographics, and personalities	Balance the economic, informational, and emotional rewards for all participants	Create an environment—physical and virtual—that supports the exchanges	Exploit leading-edge technology—but not for its own sake
Facebook	Enable students to form relationships and maintain circles of friends	Students only	<i>Economic:</i> none <i>Informational:</i> “who’s who” and “what’s happening” awareness <i>Emotional:</i> new and deeper friendships	Simple interface based on the “wall” and the news feed	Web-based with no new functionality required
Vocalpoint	Create consumer awareness of and demand for new products	Women with kids	<i>Economic:</i> Product samples and discounts <i>Informational:</i> Insight into new products <i>Emotional:</i> Pride of being “in the know,” respect from having one’s voice heard	Clean, bright design and chatty content	E-mail distribution Web-based surveys and chat Live “Coffee Talk” meetings

technology-led platforms and come to be populated by arbitrary collections of people. Some members linger and some leave, depending on how they perceive the benefits. In rare cases, value emerges for the network's host. Even more rarely, it's value of the kind that was sought. The odds of getting that value from a network are exponentially higher when you put the work first.

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18. Why U.S. Health Care Costs Aren't Too High

There is nearly a consensus that American health care is careening toward fiscal catastrophe. Reasonable estimates of unfunded health care liabilities are sky-high. But the belief that health care costs threaten to wreck the U.S. economy is misguided.

In the first place, procedure by procedure, those costs are quite probably *falling*. It is *spending* that is rising, which is not the same thing at all. The advent of minimally invasive techniques means that, for example, the cost of a gallbladder operation has dropped substantially, and the patient can usually return to work the next day instead of sitting at home for a week. But because many more people are now willing to undergo the surgery, total spending is up. It's the same story with all kinds of medical care, from hip replacement to the treatment of depression. In other industries, falling prices and added features have similarly led to big increases in spending—on PCs, cell phones, and video games, for example—but we call that a productivity triumph, not a “cost” problem.

Three-quarters of health care spending goes toward people who are very sick. Yes, interventions are sometimes overdone, but doctors don't know in advance which of their patients are going to die, and the great majority of very sick patients recover. Over the past thirty years, the death rate from heart attacks has plummeted, so millions of heart attack survivors are now going to work or playing with their grandchildren. And, of course, successful health care always breeds more spending: The people who used to die of heart at-

tacks now live on to consume expensive medications, visit specialists, and contract cancer or Alzheimer's. Does that mean we should stop saving heart attack victims?

Besides, one person's spending is always someone else's revenue. Explain to GE Healthcare (\$15 billion in revenues, 45,000 employees, sales in 100 countries) why rising health care spending is a bad thing. The profile of Medtronic—in the areas of growth, profitability, and R&D spending—closely tracks that of Intel ten years ago. Modern operating rooms boast millions of dollars' worth of equipment, and the vendors include global corporate giants and tiny start-ups.

Health care is now, by most measures, America's largest industry and biggest private employer, as well as a major source of competitive advantage for the United States. Health care's growing share of GDP, moreover, is entirely in keeping with historical trends. A hundred and fifty years ago, agriculture accounted for about half of GDP; it accounts for only 3% now. Fifty years ago, a third of the workforce was in manufacturing, but only 10% is now, although real American manufacturing output is currently far higher. Simple economics is driving health care's expansion: As a society grows richer, the marginal value of one more toy inevitably pales in comparison with another year of life in which to enjoy all one's toys.

Without a truly radical adjustment in health care spending patterns, which there is no reason to expect, demographics alone will drive health care's share of GDP—now 16%—to as high as 25% to 30% over the next couple of decades. In purely economic terms, that would not be a bad thing. Indeed, in terms of trade balances and international competitiveness, it might be a positive development. And even at very modest levels of overall economic growth, people could still increase their spending on cosmetics, video games, and other fun things, although perhaps a tad more slowly than they do now. In short, at least for the foreseeable future, health care in the United States is an economic, a societal, and an affordable good.

To be sure, there are serious problems of waste in health care, just as there are in investment banking, the media, and most other industries. Better oversight may be the answer, but it will be the work of decades. In the meantime, the challenge is one of *financing*, not *affordability*. The current primary financing

mechanisms—employer-based insurance and Medicare—are clearly breaking down. And privatization is an unrealistic solution: While it may, barely, be feasible to privatize old-age pensions (the savings shortfall is far smaller in pensions than it is in health care), privatizing both pensions and health care is a pipe dream.

Instead, in time-honored fashion, a succession of presidents and Congresses will respond to the challenge with a mix of cuts and patches. Spending will keep on rising, and it will continue to shift toward government accounts. Taxes will go up after a lag, and everyone will lie about it. Over time, some highly imperfect but tolerable new accommodation will emerge. Elegant it won't be. That's just the way we do things.

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19. In Defense of “Ready, Fire, Aim”

The open source software movement has been one of the great successes of the digital age. Open source projects such as the Linux operating system and the Apache Web server—as we learn nearly every time we pick up a business publication—have turned the efforts of a widely distributed group of programmers, who contribute those efforts free, into world-class products.

Yet when we look closely at the open source ecosystem, a very different picture emerges. For example, the world's largest open source site, Sourceforge, hosts more than 100,000 projects, and its most popular software is downloaded tens of thousands of times daily. But most projects have never broken a hundred downloads, and more than half are simply inactive: A project was proposed, but nothing happened.

If the vast majority of open source projects are failures, has the press been wrong to emphasize the movement's few successes? The answer is—obviously and measurably—yes. So can businesses that face seemingly formidable competition from existing or future open systems breathe easy? Absolutely not. Open systems are a profound threat not only because

they outsucceed commercial firms but also because they *outfail* them. They grow not in spite of failure but because of it.

