

Special Report

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# NEW CHALLENGES FOR 'MADE IN CHINA'





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## **New Challenges for ‘Made in China’**

Manufacturers in China — whether foreign or domestically owned — face a series of key challenges in the years immediately ahead. Major tests involving product quality and safety, energy costs and environmental viability all come against the backdrop of a difficult world economy. Yet, while world demand for Chinese products has dipped in the short term, the long-term need to hold down costs while meeting shifting customer requirements has never been greater. In this special report, experts from Wharton and The Boston Consulting Group look at how this growing list of challenges will change the way manufacturers must think about their operations in China.

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Regional specializations have always existed in China. Tailors from the city of Cixi, for instance, controlled clothing manufacturing in Beijing for some 250 years. Now China has taken the idea to a new level by creating huge manufacturing clusters that specialize in a single industry or product. Thousands of manufacturers in Datang in Sichuan province, for instance, crank out more than six billion pairs of socks annually. But with a shifting world economy, expect manufacturing clusters in some sectors — such as simpler textiles and toys — to fade in importance, even as others, such as biotechnology, grow.

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China has a wealth of advantages as a business innovator, including an adaptable population with an affinity for improvisation and reverse engineering, and a low-cost operating environment. Companies from developed economies soon will either profit from or compete against this developing culture of innovation as China moves beyond labor-intensive, low-value-added consumer goods. But China is not an easy place for outsiders to be innovators, and companies from developed economies looking for R&D partners there must proceed carefully.

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After being stung by consumer backlash and stiffer penalties for piracy, counterfeiting and contamination, China is working hard to overcome its reputation for poor quality. Many experts see quality issues as the simple growing pains of an accelerating economy. After all, China already makes high-quality products such as iPods. The challenge today for foreign partners: How to set and enforce effective quality benchmarks.

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China is slowly moving away from energy subsidy policies that hold down prices — especially for industry. Those subsidies protected exporters from devastation when energy prices shot up to record-setting levels in 2008 and helped to keep social unrest somewhat under wraps. No one knows for sure how far China will go in reducing energy subsidies for business in the future, but China could use subsidy policies as a tool in pushing particular industries away from low-value exports that generate a lot of waste to higher-value goods that produce less waste.

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The skies over Hong Kong today are permanently gray, covered with smog from southern China’s factories — the same factories that have made China one of the world’s most important manufacturing hubs in just two decades. Now the government is shifting emphasis from economic growth at all costs to growth without a high environmental cost. Who will gain as China cleans itself up? Who will lose? And what opportunities will this historic shift in national priorities create?



## Rising Giants: Industrial Clusters Are Changing the Face of Chinese Manufacturing

Over the past 30 years, most economists have come to believe that advanced economies are less likely to be driven by strong, lone companies than by complex ecosystems, or clusters, centered in a particular industrial sector. The evidence shows that outsized economic growth often requires an outsized pool of talent and specialized capital in a single geographical region. Intuitively, this makes sense — the public might like the idea of the heroic entrepreneur, but from Wall Street to Madison Avenue to Silicon Valley, the biggest success stories in American business are often less about an individual's or company's triumphs than the strength of interdependent, regional communities within an industry.

Teaching each other, helping each other, pushing each other — the evidence all suggests that companies tend to profit from proximity, though what is good for business in general may not always maximize the fortunes of a particular company.

In China, a recent study by the National Science Foundation, titled, “Analyses of Dynamic Factors of Cluster Innovation — A Case Study of Chengdu Furniture Industrial Cluster,” found that the presence of many firms in a single area helped encourage innovation, diffusion of new ideas, flexibility and specialization. In this article, part of special report on manufacturing challenges in China, experts at Wharton and The Boston Consulting Group (BCG) discuss factors driving the growth of clusters in China and the opportunities and risks clusters present.

This look at the manufacturing sector comes at a time when China's factories face deep retrenchment. Exports are plummeting amid the global economic downturn and domestic demand appears unable to take up all of the slack. Moreover, with failing factories driving millions of idled workers back to

the farms from the coastal industrial centers, the country's explosive growth rate of the last couple of years is unlikely to return anytime soon and, therefore, the upward pressure on China's labor rates has eased. So, at least for the moment, there is much less discussion about manufacturers shifting their operations to lower-wage countries like Vietnam. Still, the need to hold down costs and improve production quality has only increased given the current market conditions, and that makes questions about where to operate in China — and the value of clusters — as relevant as ever. At the same time, companies should be thinking about how to position their manufacturing facilities for an eventual recovery.

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The value of clusters is a fairly new idea to Western economists. Although some of the thinking behind them dates back to 1890, the term itself was popularized only in 1990 by Michael Porter in his book *The Competitive Advantage of Nations*. It's an idea that Chinese businesses and policymakers have embraced and capitalized on. One reason for the enthusiasm, perhaps, is that winning through cooperation is a core concept of Chinese culture, which has a tradition of highly valuing mutual social obligations. In fact, the original concept can be traced to the early days of Chinese history: More

than 3,000 years ago Confucius advised, “Wishing to be established oneself, he assists others to be established.”

## The Tailors of Cixi

Regional specializations have always existed in China as they have everywhere. Tailors from the city of Cixi, for instance, have been renowned for their skills for hundreds of years and controlled clothing manufacturing in Beijing from the 1680s to the 1930s. Advanced industrial clusters are a fairly recent phenomenon, however. One factor that held back their development was the Maoist tradition of encouraging local self-sufficiency — an idea that brought industrial production almost down to the village level.

Beginning in 1958 and continuing on into the 1960s, Mao’s Great Leap Forward campaign amounted to a great leap backward. The small-scale, low-technology industry he advocated as the way to develop the country actually reduced industrial production by 30%. One result: Many Chinese industries, such as cement-making, are fragmented, and operate with sub-scale and out of date methods — a good counter-example to why Chinese authorities in many regions now see clusters as the new way to make an economic leap. “These guys are pretty savvy, and they’ve made some guesses about where they might have some advantage,” says Benjamin Pinney, a principal in BCG’s Shanghai office.

In some areas, such as the Zhejiang sub-province of Ningbo, where the old tailoring center of Cixi is located, policymakers looked to their roots to find that special advantage. Ningbo decided, literally, to stick to its knitting. It began by converting factories that had made military uniforms into factories for more fashionable garments, at the same time allowing smaller entrepreneurs to form more specialized companies. Today, the sub-province has more than 2,000 apparel companies, which together produce about 5% of the nation’s textile output.

Other examples, unconnected to some past industrial glory, include the many factories in the city of Dongguan on the Pearl River delta, which manufacture nearly a third of the world’s magnetic recording heads so integral to computer hard drives, and some 16% of all computer keyboards. Additional notable centers include the Nanhai district’s Dali township, which produces some 40% of the nation’s aluminum products; Zhejiang province’s Zhili township, which specializes in

children’s clothing; and Datang in Sichuan province, with thousands of manufacturers turning out some six billion pairs of socks each year. All told, more than 1,000 clusters are devoted to exports.

