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### SUMMARY

Disruptive technologies create new economic growth by offering products and services that are cheaper, better, and more convenient than ever before. Understanding how these technologies work will allow policymakers to not only invigorate stagnant economies such as Japan's, Germany's, and India's, but also head off potential dangers in strong economies such as South Korea's.

## The Great Disruption

By Clayton Christensen, Thomas Craig, and Stuart Hart

### REVERSAL OF FORTUNE

The booming Japanese economy from the 1960s through the mid-1980s was one of the most thoroughly studied and admired phenomena of modern times. From steel to automobiles, consumer electronics to watches, Japanese companies easily overran the fortifications of their American and European competitors. Western scholars praised Tokyo's careful economic planning and the focus of Japan's keiretsu -- massive, interlocked networks of companies such as Mitsui, Mitsubishi, Matsushita, and Sumitomo -- on building long-term competitive advantages. Other analysts attributed Japan's economic momentum to its workers' selfless dedication to improving productivity and to the extraordinarily high savings rates of its consumers. Scholars cited the absence of similar factors in Europe and North America, meanwhile, to explain the stagnation afflicting those countries. In the United Kingdom, for example, the huge share of GNP taken up by government spending was seen as crippling economic growth because it crowded out private investment capital.

The fortunes of these economies, of course, have now reversed. America has experienced the longest unbroken economic expansion in its history, and the United Kingdom has achieved levels of prosperity that few could have imagined 30 years ago. Japan, in contrast, has been mired for a decade in stagnation that

[A review of Clayton Christensen's \*The Innovator's Dilemma\* from The Motley Fool's investment Web site](#)  
[Fool.com](#) »

From the Model T to the Internet: a brief history of disruptive technologies from BusinessWeek on-line. "▶

"Innovate or disintegrate" is the message from Integral, Inc., an international consulting firm specializing in strategies for disruptive markets. "▶

appears to have no end. What happened? The answer lies primarily at the managerial and microeconomic levels and in particular with a phenomenon best termed "disruptive technology."

Disruptive technologies create major new growth in the industries they penetrate -- even when they cause traditionally entrenched firms to fail -- by allowing less-skilled and less-able people to do things previously done only by expensive specialists in centralized, inconvenient locations. In effect, they offer consumers products and services that are cheaper, better, and more convenient than ever before. Disruption, a core microeconomic driver of macroeconomic growth, has played a fundamental role as the American economy has become more efficient and productive. Once the microeconomic roots of disruptive technology are understood, policymakers can learn how to transform relatively stagnant economies such as Japan's, Germany's, and India's. Understanding disruptive technology can also help forecast the dangers lurking for strong economies such as South Korea's.

#### TOO MUCH OF A GOOD THING

Japan's macroeconomic puzzle has a microeconomic parallel. Why did so many companies that were once considered the best run in the world stumble so quickly? Many of these leading companies faltered not because they were ineptly managed but precisely because they were well managed. In fact, their leaders followed some of management's most sacred rules, such as staying close to their customers and focusing investments on the most profitable new products and services. But their innovations fell victim to disruptive technologies.

Every market features two types of "performance trajectory" -- the rate at which the performance of a product or service improves over time. One trajectory measures the ability of customers to utilize the product improvements introduced by manufacturers. For example, even though carmakers keep developing new and better car engines every year, most drivers cannot take advantage of this improved performance because of outside constraints such

as speed limits.

The second trajectory measures the actual pace of technological innovation. This pace of technological improvement almost always outstrips customers' abilities to utilize the improvements -- so that companies with products and services centered on what customers need now nevertheless almost always overshoot what those same customers will be able to use tomorrow. A good illustration is Microsoft's popular Excel spreadsheet software. Microsoft can innovate at a much faster pace than its customers' needs, so most users are not even aware of 90 percent of this program's features. Well-managed producers overshoot the improvement rate that customers in any given tier of the market can absorb because they can improve their profit margins by selling more-sophisticated products to the most demanding customers. Companies that do not overshoot but instead keep their technology aimed at lower tiers of the market often find that competition drives profit margins sharply down. Hence good managers try to keep their profit margins healthy by moving their product lines out of the sluggish tiers of the market into those tiers where profitability is greater.

