

Capturing Global Advantage

How Leading Industrial Companies Are Transforming Their Industries by Sourcing and Selling in China, India, and Other Low-Cost Countries



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A Word from the Authors

Industrial companies are facing an unprecedented challenge: how to capture and maintain advantage during this period of rapid globalization. It is a daunting task. Executives urgently need to understand how globalization is affecting their companies and their industries. Specifically, they need to be able to answer tough questions about the likely impact of globalization on each of their products, their customers, and their assets—both today and in the very near future. And then they need to craft strategies and build capabilities that will help them seize the opportunities offered by globalization, moderate its risks, and contain its costs. The reward, for companies that meet the challenge, will be solid competitive advantage. But getting there from here will be far from simple. This report is intended to offer both insight and practical guidance.

We would like to thank everyone who contributed to the realization of this report, especially

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While the process of globalization is inexorable, there is still much that executives can do to affect its impact on their companies, their industries, and their national economies. We hope you will find this report helpful, and we would welcome an opportunity to discuss these issues with you.



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Introduction

Globalization is no longer merely an option but an imperative. The migration of sourcing, manufacturing, R&D, and service operations from high-cost countries (HCCs) to low-cost countries (LCCs) is well under way and accelerating fast. Fully loaded wage rates, including benefits, of \$1 to \$2 per hour in LCCs—compared with rates typically between \$15 and \$25 in the United States and as high as \$30 or more in Europe—are the primary driver. But other factors, such as advances in telecommunications technology and in techniques for supply chain management, are contributing to the opportunity to radically restructure costs.

Moreover, low cost no longer means low quality. Companies in HCCs can now source virtually anything on the other side of the globe at much lower cost than at home and get equivalent quality. Increasingly, LCCs' pools of highly motivated and highly skilled workers are supported by first-rate infrastructure, education, and training. Most LCCs, mindful of the benefits their economies stand to gain from development, have been adopting favorable economic policies and making sustained investments in these areas. In addition, LCCs have absorbed extensive knowledge transfer from multinational companies that are already operating there. And although LCCs have far less automation than industrialized countries, modern management techniques, rigorously applied, are ensuring equivalent levels of quality.

Driven by these developments, the globalization of cost structures will have a direct impact on a significant portion of global manufacturing GDP over the next decade. No major industrial category will be immune: imports from LCCs are growing fast across all of them. In industry after industry, globalization is redrawing the playing field and creating new winners and losers. So companies are under enormous pressure to make the move to global operations. But executives are struggling to overcome the seemingly daunting tactical and organizational barriers to realizing this opportunity.

Certainly, deciding what products and processes to globalize is a big task. But dealing with tactical and organizational barriers can be even more challenging. Issues of mindset, structural complexity, culture, resource constraints, real and perceived risks, incentives and disincentives—as well as costly legacy obligations—all combine to make progress difficult, both at home and in LCCs. Nonetheless, the forces driving globalization are inexorable. Companies that are not yet actively pursuing this opportunity need to begin now; those that are already moving may need to pick up the pace.

The imperative is not just global sourcing but globalization. Capturing global advantage requires taking a very broad view. It entails deciding not merely what to source from where but also how best to globalize a company's entire operations—to deconstruct them and then reconstruct them in a radically new form, so that every activity takes place where and how it is most advantaged, considering the strategic and operating advantages and risks involved.

Creating advantaged operations will likely mean moving in many directions at once. Increasingly, companies will do business not so much in regions that happen to be geographically contiguous but in clusters of countries—perhaps widely dispersed—that offer complementary advantages. For example, a company might conduct R&D in the United States and Poland, manufacturing in China and Mexico, and customer service in India and Ireland. The best location for each activity will not necessarily be the least costly option. In some cases, other advantages may outweigh cost considerations. For example, in the case of highly specialized products or those with short lives, proximity to customers may offer an overriding advantage, regardless of cost.

Going global also means staying local. In creating advantaged global operations, companies cannot neglect local focus. Global production will still need local customization, local distribution systems,

and local branding. In addition, significant portions of manufacturing are expected to remain advantaged in their current locations. Reasons for staying in higher-cost locations might include the need to safeguard intellectual property content, the importance of collocation with customers, or the requirement to use local content. In other cases, aggressive programs to drive innovation in processes, work methods, and technology in existing facilities could boost real productivity enough to offset the advantages of offshore operations. Each company must balance such considerations for each product line and market worldwide.

Assets may become liabilities.