The Zhuhai Yacht Industrial Zone on the south coast, meanwhile, hosts some 20 boat makers and rose up in part with the help of government incentives available to many manufacturing clusters. Such incentives have often proved especially important for the development of new high-tech industries like biotechnology, where the government has played a more direct role in providing advantages to business. “China is very good at developing the infrastructure that really enables a city to attract a cluster,” says David Lee, a partner and managing director of BCG’s Beijing office. “Clearly, they’re good at building roads, ports and bridges, but they’re also good at building institutes and training facilities.”

The growth of biotechnology clusters in Beijing, Shanghai and Shenzhen/Guangdong, for example, results from several government policies going back to the 1970s. The first major policy change allowed more than 200,000 students to earn post-graduate science degrees abroad. Then in 1986, the government made plans to train hundreds of thousands of postgraduates in biotechnology. Next, they encouraged biotechnology professionals who had been working abroad to return home. Many did, and founded companies, drawing on the managerial and scientific expertise gained in their careers in the U.S. and elsewhere.

In biotechnology and in other clusters, company formation tends to proceed a little differently than in most Western market economies. Essentially, the Chinese authorities argue that entrepreneurship is less a function of spotting a profitable opportunity than it is an ability to form alliances with those who hold key assets.

The entrepreneur’s social connections with government officials, for example, are often far more important than in the West. At the same time, working these connections is not simply a matter of gaining approvals by passing some envelopes under the table. Unlike arrangements in other emerging markets, analysts say that local governments in China today often add real value to local clusters by championing industry more generally rather than picking winners and losers among individual companies, as in the past. In Ningbo, for instance, the government began as a shareholder in some local firms, but now more often organizes trade and fashion shows, or coordinates local development.

When this broader approach at coordination with industry works, as it seems to have in textiles and biotechnology, it adds effective state support to the initiative and energy of entrepreneurs. Some observers even argue that one key reason China is so much further ahead economically than Russia is that Chinese local officials tend to view business more as a source of long-term growth than a short-term revenue opportunity.

On the corporate side, companies like the service they receive in the industrial parks where clusters tend to locate. “A lot of these clusters are anchored around enormous industrial parks, and these industrial parks are typically government entities,” Pinney says. For a foreign company, opening a factory in one of these parks can offer advantages, he notes. Such parks generally have an office to coordinate contact with other agencies, such as local environmental inspectors and tax authorities — key contacts for companies in a country where individual connections count for a lot.

These kinds of strong relationships are important in a semi-directed economy. Get on officials’ good sides and taxes can be cut and permits signed quickly. “For other companies maybe it will take three months to get one approval. For us, maybe three days,” one well-connected CFO told *CFO Asia* magazine. On the other hand, get on the government’s bad side and suddenly, approvals may take a whole lot longer, and getting a clear answer about how local authorities are interpreting a new regulation may be more difficult.

Yet buying into the cluster mentality, even with connections to the right officials, isn’t a foolproof strategy. Much of the overbuilding in China today, for example, reportedly results from town fathers championing pet projects driven more by self-aggrandizement than prospects for financial return. That kind of official involvement can also lead to the championing of outmoded industries. Automotive clusters are now favored because officials imagine that will help to develop other sectors, including steel and chemicals, according to John Zhang, a professor of marketing at Wharton. But Zhang argues that the accompanying fuel subsidies that may be good for boosting demand in Shanghai, Chongqing and other automobile centers now may damage the economy in the long run because they siphon money away from other clusters and stunt development of more energy-efficient technologies.

## A Slow Push West

The vast majority of China’s industrial clusters are located near China’s east coast, where infrastructure is much stronger. A 2006 survey of 138 foreign and domestic logistics companies by real estate firm Jones Lang LaSalle, for example, found that 85% of their warehouses were located in just three different regions: the Yangtze River Delta, the Pearl River Delta and Greater Bohai Bay. The only eastern city where logistics companies maintained any presence was in Chengdu, where they have located 5% of their warehouses and other assets.

But a number of multinational companies, including Intel Corp. and Ford Motor Co. have set up plants in less-advanced interior cities, lured by the prospect of cheaper land, labor and tax benefits.

The government launched its “Go West” policies nearly a decade ago, intended to encourage broader geographic distribution of development, but much of the outside investment seems instead to be focusing on pre-existing western clusters. In fact, most of the new investment has concentrated in the western provinces’ two largest cities, Chengdu (11 million) and Chongqing (at 31 million, China’s largest city), according to the China Supply Chain Council.

Intel, for instance, now operates two plants in Chengdu. For Intel, the move to Chengdu was hardly a sacrifice. Chengdu’s Hi-Tech Zone is home to 968 high tech companies, including 387 other Fortune 500 companies. Chengdu also produces more than 20,000 bachelor’s, master’s and PhD graduates every year, just in electronics. At the same time, the site location cost the company just a fifth of what it had paid in Shanghai, and the city gave the company a steep tax break for moving in, according to the Chengdu Business Guide. The company nevertheless doesn’t seem to see either cheaper land or cheaper taxes as the biggest draw in Chengdu. Instead, when it opened its first Chengdu plant in 2003, Intel cited Chengdu’s “strategic location, the quality of its educational system and the well-trained workforce in the region” as its reasons for selecting the city as its production base.

Apart from a few highly successful examples, however, the success of the western strategy has bogged down in the face too little transportation infrastructure and too much bureaucracy.

## Should You Join?

So if a delegation from a city's economic development office invites you to join a cluster — even if it is in the right city for your company — should you accept?

"It's a question I think about a lot," says Pinney. "There is no easy, right answer. It depends on who you are and the capabilities you want to tap into." Xian, for instance, one of the few successful clusters to take root in the western part of China, was once the home of the nation's largest aircraft factory, which used to produce knock-off versions of Soviet fighter aircraft. This gave the city a large population of trained machinists — a big draw for McDonnell Douglas, Boeing, Airbus and other foreign aerospace companies when they were looking for a home in China. That skilled workforce offered a clear-cut advantage for the aerospace and defense companies.

But in newer clusters, there's often no *there* there, as Gertrude Stein said of Oakland, California. "What may exist is an aspiration for a cluster," says Pinney. "A city might put out a brochure that says it is an excellent location for medical technology companies, semiconductor companies, and some other thing. But when company analysts examine the offer, they find that it's rather wishful thinking," a place in which they have hung out a banner and hope someone will come. And while less-established clusters may offer tax breaks and other incentives to attract companies, there is a potential downside: It's possible the cluster won't take root. "You don't necessarily want to be the last one to join or the first one to join," Lee says.

Yet, even established clusters can offer their own brand dilemma. On the one hand, mature clusters can offer more access to advanced expertise, and more potential supply and distribution partners. On the other hand, clusters can sometimes limit a company's ability to grow. They tend to be expensive operations bases, Wharton and BCG experts note. Labor costs, for example, tend to be higher where a lot of skilled labor is required. Then again, a highly skilled, specialized labor force often brings higher productivity, particularly in certain industries. "Silicon Valley is an extraordinarily expensive place to do business, but everyone goes there because you can get great people. The business logic says go there even though you're going to pay through the nose for people," Pinney says. If you're making pharmaceuticals and need

to pass an FDA inspection it's a lot easier to do that with a workforce that already knows something about the business than "a farmer coming in from the hinterland," he adds.