In traditional business, trying anything is expensive, even if only in staff time spent discussing the idea; so some advance attempt to distinguish the successes from the failures is required. Even at firms committed to experimentation, considerable effort has to go into reducing the likelihood of failure. And because green-lighting ideas that turn out to be failures will be noticed more than killing radical but promising ones, many people err on the side of caution.

In open systems, by contrast, the cost of failure is reduced, partly because less coordination is required among the various players and partly because each player is willing to accept some of the risks of failure directly. This means that worrying about whether a new idea will succeed is unnecessary; you simply try it out. The institutional barrier between thought and action—the need to convince someone that your idea is worth giving a whirl—doesn't exist. The low cost of trying means that participants can fail like crazy as they continue to build on their successes.

In systems where anyone can try anything, the good has to be filtered from the bad after the fact. The cost of trying to prevent bloggers from saying stupid or silly things, for example, would be high, whereas the cost of allowing anyone to publish anything is low. As a result, filtering services like Technorati have been created to provide guides to what's worth reading; these work the way Google does, judging an individual blog post not according to the quality of its content but according to how often other blogs link to it. If all blogging had to be filtered in advance, the practice would never get off the ground; unfiltered, it would fall to earth. The middle way—publish and *then* filter—keeps the enterprise aloft.

This model is spreading outward from software and media. Meetup.com is a site designed to help users find people with shared interests and arrange meetings in their communities. The most active groups on Meetup right now consist of stay-at-home moms, known as SAHM. These groups are particularly popular in largely suburban metro areas like Atlanta and Houston, where such moms, driving in isolation from one destination to another, are unlikely to meet by accident. Meetup's founders

are overeducated, undermarried urbanites. So how did they know that SAHM groups would be such a hit? They didn't. They simply let users propose potential Meetup groups. The majority of proposed groups in fact fail, and most of the rest have moderate success only. A few, though, like SAHM, are very popular—the same pattern found among open source projects.

This presents a conundrum for business. Clearly, firms can't just start trying everything. Management overhead is real, and the costs of failure can't simply be laid at employees' feet. As a result, open system-like innovation must necessarily continue independent of any firm's ability to either direct or capture all of the value. Some companies' product lines or employee structures may not allow radical experimentation, but smart managers will look for ways to take advantage of this sort of broadly distributed effort. In environments where organizations can reduce the cost of failure by farming out a problem to individuals—who may be induced to participate solely by the chance to learn new skills or to gain the respect of peers—we can expect open systems to make increasing inroads into standard commercial efforts.

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20. The Folly of Accountabalism

Accountability has gone horribly wrong. It has become "accountabalism," the practice of eating sacrificial victims in an attempt to magically ward off evil.

The emphasis on accountability was an understandable response to some god-awful bookkeeping-based scandals. But the notion would never have evolved from a buzzword into the focus of voluminous legislation if we hadn't also been lured by the myth of precision: Because accountability suggests that there is a right and a wrong answer to every question, it flourishes where we can measure results exactly. It spread to schools—where it is eating our young—as a result of our recent irrational exuberance about testing, which forces education to become something that can be measured precisely.

When such disincentives as the threat of having to wear an orange jumpsuit for eight to ten years didn't stop the Enron nightmare and other bad things from happening, accountabalism whispered two seductive lies to us: Systems go wrong because of individuals; and the right set of controls will enable us to prevent individuals from creating disasters. Accountabalism is a type of superstitious thinking that allows us to live in a state of denial about just how little control we individuals have over our environment.

Accountabalism manifests itself in a set of related beliefs and practices:

It looks at complex systems that have gone wrong for complex reasons and *decides the problem can be solved at the next level of detail*. Another set of work procedures is written, and yet more forms are printed up. But businesses are not mechanical, so we can't fine-tune them by making every process a well-regulated routine. Accountabalism turns these complex systems into merely complicated systems, sacrificing innovation and adaptability. How can a company be agile if every change or deviation requires a new set of forms?

Accountabalism *assumes perfection*—if anything goes wrong, it's a sign that the system is broken. That's not true even of mechanical systems: Entropy, friction, and manufacturing tolerances ensure that no machine works perfectly. Social systems are incapable of anything close to perfection, so if something goes wrong in one, that need not mean the system is broken. If an employee cheats on expenses by filling in taxi receipts for himself, the organization doesn't have to "fix" the expense-reporting system by requiring that everyone travel with a notary public.

Accountabalism *is blind to human nature*. For example, it assumes that if we know we're being watched, we won't do wrong—which seriously underestimates the twistiness of human minds and motivations. We are capable of astounding degrees of self-delusion regarding the likelihood of our being caught. Further, by overly formalizing processes, accountabalism refuses to acknowledge that people work and think differently. It eliminates the human variations that move institutions forward and provide a check on the monoculture that accounts for most disastrous decisions. It also makes work no fun.

Accountabalism *bureaucratizes and atomizes*

responsibility. While claiming to increase individual responsibility, it drives out human judgment. When a sign-off is required for every step in the work flow, those closest to a process lack the leeway to optimize or rectify it. Similarly, by assuming that an individual's laxness caused a given problem—if so-and-so hadn't been asleep at the switch or hadn't gotten greedy or hadn't assumed that somebody else would clean up the mess, none of this would have happened—accountabalism can miss systemic causes of failure, even, ironically, as it responds to the problem by increasing the system's reach.

Accountabalism tries to squeeze centuries of thought about how to entice people toward good behavior and dissuade them from bad into simple rules by which individuals can be measured and disciplined. It would react to a

car crash by putting stop signs at every corner. Bureaucratizing morality or mechanizing a complex organization gives us the sense that we can exert close control. But grown-ups prefer clarity and realism to happy superstition.

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