Companies will need to reposition some facilities in HCCs and eventually shut down others. They may also need to take write-offs and lay off employees. These issues can be extremely complex and painful. But they must be faced squarely and managed with care and skill as part of a necessary restructuring for long-term competitive advantage. Companies must understand the scope of these emerging liabilities now, so that they can plan and act to minimize the costs and pain over time.

Low-cost labor will change the tradeoff between capital and labor, transforming products and processes. In the developed world, most industries have invested heavily in automation and have also simplified product design in order to reduce labor content. In LCCs, where high labor content is less costly than high automation, the tradeoff between capital and labor is radically altered, as is the basic economic equation between fixed and variable investments. Product design and manufacturing processes will need to be adjusted accordingly; screws may once again be cheaper than welds, and built-up assemblies may become cheaper than more complex integral designs.

There will be no more “business as usual.” Going global means doing business in radically new ways. Companies that master the art of globalization will look and feel very different from traditional com-

panies. They will make decisions globally, in a way that is more inclusive, more flexible, and faster than anything they have known before. They will do it by breaking down old silos, establishing new structures and processes, writing new policies, and nurturing new kinds of employees. Along the way, they will create whole new ways of competing in their industries. And they may potentially create phenomenal value.

The advantages to be gained are huge—and strategic.

Companies that move quickly and intelligently stand to benefit from three compelling forms of competitive advantage: significantly lower costs, direct access to burgeoning markets, and capabilities that create far more operational flexibility, customization, and variety.

The cost advantage is striking. Companies that pursue well-crafted LCC strategies are likely to see the landed costs of their products reduced by 20 to 40 percent, and service costs reduced by as much as 60 percent. The primary source of this advantage is lower wages and benefits, which translate into higher margins. Importantly, this cost advantage is likely to increase, not decrease, with time. Other benefits to the bottom line include significantly lower capital requirements. And, of course, lower costs make it possible to sell products at more competitive prices, boosting volume and accelerating revenue growth.

The market access advantage is critical. Establishing operations in LCCs opens opportunities in fast-growing markets. Access to local markets should play a central role in global strategic thinking. Many LCCs have attractive local markets. Most notable among them is China, which is already one of the five largest markets in the world for nearly all product categories—and it is growing fast. But other LCCs also offer significant opportunities for companies interested in selling products locally, as well as manufacturing them. Companies that establish platforms in those countries will be best positioned to serve those markets.

The capabilities advantage opens up new possibilities. This source of advantage is rooted in the reintroduction of skillful human hands into highly sophisticated assembly processes, replacing costly monolithic machines. This shift creates exciting possibilities for flexible manufacturing, cost-effective customization, richer segmentation, and vastly increased variety—at little extra cost. Added to these advantages are access to rich talent pools for skilled work and research and development.

Radical changes in competitive positions are likely.

By capitalizing on all the kinds of advantage available through globalization, companies can break new ground. Companies that currently lead their industries, but with seemingly little room to create new value, can reemerge as growth companies and expand their leads. Companies that are trailing or stuck can use this chance to reinvent themselves and strike out in new directions.

Capturing long-term advantage will require sustained effort.

Globalization will create real advantage in the short to medium term as cost structures shift. However, over time, the initial advantage is likely to shrink as competitors move to create the same value. So companies that are now focusing on globalization should also be identifying the basis of long-term advantage and preparing for the next stage of competition. Developing partnerships, building advantaged local positions, and otherwise laying the groundwork for capturing trade share in the future must begin now so that the advantage thus created can endure for decades to come.

Getting there from here will be challenging.

Companies are discovering that seizing the advantage offered by LCCs can be complex and arduous. While rules of thumb are emerging, there is no simple formula for determining which products and services should move to which LCC and which should stay at home. The bottom-line economic advantages to be gained in various regions are not always easy to assess or compare. Many kinds of risk need to be taken into account, from operational, monetary, and intellectual property risk to geopolitical risk. Investment decisions must be made not just once but repeatedly, as the sources of advantage shift. And, of course, once these decisions have

been made, companies must meet the huge organizational and implementation challenges entailed in developing their operations in LCCs.

Speed is critical. Despite the challenges, the real question now is not whether to go global but how much and how fast you can move. The largest competitive advantage will lie with those companies that move soonest and make the strongest commitments. They will secure structural advantages in terms of access to the most desirable suppliers, partners, facilities, and workers. They will also move up the learning curve ahead of competitors and begin to build scale in local markets. In doing so, they will be building advantaged positions that will form the foundations for long-term advantage. Companies that win this race will enter a virtuous cycle, using their globally advantaged operations to create value that will allow them to invest in innovation and growth, thus building more advantage. In contrast, companies that wait will be caught in a vicious cycle of uncompetitive costs, lost business, underutilized capacity, and the irreversible destruction of value.