Another advantage to joining a cluster in China — at least for a company starting out — is that workers there tend to be more open to moving between companies than is typical elsewhere in the country. In the Nanjing and Yangtze delta area, says Pinney, "the talent moves back and forth between all the foreign and local chemical companies that make their home there." Locating in a cluster can also lead to new opportunities and innovation, particularly for specialized service companies. In Hangzhou, for instance, a fast-growing local company called Han's Laser has had tremendous success in encouraging button-makers to use a special laser machine to engrave tiny brand names on buttons, a simple addition that can raise the value of a button ten-fold. When a company such as Han's "offers extremely high value added, it can propagate very, very quickly," says Marshall Meyer, a professor of management at Wharton whose research focuses on China.

## The Next Big Thing

Certain kinds of clusters seem destined to reinvent themselves in surprising ways, as they have in Ningbo for the last 400 years. At the same time, others may fade. In general, as we will see in the next parts of this report, the national government is trying to push the country's manufacturers into higher-value goods. As the cost of labor rises and the country cedes some of its supremacy as a source of low-cost labor to Vietnam and other lower-cost markets, new sources of comparative advantage will need to be developed.

For clusters, this seems to mean that some sectors, such as toys and simpler textiles, are likely to fade in importance, even as others, such as biotechnology, grow. The locations are also likely to change: Victor Du, a principal in BCG's Shanghai office, says we should still expect to see some clusters develop in interior cities where the cost of living is still much cheaper. Some reports have noted just how much a little infrastructure investment in these areas could help: If China could reduce transportation costs by half in the region, it would enjoy a 5% jump in foreign investment in the cities located well into China's interior, notes one World Bank report. ✨



## China's Growing Talent for Innovation

As a business innovator, China has a wealth of advantages. These include a huge, adaptable population with an affinity for improvisation and reverse engineering; low-cost labor, operations and overhead; and mature industrial clusters ready to supply a variety of parts, components and subassemblies. These elements are creating a strong culture of innovation, one that companies from developed economies soon will either profit from, or compete against, as China moves beyond labor-intensive, low-value-added consumer goods.

Already, many large multinational corporations (MNCs) have set up R&D centers in China, and the government is encouraging the development of design capabilities among its workforce. But China is not an easy place for outsiders to be innovators. Companies from developed economies looking for R&D partners in China must learn to operate within an industrial structure quite different from their own, and take great care in selecting whom to work with and how, experts caution.

MNCs are likely to find that the best opportunities for harnessing Chinese-style innovation lie in two areas: discrete, targeted pieces of larger products and products for home-market consumption.

In this article, part of a special report on Chinese manufacturing, experts from The Boston Consulting Group (BCG) and Wharton look at how companies can profit from Chinese innovation, what drives this innovation, and what challenges they face in sourcing R&D in China.

### Global Recession's Role

Jim Andrew, a senior partner and managing director in BCG's Chicago office and head of its global innovation practice, says that in the current recession, companies need to ensure that they are getting full benefit from every dollar they spend — including their investments in innovation. Andrew sees growing innovation in low-cost countries such as China and India as one way for companies to increase the cost-effectiveness of their innovation spending. "The crisis in the developed markets has

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accelerated the move to developing markets because they are lower-cost and now have a track record," he says, noting that the changes afoot are redefining the innovation landscape. "We will look back on this time and say it was an inflection point with regard to the speed at which certain innovation activities were scaled up in China and India in particular. There is really a step-function change in the rate at which some of these activities are growing."

Innovation in China before its economy opened up was limited to design institutes that were part of

government departments, says David Michael, a senior partner and director of BCG's Beijing office. Some of institutes have since been repurposed for new commercial goals. Such is the case with the state-owned oil company PetroChina, which has a large network of design institutes within it, according to Michael.

MNCs now realize that China has tremendous development capabilities, including the ability to size up opportunities and rapidly bring products to shelves at low cost. The availability of well-educated talent is particularly attractive, Andrew says. "You can access that talent to do a lot more of the 'R' (research) that is increasingly relevant not just to China's domestic markets but to developed markets." For MNCs that set up R&D centers in China, "It is more about accessing talent rather than some unique source of innovation," Michael notes. That makes innovation in China substantially different from that in other global hubs such as the Silicon Valley. "There is low-cost engineering talent in China, but that's different from saying that there is a whole fountain of innovation we can tap into," he adds.

This raw engineering talent is a valuable resource for companies from developed economies. The best way for MNCs to tap into Chinese design skills is by sourcing select pieces of their product, Michael says. As is true for contract manufacturing, much of the advantage of Chinese R&D is in low-cost labor — but for brains, not brawn. "When Western or world-class business practices line up with low Chinese costs, new types of companies develop to take advantage of this opportunity," he notes.

In health sciences, for instance, some Chinese companies are already responding to Western research needs with low-cost services. Michael offers WuXi PharmaTech in Shanghai's Waigaoqiao Free Trade Zone as an example. WuXi, a leading provider of contract research work for the global pharmaceutical industry, has become adept at setting its engineers to work on Western pharma projects. "It's run by people who understand the needs of Western pharmaceutical companies and know how to leverage local engineering talent to do the work."

This kind of division of labor is common in such East-West partnerships. Western companies typically tap into Chinese design for parts or modules, Michael says. One global energy company gets "a lot of its design for oil exploration and drilling facilities in China at the local oil companies' design

institutes," he notes. Microsoft and other Western and Korean gaming and software development companies have a network of local software developers. Michael also points to Perfect World, a Chinese gaming software writer that "is booming in the 3-D world." It may not be a household name in the United States or Europe yet, but Perfect World is a leader in the country's online game market, according to Morgan Stanley Research.

## Development Attitude and Disruption

Such industry specialization is common. Corporate R&D in China tends to focus on specific industries and on product development rather than basic research, says Marshall Meyer, a Wharton management professor whose research focuses on China. "You see successes in China in machine tools and lasers, but it has been a combination of development and marketing more than basic research."

Chinese companies have been good at the "D" (development) part, Andrew says. "You could grow very large very quickly by playing in existing markets if you developed new products that were just a little better than everybody else's. But with increased competition everywhere, it takes products and services that are more innovative and targeted to needs that are not already being met." One recent example is a soybean blender that produces a popular soy milk drink. Joyoung Co. in Jinan, China's Shandong province, manufactures the blender, which has become "a big hit product." The blender has no fancy technology — just a plastic body with an electric motor, but its "fundamental concept is what local consumers want," he says.

More dramatically, according to Michael, Taiwanese computer manufacturer Asus used its development capabilities to "single-handedly invent the netbook segment of the PC market." Producing computers stripped down in functionality and priced at \$300 each, Asus "has completely disrupted the global PC market."

As existing markets become saturated, however, China must invest more in the "R" part of R&D to compete differently or to expand into fundamentally new markets, Andrew says. And while piracy has eroded profit opportunities in China's traditional gaming software industry, Michael points out that it has not similarly affected online games. "People are paying for the experience of playing games with each other, and that turns out to be profitable despite some piracy."