Much of humanity's progress over the last three centuries came from tools for creating disruptive technologies. The Internet is just the latest, according to columnist Howard Rheingold. "►

The tendency of good managers to overshoot, however, can allow disruptive technologies -- cheaper, simpler, and more convenient products or services -- to enter the tiers of the market where customers are already overserved by the existing (but more expensive) offerings. The leading companies in such industries are so focused on sustaining innovations and addressing the more sophisticated and profitable customers that they ignore the disruptive innovations piercing into the market from the low end. In this way, disruptive technologies have plunged many of history's best companies into crisis and, ultimately, failure.

An irregular and irreverent free newsletter on economics, entrepreneurship, and management from veteran Wall Street Journal reporter and columnist Tom Petzinger. "►

There are four reasons why good managers become paralyzed when faced with disruptions. First, leading companies listen to their customers. Because disruptive technologies perform significantly worse than mainstream products in the beginning, the

leading companies' most attractive customers typically will not use them. The more carefully companies listen to their best customers, therefore, the less they will recognize that the disruption is important. Second, such companies carefully measure the size of markets and their growth rates to understand their customers better. But disruptive technologies foster new products and services with a market impact that cannot be easily predicted. Third, good managers focus on investing where returns are the highest. Disruptive innovations, however, usually translate into cheaper products with lower profit margins. (It never made sense for IBM to market software in the 1970s -- because the profits from making hardware were so much greater.) Finally, leading companies almost always pursue large markets. As companies become successful and grow, their managers are compelled to rake in more revenue each year to maintain their growth rates and boost stock prices. But the emerging markets for disruptive innovations are much smaller at first than mainstream markets and cannot provide the huge volumes of new business that keep a large company growing.

These four factors explain why most minicomputer companies could not position themselves well in the personal computer market when the PC emerged. At first, no customers of the large computer companies could use the new devices. They were like toys; indeed, firms like Apple often marketed them for children. Although pcs were developed as early as 1977, the ultimate size of the market and the computers' great potential for word processing and spreadsheet analysis did not become clear until about 1984. The evolution of this market -- ultimately one of the world's largest bonanzas -- defied the skills of the world's best corporate planners and market forecasters. Moreover, the gross profit margins in minicomputers for a firm such as Digital -- the mid-range computer producer of the 1970s -- averaged about 45 percent, and those margins were always under pressure from competition. The choice was between making higher-performance minicomputers, which promised margins of 60 percent and could be sold for more than \$100,000 apiece, or personal computers,

which yielded margins between 20 percent and 40 percent and were priced at \$2,000 to \$3,000 apiece. Hence personal computing represented a much smaller market than minicomputers did during the formative early years. Developing the PC, a classic disruptive technology, simply made no sense for minicomputer makers.

Of course, minicomputers themselves had once been a disruptive technology. In the 1960s, employees had to take punch cards to the corporate mainframe computer center and wait in line for the computer specialists to run the job. System crashes occurred almost daily. At the outset, minicomputers were not nearly as capable as mainframes, so the professionals who operated the sophisticated computers -- and the companies that supplied them -- discounted their value. But minicomputers eventually enabled engineers to solve the problems that historically only the centralized computing facility could handle. Later on, pcs enabled the less-skilled masses to compute in the convenience of their offices and homes. Even though desktop computers could address at first only the simplest of computing problems, they subsequently evolved into cheap, reliable, and convenient machines, which today do tasks far more complex than those that mainframes and minicomputers used to solve.

Photocopiers provide another example. Xerox once dominated the market with its complex, expensive machines. Employees needing photocopies had to wait at the corporate copy center until the operator could get around to the job. But then Ricoh and Canon brought their slow but inexpensive tabletop photocopiers to the market in the early 1980s. Xerox at first ignored these poorly performing machines; they were not good enough to address the needs of the customers who wanted better, faster machines for their high-volume, centralized copy centers. Yet as with minicomputers, the tabletop copiers allowed a larger population of unskilled people to make copies in closets and nearby supply rooms. From those disruptive beginnings, photocopying has become so convenient that easy access to high-quality, feature-rich, and low-cost copying is now viewed as a constitutional right.