* * *

In this report we address the opportunities—and the issues. This report is based on a global study conducted by The Boston Consulting Group in late 2003, as well as a broad range of work with leading companies around the globe. In the course of our research, we have performed detailed analyses of the competitive economics of industrial companies. We have also engaged in selective interviews with executives in the United States, Europe, and Asia. We have looked primarily at a wide range of categories in discrete manufacturing industries, from highly complex engineered products such as cars and trains, to assemblies such as pumps and generators, to simple components such as aluminum extrusions. In addition, we have drawn lessons from the experience of consumer-oriented manufacturing industries where relevant.

In these pages we identify the specific opportunities to be captured by incorporating LCCs into a company's cost structure. We look at the full spectrum of ways that companies can leverage LCCs as a source of advantage, including purchasing parts

and components, manufacturing and assembling, conducting R&D, performing key service functions, and taking advantage of these countries' domestic markets. We focus particular attention on China and India because of their sheer size and striking advantages.

While we do not attempt to address all the political and social issues raised by the increasing globalization of manufacturing and service operations, we do tackle the thorniest strategic and operational

issues involved, including how to manage the balance between home-country and LCC operations, how to choose among LCCs, how to redeploy high-cost assets, and how to manage risk. We offer counsel on how to set up and manage a global sourcing or manufacturing operation for maximum flexibility and minimal risk. We also address the challenges of implementation and how to keep the new structure working dynamically to capture the constantly shifting advantage.

The Changing Pattern of Global Competition

Consider this scenario: A global player in industrial equipment has its products designed in various R&D centers in the United States and India, then has the components manufactured in China and shipped to assembly locations in Mexico and Eastern Europe, from which the finished products are sold all over the world. Meanwhile, the company's global warranty-management process is carried out in India, where a team accesses incoming field data from around the world, analyzes it in real time to determine the root causes of performance problems, interacts with field or design engineers around the world if necessary, and sanctions payments to customers as appropriate. The product's "owners," based at the company's R&D centers, follow up on the root causes, initiate any needed design adjustments, and communicate the revised designs to the manufacturing unit in China—often in a matter of days.

Welcome to the brave new world of low-cost-country operations. While companies have been sourcing both manufacturing and services from LCCs for many years, the pace of displacement has recently accelerated and its scale has expanded. Imports from LCCs are now making substantial inroads into sectors historically considered protected from LCCs—even within core industrial categories. Moreover, these imports are no longer coming only from LCC neighbors such as Mexico for the United States or Eastern Europe for Western Europe—or from traditional Asian players. The accelerated pace and broadened scope of global outsourcing raise the stakes considerably for all Western companies.

Deeper Competition: The End of Protected Sectors

The prevailing view is that many industrial goods are somehow "protected" from LCC sourcing. This may have been the case in the past, but it is not anymore. While the current penetration of LCC-sourced industrial goods into U.S. and European markets is still relatively small, it is far from negli-

ble. The migration of industrial sourcing, manufacturing, and service operations from high-cost to low-cost countries is well under way and accelerating fast. In some sectors, LCC imports are growing at rates as high as 30 percent per year. To help companies visualize precisely where these changes are happening and at what speed, we have created the LCC Matrix, which provides a way of viewing the inroads that globalization is making into today's domestic industrial markets. The LCC Matrix is a flexible tool that can be used to compare selected industries, companies, or products in terms of the speed and magnitude of their migration to LCCs. (See Exhibit 1.)

In this application of the LCC Matrix, we compare selected industry segments. As an indicator of *speed* (shown on the horizontal axis), we use the net growth of imports from LCCs to the United States—that is, the growth rate of imports minus the rate of growth in U.S. domestic consumption. As indicators of *magnitude*, we calculate both the value of imports from LCCs as a proportion of the value of total domestic consumption (indicated by the position on the vertical axis) and the absolute amount of LCC imports (reflected in the size of the bubbles). For example, in 2002 the United States imported from LCCs approximately \$6 billion of various fabricated metal products, or 11 percent of total U.S. consumption, and these imports have been growing 12 percent per year faster than the market. In our work with leading companies, we have found it useful to create individualized versions of the matrix, comparing companies or product categories of particular interest to the company in question.

As this version of the LCC Matrix illustrates, major industrial-product categories in the United States fall into four clusters.