Longer-term, the capacity to innovate seems likely to grow. “The culture is very, very good at devising quick and often effective solutions to problems,” Meyer explains. “I see a lot of improvisation.” An increasing demand for a Chinese language card in computers, for example, prompted Lenovo years ago to create one for its products. Chinese white-goods manufacturer Haier found that potato farmers in China were using their washing machines to clean produce, so it designed a heavy-duty, special-purpose machine that can be used outdoors and will “wash your clothes or your potatoes,” Meyer notes. Electronic and electrical manufacturers often design products that work with “very heavy-duty power supplies because of the poor quality of electricity” in the country.

Nor are Chinese innovators focused entirely on their domestic market. According to David Jin, managing director and head of BCG’s Shanghai office, some Chinese companies have already tried to out-innovate large MNCs — and succeeded. In one highly publicized case in 2006, Chinese electrical products maker Chint won a lawsuit over its patent for a circuit breaker against the Chinese unit of the French company Schneider Electric. “Usually, it is the other way around,” Jin says, alluding to Western companies accusing those in developing countries of patent infringements. Many high-tech operations are succeeding abroad as well. China Medical Technologies, a supplier of in-vitro diagnosis and treatment systems, competes with MNCs and commands a market share of more than 90% in at least one product segment and 70% in another, according to a July 2008 report from Citigroup Global Markets.

## Choosing a Business Model

For companies in developed economies that want to harness Chinese innovation, Wharton and BCG experts say it’s important to select the right business model. These models range from plain-vanilla purchasing through a series of one-off orders, to joint technological collaborations through supplier development programs, to taking an equity position in Chinese suppliers, says David Lee, partner and managing director in BCG’s Beijing office and a supply chain and procurement specialist.

No one-size-fits-all formula exists for such partnerships, Lee adds. He has seen several MNCs invest in their suppliers, but “a lot of them don’t like the idea,” in part because of potential management disagreements. Some Chinese companies “are reluctant to change the way they have worked historically,” he says, adding that the handling of

human resources and material waste, in particular, could be points of friction. However, many of them have begun reining in waste of materials in manufacturing processes and increasing wage levels have got them to focus on lean manufacturing and productivity enhancement, he adds.

Many MNCs have rolled out supplier development programs, transferring pieces of technology and attempting to transfer their best practices to Chinese partners. But this, too, is unfamiliar territory for some. Companies from developed economies typically haven’t had to worry much about quality control in their home markets “because suppliers themselves take the initiative to invest in quality-control processes,” Lee says.

Markets are so competitive and dynamic in China that innovation is likely to continue relentlessly. Companies are being pressured for ever more gains in productivity. And where Chinese manufacturing wages were relatively flat for many decades — allowing wage productivity to grow — labor markets have tightened and wages have started rising, Michael points out.

The challenge going forward will be to accelerate productivity growth ahead of any inflationary pressure on wages, he says. The available labor supply in the medium term will not be as large as it was in the past — although the global economic slowdown has idled millions of workers for the moment. But the release of large blocks of talent through the restructuring of state-owned enterprises is almost complete. At the same time, rising farm incomes — at least until very recently — had constrained the supply of migrant rural labor to the industrial centers, Michael explains. That gave labor more leverage. Ultimately, as labor increasingly absorbs more manufacturing resources in the long run, companies will have to push even further for innovative solutions with “a focus on driving more productivity increases in Chinese operations.” The global economic downturn will likely slow the pace of these trends — and even reverse some — in the short term. But over the mid-term and beyond, expect China to build upon its already substantial innovative capabilities in manufacturing and services.

## Innovation and Intellectual Property

Does porous intellectual property protection have a negative impact on innovation? Not necessarily, says Harold Sirkin, senior partner at BCG in Chicago and global leader of the firm’s operations practice. When you innovate, “you’re creating a brand,

and that's a different kind of intellectual property (IP) than a patent." IP protection is growing less important to innovation, even in the West, Sirkin notes. "The world has gotten so small that even if you invent the next iTunes, you can't rely on patent protection," he notes. "It's readily copied now, everywhere. A lot of the [market appeal with] iTunes and the iPod is about [their] installed base."

However, innovation and protection of IP have long been connected, and China has duly noted that linkage in its attempts to transform itself from a low value-added manufacturing center to recognized innovation leader, particularly as lower-cost countries compete for China's core business. Mike Chao, a Principal at BCG in Beijing, notes that, "The IP laws have always been there, but what's changed in the last 20 years is how they have been interpreted and enforced. There's a big difference between policy and enforcement." One notable example is the software industry, where Chao battled piracy with Microsoft China for over five years before joining BCG. After strong lobbying by Microsoft in partnership with the US government, China declared in 2003 that the government would only use legal software. That announcement was followed by two additional decrees requiring that PC manufacturers only preinstall genuine software and Chinese enterprises only use legal software. "While that's absolutely a step in the right direction, there's still work to do in terms of bringing up the levels of enforcement and awareness to comply with the policies," Chao says.

On another front, however, he notes the Chinese government's tendency to provide research grants to projects that have the same time frame as the tenure of bureaucrats, thus sacrificing long-term horizons for short-term gains. "Innovation requires a long-term approach, and companies need to know their hard work won't just be stolen right away." Therein lies the difference between betting the company on the "R" or the "D": "Research is never a sure thing, but development can consistently result in realizable output," Chao explains. "With the recently announced government stimulus programs, there is hope that more funding will go to the companies that can actually productize that research and bring it to market." Academic institutions that have traditionally received such grants have "not had a great track record in commercialization," Chao points out.

Evolving IP policies, however, will not necessarily be the savior to spurring a wave of innovation in China. "At the end of the day, the market will force you to innovate and differentiate, and if your company isn't doing that, someone else will." Chao points to the PC industry as an example. Prices of notebook computers dropped 13% on average in China last year, in large part due to pressure from netbooks, other low-cost offerings, and a general lack of differentiation. "Asus saw an opportunity to disrupt the industry with the netbook, and now PC companies are dropping prices and scrambling to catch up." Innovation is and has always been the key to competition. China's ability to do so effectively will undoubtedly determine its future in the global economy. ✨



## Raising the Bar: Can China Meet the Quality Challenge?

Stung by consumer backlash and stiffer penalties for piracy, counterfeiting and contamination, China is working hard to overcome its reputation for poor quality. Scandals involving contaminated food and drugs, and toys tainted by lead paint, have made quality a Chinese government priority.

Although the government is building stronger regulatory agencies and writing tougher standards, spotty enforcement means quality will need to be addressed both by Chinese suppliers and foreign buyers. The challenge for Chinese manufacturers is how to invest in quality control and processes without losing their advantage as a low-cost producer. For their foreign partners, the challenge seems simpler: How to set and enforce effective quality benchmarks.

In this article, part of a special report on Chinese manufacturing, experts from The Boston Consulting Group (BCG) and Wharton examine how quality standards are being introduced and how China's manufacturers and their foreign business partners might meet those goals.

### Misplaced Assumptions

China's quality challenge begins with misplaced assumptions and perceptions on both sides, attributable in part to the speed with which many companies from developed countries embraced offshoring. The result was an inescapable "trade-off between cost and quality" says David Lee, partner and managing director in BCG's Beijing office, and a supply chain and procurement specialist. He recalls executives at a Chinese ball bearing company offering three prices: top quality at high prices, "acceptable quality" at lower prices, and, at the lowest price, "something that will turn and not freeze by the time the customer gets it."