High-speed photocopying facilities still exist, but they thrive by disrupting conventional printing businesses -- enabling low-skilled operators to copy and bind printed matter on demand, which once required the time-consuming skill of professionals.

The examples abound. Alexander Graham Bell's telephone was initially rejected by Western Union, the leading telecommunications company of the 1800s, because it could carry a signal only three miles. The Bell telephone therefore took root as a local communications service that was simple enough to be used by everyday people. Little by little, the telephone's range improved until it supplanted Western Union and its telegraph operators altogether. Merrill Lynch brought equity ownership within the reach of middle-income Americans, and now firms such as E\*Trade and Charles Schwab let college students and middle-class investors manage their own portfolios. Likewise, George Eastman's camera enabled amateur photography. In each of these examples, customers ultimately found products and services that were far more reliable, more convenient, and less expensive than what would have been available had these revolutions not occurred. Although they were simple and inadequate at the outset, the disruptive innovations that overturned their industries left people much better off and created huge new waves of economic growth -- despite leaving the wrecks of the industry's prior leaders in their wake.

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Two views on the Japanese economy from the July/August 2000 issue of *Foreign Affairs*: [Japan's economy--once coddled by an overbearing government and riddled with corruption--is now undergoing a revolution, says M. Diana Helweg in "Japan: A Rising Sun?"](#) [»](#)

But in "Japan: A Setting Sun?" Aurelia George Mulgan argues that [Japan's reforms--and its economy--are permanently stalled.](#) [»](#)

## BIG IN JAPAN

Nearly all of the technologies that drove Japan's stunning economic growth through the 1960s and 1970s were disruptive relative to the dominant American and European manufacturers. For example, Japanese steel companies began exporting inexpensive steel targeted at the lowest-quality tiers of the American steel market in the early 1960s. As the Japanese captured these markets and drove the prices of their products down, Western steel makers simply exited those tiers of the market to focus instead where profit margins were higher. To improve their own margins, the Japanese steel makers then pursued the Americans into the higher tiers of the market. Today, Japanese companies such as Nippon Steel, Nippon Kokkan, and Kobe Steel are among the world's largest high-quality steel producers.

In similar fashion, Toyota attacked the lowest tiers of the North American automobile market in the 1960s with its Corona model. Over time, this strategy created new growth markets. The cars were so simple and ultimately so reliable that they became second cars in the garages of middle-income Americans. This track worked until Toyota encountered competition in this tier from other Japanese companies such as Datsun (Nissan), Honda, and Mazda. To maintain its profit margins, Toyota then introduced models targeted at more demanding consumers -- first the Corolla and the Tercel, then the Camry, the 4Runner, and the Lexus, and finally the Avalon line. Honda and Nissan have followed Toyota in this upmarket march. From the small manufacturers of the cheap Japanese imports of the

1960s, these firms have grown into huge global corporations that make some of the highest-quality automobiles in the world.

Another good example is the Sony transistor radio. In the 1950s, Sony's battery-powered pocket radio was one of the world's first applications for the transistor, which was then a disruptive technology relative to the vacuum tube. The sound produced by these cheap radios was tinny and static-laced, but Sony's customers -- teenagers who could listen to rock-and-roll out of the earshot of their parents for the first time -- did not care. Within a few years, Sony and its Japanese competitors had driven American radio producers (who relied on vacuum tubes for their larger, higher-quality products) from the market. Sony disrupted the television market in the same way, starting with a cheap, portable black-and-white model and ending up with its Trinitron. Japan later followed the same tactic in the video-recording and home-sound-system markets. Far from the days when the "Made in Japan" label was considered an epithet, Sony, Matsushita, and Sharp are today among the largest makers of high-quality consumer electronics products in the world.