Moving early. Approximately 10 to 15 percent of sampled industrial demand belongs to this cluster. It comprises product areas in which penetration by LCC imports is already established and growing

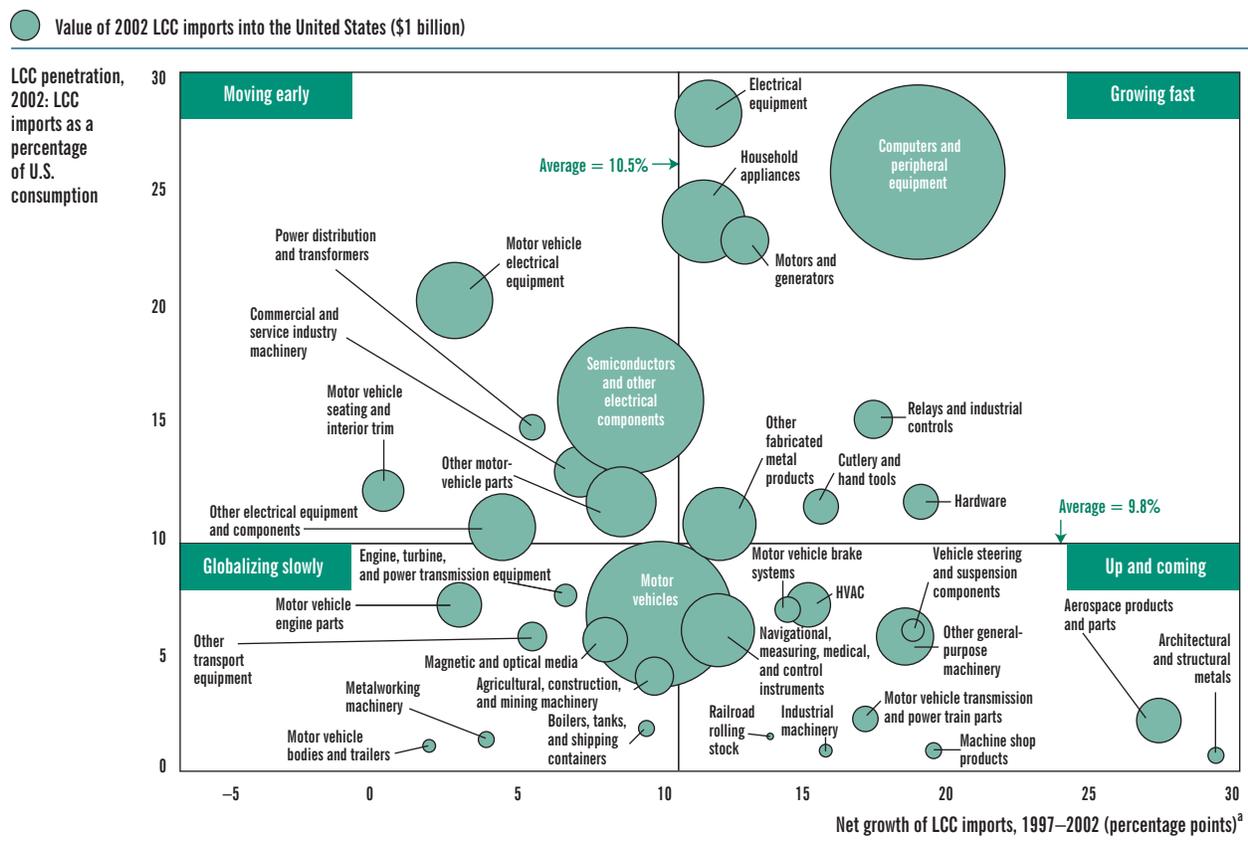
moderately. These products were part of the early migration wave, and their growth has subsequently been facilitated by improved logistics chains and standardized product interfaces. Increasingly, these products arrive in the United States not as components that are “ready for assembly” by a U.S.-based manufacturer but as finished end products. In other words, these are the products for which a significant portion of manufacturing has left the United States and will not return. Automotive electrical equipment contained in a car assembled in the United States is representative of this category. Highly labor-intensive wiring harnesses are a good example of a segment in which Mexico and low-cost Asia already account for major volumes.

Growing fast. Approximately 15 to 20 percent of sampled industrial demand falls into this cluster. Products in this cluster will be the big movers in the short term. LCC imports have already achieved high penetration and are continuing to grow at high rates. Household appliances are examples of items in this cluster. Fast-developing production facilities in Asia, particularly in China, are producing unprecedented quantities of vacuum cleaners, kitchen appliances, and germ-killing humidifiers for their own domestic markets and for export markets in which consumers are increasingly searching for bargains. In the core industrial business, motors, generators, relays, and industrial controls are expected to be on a similar path. These indus-

EXHIBIT 1

THE LCC MATRIX SHOWS THE PENETRATION AND GROWTH OF LCC IMPORTS

Case Study: The United States



SOURCES: U.S. Census Bureau; BCG analysis.