Foreign buyers often tend to make strategic mistakes that end up hurting quality. For instance, many assign procurement managers to lead contract negotiations with suppliers, says Benjamin Pinney, a principal in BCG's Shanghai office. "They have a procurement mentality and focus purely on price negotiation, and it's an arm's-length transaction," he says. Because their expectations are based on their experiences with home-country suppliers, they don't always follow up with their Chinese vendors to monitor processes and quality testing.

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*"Companies were in a rush, working with whichever suppliers were at hand or feeling their way in the dark, not knowing what they were getting into."*

*—Benjamin Pinney, Principal, BCG*

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This enthusiasm for cost-saving deals can impede buyers' ability to correctly gauge the risks or understand the context of operating in China. "Companies were in a rush, working with whichever suppliers were at hand or feeling their way in the dark, not knowing what they were getting into," Pinney says. With little to lose, Chinese suppliers would readily agree to meet quality standards. "In the great rush to China over the last 10 years, players on both sides of the fence were incompetent."

Many foreign companies didn't understand how much support a Chinese supplier often needs, and many expected to achieve quality benchmarks without investing in their suppliers. Few stepped back to ask what incentives their suppliers had to

adopt the desired production systems and practices. So it wasn't surprising that some Chinese suppliers took shortcuts that compromised quality. One recent controversy over quality defects in Chinese-made toys came about because of design flaws and the use of raw materials that weren't approved by the foreign buyer, Lee says. Such defects can be difficult to prevent, especially if only a few suppliers are performing badly. But it adds to a perception of China as a source of poor quality. "It is a small drop in the bucket, but it is still a drop," Lee notes.

Blame shouldn't automatically be ascribed to Chinese contract manufacturers, some experts caution. Marshall Meyer, a Wharton management professor whose research focuses on China, points to a 2008 paper by Paul Beamish of the University of Western Ontario and [Hari Bapuji](#) of the University of Manitoba, titled, "Toy Recalls and China: Emotion Vs. Evidence." The authors write that the "vast majority" of toy recalls in the United States from 1988 to 2007 "were due to flaws in product designs conducted in the corporate headquarters of toy companies, rather than to poor manufacturing by factories in Asian countries." The researchers note that "the recalls have increased over the years, due both to design and manufacturing flaws." Meyer says he is "not sure" whether he agrees with Beamish and Bapuji's assessment. "There is a fair amount of design work done in China, including original equipment design."

## The Role of Regulation

Meyer traces quality issues to another sort of decentralization: the traditional Chinese subcontracting system that has "multiple layers, with fourth- and fifth-tier subcontractors," making it difficult to control supply-chain networks. "Multiple tiers of subcontracting introduce lots of uncertainty into the system, and the costs in terms of quality can exceed those savings," he says.

Regulation can be effective if it is enforced nationally and locally, Meyer says. The overarching problem is that Beijing "cannot easily enforce regulations ... and the ability of the central government to impose regulations locally remains limited." Meyer attributes that to "centuries of [running a] decentralized economy." He notes, for instance, that China doesn't have national courts except for its Supreme Court. "Imagine trying to resolve an IP dispute with parties from different provinces."

Eager for redemption, China's regulators nevertheless are becoming more aggressive. In a recent statement, China's cabinet outlined plans to strengthen the food-monitoring system, for example. The effort includes representatives from government departments on health, agriculture, quality supervision, industry and commerce administration, and food and drug supervision, according to the Xinhua News Agency. That follows a global consumer backlash last year that forced the government to raise safety standards for toys. Regulators inspected the facilities of 3,000 toy-makers and revoked the export licenses of about 600, dramatically narrowing the playing field. Chinese toy companies worked with the government to strengthen their quality control, but the changes pushed up costs and forced many suppliers to close down. A total of 3,631 Chinese toy exporters — 53% of the industry — closed shop in the first seven months of 2008 because of a stronger yuan and increased production costs, Xinhua reports.

More generally, a groundswell of public concern over quality has catalyzed the government's reforms. Public sentiment inside the country — aided by technology — also is driving efforts to improve quality. "You have increasingly aware consumers in China," says David Michael, a senior partner and director of BCG's Beijing office. "For instance, the company which is at the center of the recent controversy around baby formula [Shijiazhuang Sanlu Group Co.] is being brutally attacked by bloggers within China on the Internet. It is being punished much more within China than it would have been five years ago, because of the Internet."

The scandal over baby formula tainted by the chemical melamine outraged many especially because it hurt a particularly vulnerable part of Chinese society. "It's not rich people in the big cities buying that baby powder, it's poor people in the rural areas being exploited by counterfeiters," Michael says. "Low-income people feel the most exploited," he adds, when quality is compromised in such a way. The government acknowledged the severity of quality issues. China's food industry still suffers from the use of dangerous illegal additives, Vice Health Minister Chen Xiaohong told Xinhua. He spoke of underground markets for additives that still exist in some regions, and "unspoken secrets" in the food industry.

## China's Risk Profile

Supply-chain quality issues raise China's risk profile, Boston-based think tank AMR Research noted in a survey of 130 global companies this year. China was the top contributing region for nine of 15 risks examined, including supplier and internal product quality failure, security breaches and intellectual property infringement. Other risk factors for China cited in the survey include volatile energy and commodity prices. Noha Tohamy, vice president of research at AMR, notes that this "creates a dilemma" for many global companies. As those companies continue to enjoy the advantages of cheaper material and labor costs, as well as the potential to reach vast consumer markets, they must continually reassess the pros and cons of operating in China," she says.

"There is a cost to low cost," says Harold Sirkin, senior partner at BCG in Chicago and global leader of the firm's operations practice. "The key is to bring suppliers up to your standards. Given the potential cost advantages of 10% to 30% that China sourcing can deliver, it's well worth it for companies to invest in their suppliers," he adds. A good start would be for buyers to educate their Chinese suppliers on the value of brands and how quality issues could hurt them.

Chinese companies, such as white-goods giant Haier and telecommunications equipment-maker Huawei, have shown "demonstrable success" in ensuring quality control, Pinney says. Companies that have years of experience in procuring from China are also "on top of this quality issue," says Michael.

Chinese suppliers, meanwhile, watch and learn from their foreign customers, Sirkin says. "In the 'old days' of globalization ... while the multinationals were outsourcing their production to the developing countries, something unexpected happened," he noted in a blog post after the release last year of a book he co-authored, *Globality: Competing with Everyone from Everywhere for Everything*. "Their suppliers and vendors, little companies in China and India and Brazil and elsewhere, watched carefully and learned well."

But not all Chinese companies have learned the right lessons, especially those behind the recent quality scandals, and a reorientation appears to be in order. Managing supplier relationships is one critical area. Setting up small, on-the-ground procurement teams with weak local relationships isn't as effective as adapting to local conditions, Pinney says.

Companies that succeed with China sourcing "invest in localizing their teams, processes and quality controls," he notes. "They become more flexible and adapt their operations to local conditions." As a result, local suppliers and manufacturers absorb the right systems and processes either as joint venture partners, by watching and learning, or by hiring select talent from foreign companies.