Over and over again, Japanese companies succeeded with this approach. But disruptive technologies also set their own trap. These very firms are now stuck at the high end of their own markets, paralyzed by the four practices of good management cited above. Their best customers are now the most sophisticated and demanding ones, with needs that cannot be served with just another round of disruptive products. The firms' skills at careful planning are legendary, enabling them to compete better in established markets, but they now work against aggressively creating new markets. Their profit margins now can be hurt only if they attempt to move back down-market. And the most successful of these companies -- Toyota, Nippon Steel, Sony, Canon, and Matsushita -- have grown to join the ranks of the world's largest corporations. They can no longer meet their needs for growth with the kind of modest revenues offered by the first transistor radios, portable televisions, tabletop copiers, and compact cars.

Again, Sony is a good example. Between 1950 and 1979, it introduced nine significant disruptive technologies, including pocket radios, portable televisions, consumer video cameras, and the Walkman. Because of their affordability and simplicity, these products allowed ordinary people to do things that previously had been limited to experts or the wealthy. But since 1979, Sony has not created a single new growth market of this genre. The company has adopted a strategy that is very different from the one that led to the dynamic growth of its first 30 years. Even though it now offers technologically innovative products such as its Playstation and the Vaio line of notebook computers, they are sustaining innovations, not market-creating disruptive ones.

Until the late 1970s, Sony's product-launch decisions were strongly guided by its chief executive officer, Akio Morita, who followed his intuition rather than conducting careful market research to unearth the potential for new products. But as the company became huge and successful in the 1980s, it had to hone its good management practices in market research, planning, budgeting, and resource allocation. These careful, rational processes, which are crucial to an established company's efficient operation, prevented one of history's most successful "serial disrupters" from succeeding at new market creation.

That said, Sony is exceptional in that it created new market after new market for 30 years before it succumbed to rational management. Most other companies, such as Toyota, Honda, and Canon, created markets only once. Once they secured their initial beachhead, they became fully engaged in exploiting the opportunity they had created and moved aggressively upmarket.

#### RISE AND FALL OF THE GREAT COMPANIES

There is nothing uniquely "Japanese" about this story. Throughout the world, capable executives balance the interaction of technological progress with customer needs in competitive markets. Most major growth markets are driven by a disruptive technology. The path to greater revenue is upmarket migration, and the ride up that trajectory

Technologies such as Bluetooth broadcasting, optical switching, code-morphing and proteomics are threatening the old

industrial order. Rejoice.  
From *The Economist*  
*Technology Quarterly*,  
December 7, 2000. "►

is exhilarating and rewarding. Just ask the managers and shareholders of Nucor, Intel, Dell, Cisco Systems, Wal-Mart, Charles Schwab, Intuit, and Qualcomm in the United States today. Or ask those who managed or owned the stock of Toyota, Honda, Sony, or Canon in the 1970s and 1980s. Things look great while the ride lasts. But once companies hit the top tier of the market and find that not enough volume exists to sustain growth, the end of the game means painful consolidation. Japanese share prices have been flat for a decade, reflecting not just persistent economic stagnation but a consensus that the economy will continue to languish.

See "Danger: Stealth  
Attack" by Toni Mack,  
*Forbes Magazine*,  
January 25, 1999  
(requires free  
registration with  
[Forbes.com](http://Forbes.com) to see  
story). "►

There is little difference in this pattern between American and Japanese companies. Firms in both nations face the innovator's dilemma as they approach the high end of their markets and become unable to pursue new disruptions at the bottom. The American economy has soared in recent years not because the paradigms of American management suddenly have become ascendant while Japan's have been discredited, but because the United States, unlike Japan, has been able to repeat the cycle of disruption.

When U.S. industry leaders become stuck at the top of their markets, employees leave, pick up venture capital on the way out, and start new disruptive companies of their own. In the disk drive industry, for example, the leaders of the 14-, 8-, 5.25-, and 3.5-inch product generations were different companies; every leader found itself paralyzed when faced with smaller, disruptive drives. Individual companies usually play the disruptive game only once, but Silicon Valley has continually dominated the global industry as its fluid labor and capital markets continue to draw resources away from the old leaders and create new disrupters.