NOTE: Consumption is defined as U.S. production plus imports minus exports; LCC sample consists of 11 countries (Brazil, China, Czech Republic, Hungary, India, Indonesia, Malaysia, Mexico, Poland, Russia, and Thailand). Industrial imports from LCCs consist of the major product lines within North American Industry Classification System codes 332 to 336.

^aThe average annual growth rate of LCC imports minus the average annual growth rate of U.S. domestic consumption.

trial electrical and electronic products could follow the pattern observed a decade ago, when the manufacture of consumer electronics migrated quickly to LCCs, which now supply more than 70 percent of U.S. consumption. Companies that have not yet put strategies in place to ward off foreign competition or establish LCC sourcing may be running out of time.

Up and coming. This cluster, the largest of the four, contains product categories that account for approximately 30 to 40 percent of sampled industrial demand. LCCs' penetration of these categories is still relatively low but changing quickly as imports from LCCs accelerate—in some cases increasing by more than 15 percent per year. This rapid acceleration of growth is particularly noteworthy. In many instances, current annual growth rates are three to five times what they were just a few years ago. This cluster contains major sectors such as aerospace, architectural and structural metal products, and machine shops. As fundamental changes occur in industries that were once considered immune from LCC sourcing, many companies will be caught off-guard. Companies in this cluster face the greatest opportunities but also the greatest threats, because much of their business will face new cost competition. Establishing comprehensive LCC strategies, both offensive and defensive, will be absolutely critical if these companies are to maintain their competitive positions.

Globalizing slowly. Representing approximately 25 to 30 percent of sampled industrial demand, products in this cluster could either remain well shielded from LCC imports or be up for grabs. For example, truck trailers, because they are extremely bulky and relatively low in value, don't appear to be the kind of product that could be sourced economically from low-cost Asia. That could change, however, if the industry were to switch to prefabricated kits made in China that could be shipped economically, and would require only minimal assembly in the United States. Metalworking machinery represents another category in this cluster. Machinery imports from LCCs are currently negligible because either the LCCs do not have the technical capabilities to manufacture sophisticated equipment or

domestic demand in those nations is absorbing most of the production. But this situation could certainly change. The bottom line is that some of the sectors in this cluster that now appear safe will eventually become vulnerable.

The trends evident in the LCC Matrix reveal that industrial goods are now following the path blazed over the past 20 years by consumer goods manufacturing. More than 70 percent of footwear, 60 percent of audio and video equipment, and 45 percent of apparel have their origin in low-cost Asia, Latin America, or Eastern Europe, and those areas are still gaining share. (See Exhibit 2.)

While LCC penetration of Western markets for industrial goods is still in its early days, it is clearly gaining momentum. The real shift lies ahead, as LCC-sourced goods attain critical mass in more and more categories in core industrial sectors in the United States and Europe. On average, they already account for more than 10 percent of industrial consumption in the United States, where they are growing at rates of 10, 20, or even 30 percent per year—in a market that is essentially flat. And the trends in Europe are very much the same. For instance, imports from LCCs already account for 6 percent of total manufacturing consumption in Germany, where they are growing at more than 10 percent per year. (See Exhibit 3, page 14.)

Services, too, are moving to LCCs in large numbers. Approximately 300,000 U.S. service jobs have already moved offshore. This figure is projected to grow to 2.5 million to 3 million in the next ten years. Transactional processes (for example, payroll and accounts receivable) and customer-facing services (for example, call centers and telemarketing) together constitute more than 65 percent of the services now being provided by LCCs. For example, India's business-process-outsourcing (BPO) industry is estimated at \$1.5 billion and growing at about 50 percent per year.

Truly Global Competition: The Rise of China and India

The range of LCCs involved in large-scale outsourcing has changed dramatically in recent years. To the

“traditional” Asian LCCs, such as Korea and Taiwan, have been added proximate LCCs, such as Eastern Europe and Mexico, as well as developing Asian countries, such as Thailand and Malaysia. (See Exhibit 4, page 14.) Most important, China and India have recently burst upon the outsourcing scene, changing the nature and dynamics of the game.