## Incentives and Penalties

Buyers from developed countries must get more realistic about what it takes to improve the quality of their Chinese imports, Pinney says. Western companies have a tendency to "copy-paste" in China the sourcing and manufacturing practices they're accustomed to in the United States or Europe, he says. But quality improvement carries a price tag, and companies sourcing from China must realize it. Embracing advanced management techniques, such as root-cause analysis, would also help, he adds.

With combined efforts from several quarters, quality is getting "dramatically better" and is being policed much more aggressively, Michael says. Stricter regulatory enforcement would help, but the most important regulations may not be in China. A direct correlation seems to exist between Chinese suppliers' adherence to quality specifications and the degree to which their industry is regulated in the West. For instance, pharmaceuticals and foods tend to be more advanced in quality control "largely because of the pressures and incentives at the client end," Pinney says. Similarly, Pinney sees significant quality improvements in the automobile and white-goods industries. Where the consequences of failure are less dire, quality levels are generally lower. "Quality improvements are the least far along as you move down the food chain into low-end electronics and toys," he notes. "The downside to quality mess-ups is relatively small in shoes and textiles."

Companies must make it abundantly clear to suppliers — verbally and contractually — that meeting quality expectations is as important as meeting cost and delivery targets. In other words, buyers must provide incentives to Chinese suppliers to do the right thing. Incentives may not be effective, however, without corresponding penalties. Foreign buyers need to understand what "skin in the game" their Chinese suppliers have in ensuring quality, Pinney says.

The general push toward higher-value products “over time will lead to a restructuring of industries and a shift away from high labor-low value products,” Pinney says, and Michael agrees that quality levels are on the rise in China.

Many experts seem confident that quality issues are just the growing pains of an accelerating economy. China “can make high-quality products” and often already does, Meyer says. “Look at an iPod made in China. It has the highest standards of quality. It says ‘Designed in California, Assembled in China’ on the back of the package.” \*





## Chinese Manufacturing in an Age of Resource Price Volatility

In China, as in the rest of the world, the costs of labor, energy and other commodities rose relentlessly in recent years. Although the global economic slowdown has relieved some cost pressures in the near term, costs will likely resume their upward climb over the long run — a trend with major implications for the country's manufacturing base. Will Chinese manufacturers lose out to even lower-cost markets, such as Vietnam? Or will rising prices for resources push manufacturers to find new and better sources of comparative advantage?

In this article, part of a special report on the challenges facing China's manufacturing sector, experts from Wharton and The Boston Consulting Group (BCG) discuss how the rising cost of resources over the long term will affect Chinese manufacturers, and how companies inside and outside of China can best profit from those changes.

China's rise to become a leader in global manufacturing began when the country started opening its markets to the West 30 years ago. The combination of a vast pool of relatively low-cost labor and government incentives set to encourage foreign investment proved irresistible to many Western companies. The advantages were so compelling that by early 2000 most MNCs either had set up their own operations in China or were using the country's contract manufacturers. Companies that didn't make the jump faced the daunting challenge of selling to buyers who had come to expect "the China price," which was typically far lower than what high-cost manufacturers in developed countries could charge — one-third to one half lower than what goods made in the U.S. cost, for instance.

### Short-term Advantage, Long-term Threat

This cost advantage was so significant that it more than offset increases in the cost of energy or commodity prices. Until the downturn in the world economy and plummeting oil prices, some observers had even argued that then-rising energy costs could make China more competitive in the short run, since government energy subsidies would make the country's factories immune to the increase. Commodity prices didn't matter much to Chinese competitiveness initially. "If the cost of everything else is the same for everybody else in the world, then lower labor costs go a long way toward building an advantage for your manufacturing sector," explains John Zhang, a professor of marketing at Wharton. But then a rise in transportation costs began to offset the domestic cost advantages — especially for goods that were traveling to distant markets such as the U.S.

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By early 2000 most MNCs either had set up their own operations in China or were using the country's contract manufacturers.

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Fearful of choking off the 8% to 11% in economic growth that was bringing prosperity to millions of Chinese every year, the government began to cap energy prices. Policymakers hoped that by holding prices below world-market levels, they could keep the economy moving forward and manage the public mood — always a key concern in a country of 1.3 billion. "It perpetuates inefficiency, but it also,

at least in the short term, minimizes social unrest,” says Marshall Meyer, a professor of management at Wharton whose research focuses on China. That’s important, notes Meyer, who believes that “mass disturbances are by far the greatest concern of the Chinese government.” That makes maintaining stability a crucial issue, which government officials believe, almost certainly correctly, requires ongoing levels of strong economic growth to paper over cracks in the political and social infrastructure.

The world’s largest country by population may have a middle class now of more than 100 million, but hundreds of millions still struggle. Even as the country has grown richer, industrialization is causing tremendous growing pains, and sometimes the cracks show. The number of major incidents of social unrest grew by 50% over the previous two years, to 87,000 incidents, according to a 2006 U.S. Congressional Research Service report. In recent years, some of these incidents have been more like battles than simple demonstrations — such as a clash between 1,500 villagers and 500 police over a request to the government to fire the village chief for corruption.

Like a bicycle, the Chinese economy needs momentum and balance, says Benjamin Pinney, a principal in BCG’s Shanghai office. “You really have to reach a certain speed and keep yourself steady.”

Against this backdrop, while Chinese companies may have faced rising delivery costs for exports, government subsidies protected them somewhat from the hike in energy costs. Many countries protested that this encouraged energy consumption and added cost pressures to the rest of the world, but only when the Olympics neared did the government risk unpopularity at home and let prices shoot upward. In June 2008, the government allowed a general increase that raised prices for gas and diesel fuels some 18%, while allowing a rise in electricity rates of just 5%.

In hindsight, with energy prices down, at least for the moment, the government’s bet seems to have paid off. The country did continue growing throughout the period of record-breaking prices, and social unrest stayed somewhat under wraps. But China experts say the struggle to keep energy prices low may have come at a high cost to Chinese manufacturing in the long run because the subsidies encourage more energy consumption today. “There is not a lot of incentive for companies to try to adopt new technologies and become more innovative,” Pinney says.

In the short run, this has been a good thing for manufacturers. Controlled energy prices provide a free hedge against an important set of costs. Typically subsidies apply only to state-owned companies, depending also on how important the company is to a particular local government. But such support may also lead to some wrong investment turns in development, both for individual companies and for the economy as a whole. Government policies that indirectly encourage energy demand — such as stoking the appetite for automobiles — reduce the amount of investment available to other sectors, explains Zhang. “In the long run, the government could be trapping you.”

It can also be difficult to wean an economy off such subsidies. If energy prices are eventually allowed to float freely, then companies that have no experience in hedging their own commodity purchases could face a painful shift if prices were to spike again. While the largest companies have the skill to develop hedging expertise, says Victor Du, a principal in BCG’s Shanghai office, smaller players may find such changes difficult to execute. “Those tens of hundreds of small players just do not have such a capability,” he explains. “This is a problem not only at this moment, but potentially for the future.”