Although the United States is experiencing record-low levels of unemployment today, this prosperity cannot be credited to corporate giants alone. The total number of employees in the firms in the s&p 500 has in fact declined since 1990. Rather, job growth has come in new firms, especially start-ups that specifically pursue disruptive strategies. Cisco, Intel, Dell, Microsoft, Intuit, EMC, Wal-Mart,

An on-line interview  
with Clayton  
[Christensen](http://christensen.org) on the right

and wrong ways to use the Internet and how the basic building blocks of a company never change. E-volve newsletter, Fall 2000.  
"▶

Home Depot, and Charles Schwab are just some examples. Many Internet-based companies, mobile telecommunications companies, and pharmaceutical companies are also creating new waves of disruptive growth.

Japan's economy is shrinking again. The Economist, Feb. 28, 2001. "▶

In Japan, however, the story is different. Its leading companies played the disruptive game once but then exhausted their growth options at the high end of their markets. Japan's industrial structure has made it difficult to start the new companies that create disruptive growth. Immobility in Japanese labor markets -- the tendency of employees in big companies to remain with their original employer and work their way up its career ladder rather than switch companies -- stifles the development of a vibrant venture-capital infrastructure. Successful venture investments depend on luring outstanding talent from established companies to staff new ventures. And the lack of venture capital encourages talented engineers to remain with their initial employers.

Financing differences also help explain the contrast. Rather than cultivating flexible private and public equity markets, Japanese companies rely more heavily than their Western counterparts on debt from affiliated banks. Debt requires predictability and careful development and execution of business plans, whereas successful disruptive entrepreneurs must create new markets that value the new and different attributes of their technology. This means that the latter's initial business plans, particularly their initial concepts of the product and their customers' reaction, are likely to be wrong. Hence venture equity is better at tolerating the experimental, improvisational way in which disruptive firms grope their way through the fog of new markets. Bank lenders -- whether Japanese, American, or European -- lack this flexibility.

Japan's Ministry of International Trade and Industry (MITI) became famous for its ability to coordinate multiple companies' investments toward targeted industries and economic growth objectives. But today, the agency focuses on sustaining technologies, inadvertently diverting resources away from any new disruptive waves. Indeed, the

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former Japanese Ministry of International Trade and Industry. As a result of governmental restructuring on January 6th, 2001, this institution has changed to the Ministry of Economy, Trade, and Industry. "►

industries that MITI has fostered over the past 15 years, including fifth-generation computers and high-definition televisions, are the kind of high-end sustaining technologies that are amenable to planning and coordination. In contrast, by fostering "creative destruction," disruptive innovation automatically supplants established firms with disruptive ones. Creative destruction often eludes central planning, especially in democracies where policies can be influenced by financial support (in its various forms) from established companies.

To their credit, Japanese policymakers have been trying to reform the country's financial system and industrial structure. Some of these reforms -- for example, the cross-keiretsu merger of Fuji Bank, Dai-ichi Kangyo Bank, and the Industrial Bank of Japan, or the acquisition of Nissan by Renault -- may help financial stability. But these moves are also likely to weaken these institutions' abilities to foster new disruptive businesses. A recent law that gave communities the right to ban large-scale (read: disruptive) retail enterprises similarly constitutes reform in the wrong direction. Although these steps might promise stability, Japan badly needs innovations that facilitate disruption and the economic growth it will bring. On the brighter side, the government has announced an ambitious goal to match its number of initial public offerings with those of the United States. (There is a long way to go: in 1999, Japan launched 62 IPOs, in contrast to 287 in the United States that year.) The government has also said it aims to help start 100,000 new companies within five years. To support this, the Small Business Corporation has helped channel government research and development funds to small businesses on a preferential basis. But if history is any guide, government attempts to guide the flow of R&D capital among businesses will require a rational assessment of plans and projected returns -- an approach that will only sustain improvements in existing markets, not work toward the disruptive creation of hard-to-predict new ones.