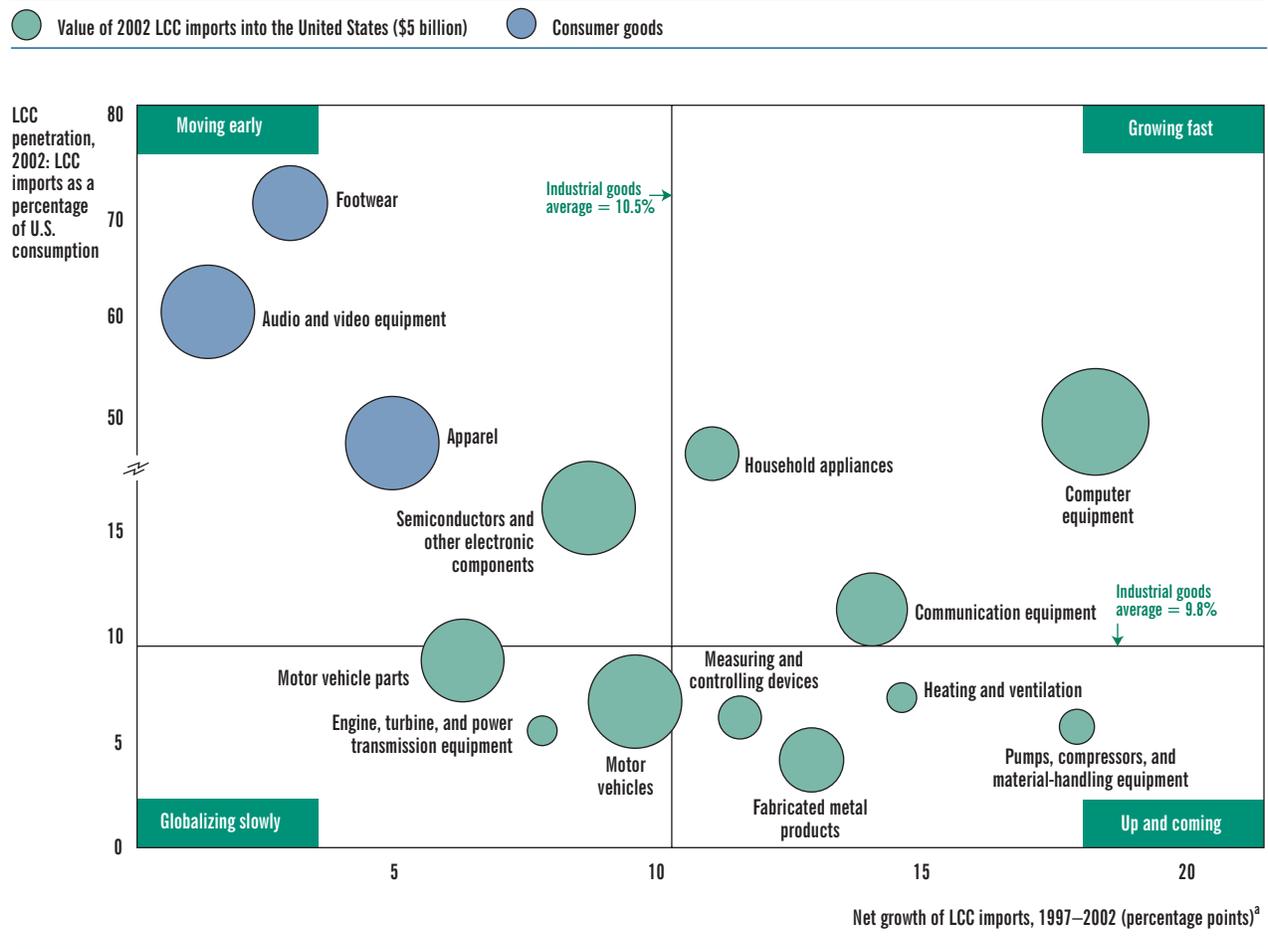
China. China is clearly emerging as the industrial power base of the future. For both Europe and the United States, China already represents a major and very fast-growing source of industrial products. For instance, imports from China now represent nearly

one-fifth of all imports from LCCs into the United States and Germany; and these imports are growing at 15 to 20 percent per year—far faster than the average of LCC imports. China is also becoming a significant source of services, particularly for Japan and Korea. This role is in part language related but is also driven by China’s advanced capabilities in products such as mobile phones—a segment in which Chinese consumers are often global trend-setters.