Higher energy prices slow down growth in the short run but may make economies more competitive in the long run. More importantly for China, they can be an important policy tool in pushing particular industries away from low-value exports that generate a lot of waste to higher value goods that produce less waste. Higher energy prices are like a negative subsidy — a kind of tax that punishes companies that produce the wrong things in the wrong way. Faced with these negative incentives, companies such as China’s highly polluting small cement producers would find reasons to either leave the business or merge to become cleaner, more efficient companies.

## Go West, Young Company

More generally, rising costs, particularly for labor and environmental protection, have led some coastal manufacturers to develop new plants in cheaper markets. Already, Meyer estimates, 10% of Taiwanese-owned companies operating on the coast have moved either inland or abroad.

Vietnam is also gaining as China loses its wage advantage, and is often positioned in the press as a “new” China. But with just 84 million people and a limited supply base, BCG experts believe Vietnam

is best suited for smaller-scale operations in areas with a developed industry focus and infrastructure. “There is no way you can move all these products over,” says David Lee, a partner and managing director at BCG’s Beijing office. The garment industry in China employs 14 million people alone, he notes — double Vietnam’s total number of industrial workers.

Du contends that companies looking for a manufacturing base may have to pay the rising wages, simply because there’s no other market that can match China when it comes to combining a large labor market with strong infrastructure. Another issue is logistics. Direct labor costs might be lower in Vietnam, but those savings could be more than offset by the much higher cost of getting goods from the factory to the ship. Moreover, if local suppliers aren’t able to meet global quality standards, companies may have to import raw materials and components from China, which would further boost costs. While moving part of production to Vietnam or another country might help diversify some risks, Du doesn’t believe it’s desirable. In fact, he says, it’s often not even technically feasible — given how much more skilled labor is available within China, and the growing importance of the country as a market in its own right — to try to shift production out of the country entirely. “You may shift some manufacturing to India or Mexico or Eastern Europe, but you still must maintain at least a portion of the product in China,” he says.

Others argue that the next big home for manufacturing will still be in China — but in second-tier inland cities, although a push earlier in the decade to attract foreign manufacturers into the more western reaches of China met with limited success. Nevertheless, the list of interior province advantages would include easier access to coal and other domestic sources of energy, lower labor costs and possibly less rigid enforcement of environmental regulations. Lee argues, too, that it is much easier to adapt to a new province than an entirely new country.

Skilled labor should not be difficult to find, since many workers there have spent time in coastal factories. “Many workers have returned home to plant crops or raise pigs,” in response to rising government agricultural subsidies, Lee says. Many more remain on tap. Du notes that many workers now on the coast moved there from the interior. In Shanghai, for example, a number of workers are originally from interior provinces who moved east

for work, and who would also return home if the right opportunity came along — “as long as there’s a good incentive.”

## Look to Self and Suppliers

Before making a decision to close or move Chinese plants, experts say, manufacturers operating their own factories or working with contract factories should take a closer look at their own shop floors and those of their suppliers. Often, relatively simple changes can give a huge boost to efficiency, says David Michael, a BCG senior partner and director of its Beijing office. “If you’re going to improve, you’ve really got to get your suppliers to improve their efficiencies.”

Not all the improvements will be difficult to accomplish. Frequently, Michael says, the tweaks are “basic stuff,” operational snags long left uncorrected because low wages made it easy to solve many problems. Whatever the challenge, the most cost-effective solution in the past often was to simply place another body on the line, reducing the need to optimize other elements of the manufacturing process. Until recently, he says, the wage differential was high enough that “you didn’t have to work to really optimize your operations.”

This kind of optimization may be the single-best source of labor savings. A 2004 study by the Conference Board and China’s National Bureau of Statistics, for example, found that even as the country’s overall economy grew by double digits, China actually lost 15 million manufacturing jobs between 1995 and 2002 across 26 of China’s 38 major industries. Analysts assigned the job loss not to plants moving to countries with lower-cost labor, but to jobs engineered out of existence through greater efficiency.

And those formerly employed workers? It’s the oldest story in industrialization: Just as the U.S. shifted from a manufacturing to a service economy as productivity and efficiency grew, China is likely to follow the same path. As the manufacturing sector becomes more productive and more innovative, it will continue to need fewer people per unit of output, says Pinney. “Eventually, those people will be absorbed by the service sector, and life is going to get better for everybody.” ✨

## The Dragon Turns Green: China's Manufacturers Adapt to a New Era

Ten years ago, the skies over Hong Kong were often blue, according to Wharton management professor Marshall Meyer. "The water was questionable, but the air was clear." Today, the skies are permanently gray — covered with smog from southern China's factories — and residents say the only clear days are during the Chinese New Year week, when workers take a rare break for the holiday. "Hong Kong is utterly polluted," Meyer says.

Those busy factories have made China one of the world's most important manufacturing hubs in just two decades. This year, in fact, China is forecast to displace the U.S. as the world's number-one producer of carbon dioxide, one unhappy measure of that manufacturing strength.

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Ten years ago, the skies over Hong Kong were often blue. . . . Today, the skies are permanently gray.

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Now, some wonder if the country can take much more smog-driven success. Over half of China's shallow groundwater is contaminated, according to the Chinese Geological Survey and seven of the world's 10 most-polluted cities are in China, notes a 2005 World Health Organization study.

In the short run, the global downturn may keep the Chinese sky a bit bluer, but in the long-run, the old idea that the only metric that mattered was GDP growth seems likely to end. For one thing, it's getting expensive — some analysts estimate that costs associated with environmental degradation

shave 12% off total GDP every year. For another, many Chinese are becoming extremely concerned about the environment, which is putting pressure on the local and national governments to change: In 2005 alone, there were 51,000 demonstrations of more than 100 people protesting the contamination of land and water, according to the latest available government statistics.

For manufacturers, the government's gradual shift in emphasis from wanting growth at all costs to growth without a high environmental cost creates new challenges and opportunities. In this article, part of a special report on manufacturing in China, experts at Wharton and The Boston Consulting Group (BCG) weigh in on the government's response to the environmental crisis and what stiffer regulations will mean to the world's biggest shop floor. Who will gain as China cleans itself up? Who will lose? And what opportunities will this historic shift in national priorities create?

### A New Priority

Not long ago, environmental issues were a secondary concern at best for regional and national officials. With 1.3 billion mouths to feed, policymakers viewed environmentalism more as an aesthetic nicety than a question of national health.

Part of their attitude may also have resulted from the newness of the concept of environmental regulation to China. Elizabeth Economy, in her book on the Chinese environmental crisis, *The River Runs Black*, notes that historically, the Chinese never had a conception of nature as something to be preserved for its own sake. The Chinese traditionally have shaped the environment to suit themselves, driven in part by the needs of a huge population. Economy notes that historians have found evidence of the

strain of high population on the land as far back as the year 700. For hundreds, if not thousands of years, the people of China have tended to go in for huge infrastructure projects, such as immense canals, which often had terrible environmental consequences.