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Private-sector initiatives targeted at creating a more supportive infrastructure for entrepreneurial capitalism are a better answer. Japan has started to accept this fact, even though American investment firms in partnership with Japanese counterparts are mostly leading this charge. For example, GE Capital Corporation and Daiwa Securities Group have launched a \$20 billion fund that will invest in unlisted companies. Goldman Sachs Group and Kyocera Corporation have launched a \$30 billion fund targeted at high-technology firms. The Japanese venture capital firm Softbank, meanwhile, has been a successful, aggressive investor in disruptive enterprises around the world, recently announcing a \$150 billion fund for investment in Internet businesses. But despite all these developments, the Asia Private Equity Review reports that the money available for private equity investment in Japan grew from \$17.8 billion in 1995 to only \$25 billion in 1999 -- a fraction of what was added to America's private equity coffers during this period.

## CREATIVE DISRUPTION

Understanding the roots of economic growth is admittedly a complex challenge. What is clearer, however, is how economic growth is tied to the infrastructure that supports disruptive technologies and the creation of new growth markets. The past decade of the U.S. boom supports this proposition. The American economy has combined robust, sustained growth with low levels of unemployment. Even though the major companies have been steadily cutting jobs, small companies -- many of them disruptive in character -- have quickly picked up the slack. The United Kingdom's economic transformation

has similar roots. Although its leading corporations are consolidating and shedding employees, a rash of high-tech companies funded with private equity are driving the country to unprecedented levels of prosperity unimaginable 30 years ago.

The South Korean and Taiwanese economies provide another contrast. South Korea's industrial structure is similar to Japan's. Rather than having its entrepreneurs create new growth markets, the Koreans have attacked large, established markets (such as ship-building, steel, automobiles, consumer electronics, and computer memory chips) by exploiting their relatively cheap labor costs to muscle their way in. The huge chaebol such as Hyundai, Samsung, and Daewoo have ingeniously mobilized their resources to attack sophisticated global competitors. Given that these firms still have not hit the high end of their markets, their labor cost advantages will continue to help the chaebol stay strong, efficient competitors. But South Korea will ultimately face the same challenge as did Japan when its huge corporations find there is not enough volume to sustain adequate growth. Taiwan's economy, in contrast, exudes Schumpeterian capitalism. Few of its companies can muster an all-out attack on global industrial concerns as the Koreans have done. But thousands of new companies financed with private equity start there each year, many with strategies targeting disruptive markets. Not surprisingly, Taiwan sailed through the recent Asian economic crisis with barely a scrape.

#### THE GREAT LEAP DOWNWARD

Looking ahead, the disruption process could hold the key to economic development in poor countries. Globalization's real market opportunity lies with the billions of poor who are joining the market economy for the first time. Consider the approach that General Motors has taken to China's automobile market. It recently opened a plant there to manufacture Buicks for the small but price-insensitive premium tier of the market. Over time, GM might convince enough wealthy Chinese to buy Buicks instead of BMWs so that the investment will generate acceptable returns. It has also been investing hundreds of millions of dollars to develop an electric vehicle that is

large, powerful, and safe enough to be used in the U.S. market. Until now, the few electric cars that have been sold in America cost so much and perform so poorly that they offer little prospect of volume or profit. But imagine if GM targeted its electric vehicle technology to create new markets for middle-income Chinese, Indonesians, and Thais -- i.e., those who could afford cars that were priced around \$3,000. The crowded, polluted streets of Shanghai, Jakarta, and Bangkok could constitute a much more hospitable market for electric vehicles than do the expansive freeways of California. If GM figured out how to make and market profitably a \$3,000 car for the masses, it would form a powerful platform to launch an upmarket attack on more developed markets around the globe.

The Solar Electric Light Fund (SELF), a nonprofit organization with projects in countries from Brazil to South Africa to China, is another good example. Two billion people on the planet have no access to electricity, instead using for fuel such dangerous, polluting substances as kerosene, candles, wood, and dung. Since most of these poor live in rural regions of the developing world, it is unlikely that electrical service grids will be extended to them any time soon. And given the growing crisis of greenhouse gas emissions, an extension of fossil fuel-based power would further devastate the environment. To achieve a sustainable form of rural electrification, therefore, self created a fundamentally different model premised on small-scale, on-site solar power generation. Self brokers the purchase, installation, and operation of household-scale solar photovoltaic units among the rural poor; these units, in turn, draw on the radiant energy of sunlight to produce voltage. Through a revolving loan fund, rural villagers get the money to own and operate their own electrical systems.