India. In contrast to China, India is becoming a powerhouse in outsourced services, taking over

EXHIBIT 2
CONSUMER GOODS MANUFACTURING SHOWS THE SHAPE OF THINGS TO COME

Case Study: The United States



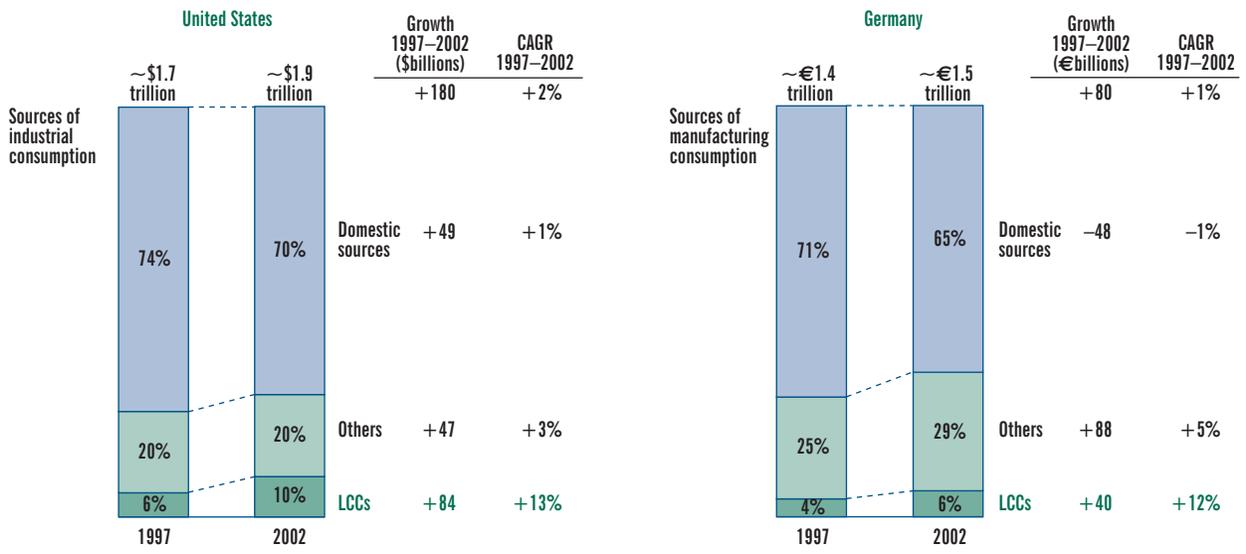
SOURCES: U.S. Census Bureau; BCG analysis.

NOTE: Consumption is defined as U.S. production plus imports minus exports; industrial imports from LCCs consist of North American Industry Classification System codes 332 to 336 with import value greater than \$2 billion.

^aThe average annual growth rate of LCC imports minus the average annual growth rate of U.S. domestic consumption.

EXHIBIT 3

INDUSTRIAL GOODS IMPORTED FROM LCCs ARE PLAYING AN INCREASINGLY IMPORTANT ROLE IN THE UNITED STATES AND WESTERN EUROPE



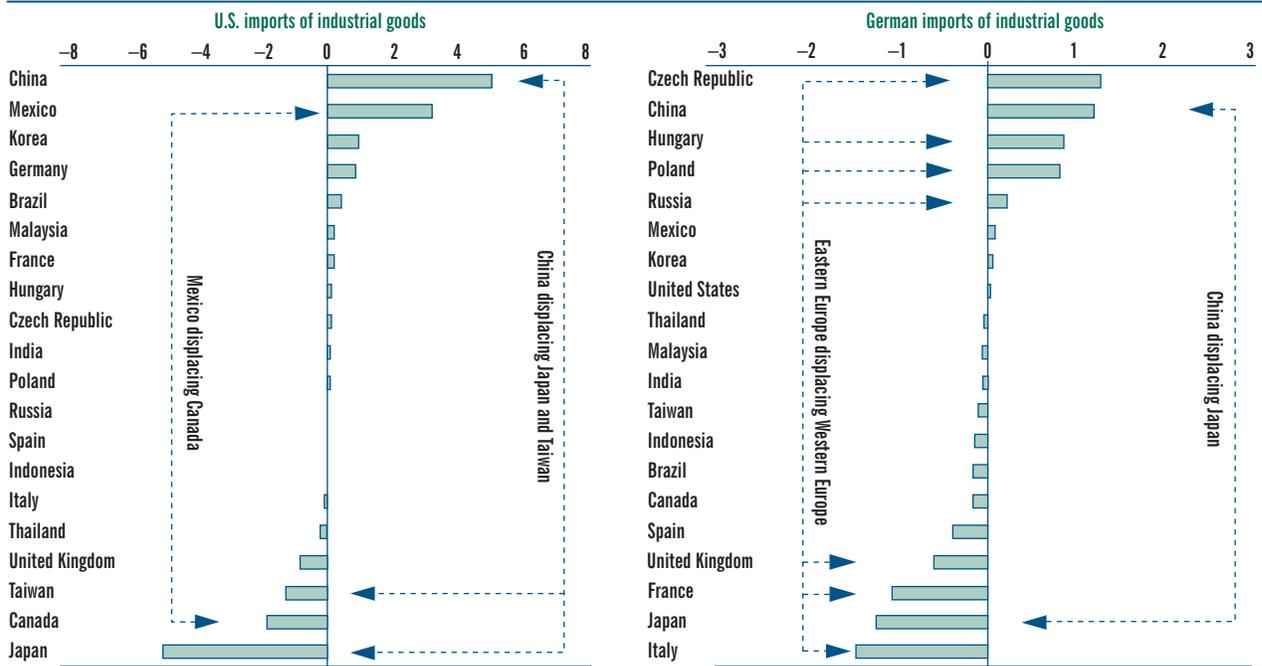
SOURCES: U.S. Census Bureau; Federal Statistical Office of Germany.