A series of high-profile environmental disasters in the past several years, however, has shifted public opinion dramatically, and the recent headlines regarding Lake Tai illustrate the kind of complex environmental challenge an ecological crisis can create in a densely populated country. Located on the Yangtze Delta in eastern China, Lake Tai's scenery is prized as a tourist destination — in fact, the islands and mists of the lake have inspired poems and paintings for nearly a thousand years. At the same time, the large but shallow lake (average depth is a little over six feet) is also a key source of water for a large chemical industry, home to a large fishing industry, and the primary source of drinking water for at least two million people.

After years of increasing pressure, the lake finally failed in April 2007 when it bloomed with blue-green algae that fed on pollutants in the water. For 10 days, the two million people who live near the lake, many of them chemical industry workers or rice farmers, had to stop drinking or cooking with tap water. "The pollution of Lake Tai has sounded the alarm for us," said Prime Minister Wen Jiabao shortly after the algae outbreak. To many in the government, crises such as the Lake Tai disaster have made it clear that for the sake of national security and social stability, the government can't continue to choose economic growth over the environment.

Yet there are conflicting signs on whether China is serious about the task ahead. In Lake Tai, for instance, 1,300 chemical factories were ordered shut down. At the same time, however, local officials sent a prominent environmental activist to prison, convicted of corruption charges that defenders say were actually retribution for his long-time campaign to stop the lake's decline. While an extreme case, what happened in the Lake Tai incident also demonstrated a key difficulty companies face with environmental regulation in China: The prime minister and the national regulators say one thing, but local officials charged with enforcing those regulations frequently do quite another, according to observers. As a result, enforcement can vary wildly by province. For example, more than 125,000 megawatts of coal-fired power plants have been built in the countryside, reportedly without obtaining official approvals.

Even when there is no strong conflict, the rules are sometimes vague enough for honest disagreements between the central government and the provinces, and between the provinces and their local companies. Rules can be opaque, warns David Michael, a senior vice president and director of BCG's Beijing office.

## Looking Ahead

Most experts seem convinced that in the end the central government will get its way, in part because the concerns of 1.3 billion people can't be ignored forever. "Obviously, over time the people will become more and more conscious of the fact that quality of living does include a clean and beautiful environment," says Pinney. As that shift occurs, manufacturers must watch closely. "You need to be quite active, quite involved in these things," says Michael. For example, companies may need to plan for longer turnaround times as the level of regulation grows. The pace of approvals is also likely to grow more uncertain, Michael adds. "The government's capacity to process these things is still developing."

Where the rules aren't clear, Michael suggests that it's better for companies to do too much instead of too little. "You certainly want to be compliant with all these regulations, but companies should worry about the environment for their own brand risk as well."

The concerns of companies with large, visible brands must extend beyond the environmental impact of their own production and include the impact of their suppliers and vendors. "The buyer has a lot of responsibility for developing suppliers so they are capable ... and making sure they comply with the rules," says David Lee, a partner and managing director in BCG's Beijing office. Major brands such as McDonald's and Adidas already have full quality compliance teams co-located among their vendors.

Foreign companies may need to be particularly careful if they lack the deep political connections of the local companies. One of the biggest concerns is "whether the rules are applied evenly or whether the foreign companies are given a particularly hard time," Michael adds. Pinney cautions that although there is a broad drive to make the government less corrupt and more transparent, local players often have more room to negotiate their way around pollution controls. "By contrast, multinationals have less wiggle room," he says.

Other BCG experts say that whatever home court advantage local players enjoy, it won't be enough to overcome the economic difficulty of being a low-margin company faced with the task of digesting a huge new cost. Many local players are already operating at such low margins that a major investment to clean up their processes could be extremely difficult. "This is beyond the reach of most Chinese players," says Victor Du, a principal in BCG's Shanghai office.

Others think that cleaner processes won't necessarily mean dramatically higher investments, since cleanliness can reduce waste and inefficiency. "It won't be cheaper; otherwise people would have done it long ago," says Lee, but with some level of savings offsetting the costs, the price for compliance may not be prohibitive. Western companies that already operate within global standards or that have been pushed by investors and regulators in their home markets to maintain those standards abroad will have an advantage, particularly when expensive new technology must be brought in to clean up a problem. Others suggest that China may have a good share of low-hanging fruit to be picked when it comes to energy conservation. One example of this could be energy-recovery processes, which recycle much of the excess heat generated by industrial plants. New technologies in this area are helping to recover wasted energy and convert it into electricity and industrial steam that can be turned back to help power the plants. These recovery processes can cut energy use — and costs — by up to two-thirds and provide payback in less than five years.

But new challenges will likely emerge. For some industries viewed as polluters, the government may be less amenable than in the past to expansion proposals. Companies in historically high-polluting industries — such as metal production or plating — may have a harder time getting approvals, says Lee, or be unable to buy a new parcel of land. Since the Chinese government is the underlying titleholder of all land, which it typically "sells" under long-term leases, sales are sometimes leveraged as a tool of government planners.

## How to Respond

Faced with growing regulatory scrutiny, companies have several strategic alternatives. To avoid environmental liabilities, for example, a company may join an industrial park to share the costs of pollution control with others, Du says. As a temporary measure, companies can move from a coastal province where enforcement is getting tougher,

and relocate to an inland province where regulatory enforcement is still relatively lax.

For some, the new scrutiny may actually create new business opportunities. Large, efficient cement producers, for example, may be favored right now as the government tries to shut down dirty, small-scale cement factories. "Every small city in China has its own cement factory, and its own brick factory and its own steel factory, all of which — because they are so small — are sub-scale and generate way too much pollution and use way too much energy," says Michael.

The government may come to larger producers and say, "If you can add X capacity, we will shut down at least that much capacity of smaller, inefficient producers," Michael predicts. These mom-and-pop factories might seem like an odd target for government ire, given that there are so many larger factories in China. In fact, they may represent one of today's biggest opportunities for greenhouse gas reduction in the world: China's cement sector accounts for 5% of the world's total carbon emissions, according to World Resources Institute estimates.

Similar fragmentation — and eventually perhaps, similar opportunities — exist across many industries. The irony, according to some historians, is that one of the justifications of the Great Leap Forward Campaign, which promoted the development of decentralized industry, was a desire to limit the pollution that had accompanied previous industrial revolutions.

Looking ahead, Pinney also sees a variety of new business opportunities arising as a result of more serious environmental regulation. "Because of the energy subsidies and higher tolerance for pollution, companies haven't had much incentive to adopt new technologies and become more innovative in that regard." That should change in the medium and longer term as domestic energy prices creep closer to the market price. And as incentives for cleaner growth increase, he says, companies will respond.

Similar opportunities for environmental technology transfer may exist outside of China, too. One group, the Berkeley, Calif.-based China Rivers Project, notes that the Chinese are now beginning to export their construction skills in large-scale infrastructure projects, such as dams. While the worldwide economic slowdown may dampen the need for these projects in the short term, over the long run demand for such work will be strong in

many places that are starved for better infrastructure. Many of these projects reportedly don't meet international environmental standards or labor standards, however, and that will create a new set of problems for already beleaguered emerging market governments.

More generally, Lee is confident that Chinese manufacturers will weather the shift toward tighter enforcement of environmental quality. "Yes, there's going to be an impact, but will the impact be prohibitive? I don't think so." ✨



Special Report

# NEW CHALLENGES FOR 'MADE IN CHINA'

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