In rich countries, researchers and marketers are struggling to bring down the cost of photovoltaically generated power to make it competitive with conventional sources and capable of satisfying the power-hungry appliances that fill homes and offices. But photovoltaic power faces none of these obstacles among the rural poor in developing countries. It is by far the cheapest source of electricity, and the consumption of electricity in poor, largely

[Solar Electric Light Fund  
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appliance-free homes is much more modest. As in the other examples mentioned above, the crucial breakthrough for this disruptive technology will not occur in the laboratory. Rather, it will seek a market where the disruptive approach does not compete with established technologies and instead establishes a foothold for robust future growth.

The future of other potentially disruptive technologies such as fuel cells and microturbines will also be forged at the bottom of the pyramid. Rather than trying to prematurely force their technology into developed-world applications, companies such as Ballard, Capstone, and BP Amoco have begun to exploit the opportunity presented at the bottom. Early experience makes it clear that a different business model is required. But with billions of potential customers in the developing world and the subsequent potential to migrate toward mainstream applications in developed markets, the investment is worth it. Given the size of the potential market at the bottom of the pyramid, savvy multinationals are already beginning to exploit this emerging opportunity.

Hindustan Lever Limited (HLL), an Indian subsidiary of Unilever, provides an example of how this process works in practice. Like most large industrial concerns, it had long catered to the needs of upscale customers in India. But a local firm, Nirma, challenged HLL in its detergent business by creating a new business system that geared its product formulation, manufacturing process, distribution, packaging, and pricing to the needs of poor customers. Initially, HLL dismissed Nirma as a low-end producer. As Nirma grew rapidly, however, HLL realized both its new opportunity as well as its vulnerability. Nirma was attacking HLL'S detergent business from the bottom of the pyramid.

HLL responded, somewhat belatedly, with its own offering for this market -- drastically altering its traditional business model in the process. It created a new product that cut the ratio of oil to water in the detergent, thereby reducing the pollution associated with washing clothes in rivers and other public water systems. It decentralized the

production, marketing, and distribution of the product to take advantage of the abundant labor pool in rural India and quickly penetrate the thousands of small stores where the poor shop. By reinventing the cost structure of the business, it was able to slash prices. Although gross margins were lower, unit sales were very high, making this business one of the most important growth and cash generators for the company. Even Unilever has benefited from HLL'S experience in India. It transported the same business principles (although not the product or the brand) to create a new detergent market in Brazil. Even more important, Unilever has now focused on the bottom of the pyramid as a strategic priority at the corporate level.

Exactly what kinds of disruptive technologies might emerge within countries such as India and China cannot be easily extrapolated from the market needs and success stories of developed economies. The trends, in fact, might flow in the other direction: technologies emerging from these countries may have profound but unpredictable implications for the rich world's markets. Moreover, the concept of disruptive technology remains a relative one. Something that is disruptive in one company can have a sustaining impact on another, and the kinds of disruptive technologies that might emerge in India and fuel its economic growth may not necessarily replicate the success stories of developed economies. But whatever they are and wherever they emerge, disruptive technologies are still more likely to come from start-up companies than from global conglomerates. Once the right reforms help create small companies with strategies aimed at a broader consumer base, more people will benefit more rapidly.

Who can facilitate this potential for disruptive capitalism in developing countries? Corporations such as Unilever have the resources, but history suggests that few firms will. Doing so would require pursuing opportunities that, at first blush, make no sense to their business models. But the economies of many of these countries have far greater resources than do the largest corporations. India, for example, has more well-educated engineers and managers than any country in the world. What they lack is local, small-scale venture

capital and a transparent, consistent regulatory infrastructure. If they can help create such conditions, these countries indeed face an exciting, disruptive future.¶

*Clayton Christensen is Professor of Business Administration at Harvard Business School and author of *The Innovator's Dilemma*. Thomas Craig is Director of the Monitor Group. Stuart Hart is Professor of Management at the Kenan-Flagler Business School of the University of North Carolina.*

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