NOTE: We define the U.S. industrial sector as discrete industrial goods (NAICS 332-336); we define the German manufacturing sector as all manufactured goods except agriculture and services.

EXHIBIT 4

LCCs ARE DISPLACING HIGHER-COST COUNTRIES AS SOURCES OF IMPORTS INTO THE UNITED STATES AND EUROPE

Percentage Change in Share of Imports, 1997-2002



SOURCES: U.S. Census Bureau; Federal Statistical Office of Germany.

NOTE: Percentage share includes only the key LCCs and HCCs selected for this study.

share from countries such as Ireland and Canada. India now supplies some 60 to 65 percent of the voracious global market for offshore BPO services. This market includes not only transactional processes but also core industrial processes such as supply chain management, design and engineering, purchasing, and dealer support. One of India's major advantages is the availability of large numbers of highly educated English-speaking workers and managers, together with a strong telecommunications infrastructure. From 1999 to 2002, India's service-outsourcing revenue grew more than 70 percent annually. Many global companies, including Alcatel, GE, Motorola, and Siemens, have set up R&D centers in both India and China to leverage the substantial pools of engineering talent that are based in the two countries.

Eastern Europe. Until recently, LCCs close to the large markets of Western Europe and the United States have provided those markets with the lion's share of their LCC imports. For example, Poland, Hungary, and the Czech Republic represent more than half of LCC imports into Germany. However, these countries' share in this trade is increasingly being challenged, especially by China. In response, some Eastern European countries have been developing service centers that cater particularly to the need for European languages. In addition, some Eastern European countries possess pockets of specialty expertise. For example, Russia's capabilities in the aerospace industry led Boeing and Airbus to establish research and design centers in Moscow. For several Eastern European countries, imminent membership in the European Union will have both positive and negative effects on competitiveness. Their labor costs may rise, thus eroding some of their current labor advantage, but at the same time they should gain simplified access to Western markets and improved logistics, which would take cost out of the sales and supply chain. Moreover, the labor rate increases may be limited, if the experience of Eastern Europe follows that of Greece and Portugal, which joined the European Union in 1981 and 1986, respectively. In both cases, although

labor rates increased, overall cost advantage relative to other E.U. members remained intact. Meanwhile, even lower-cost countries such as Romania and Bulgaria, which will not join the European Union in the near future, are becoming viable alternatives to Hungary, Poland, and the Czech Republic.

Mexico. Mexico still represents some 40 percent of LCC imports into the United States. As is happening in Eastern Europe, Mexico's share of trade with its wealthier neighbor is coming under tough competitive pressure.

U.S. imports of industrial goods from China are now growing twice as fast as those from Mexico. If this trend holds, China's exports

will overtake Mexico's within the next five years. Nonetheless, we envision continuing roles for Mexico and the Eastern European countries as "backyard" suppliers to markets in the large developed countries. We discuss this relationship in detail in the next section.

Southeast Asia. Countries in this region—principally Indonesia, Malaysia, the Philippines, Singapore, and Thailand—have assumed an important role in the globalization of cost structures. The recent economic crisis in Asia and the emergence of China and India are putting these countries under pressure. Like countries elsewhere, the Southeast Asian countries will need to adjust to the new global environment, but the fundamental factors that led to their earlier success are still present: well-educated, low-cost labor forces and fast-developing internal markets. Moreover, in some sectors there has been a critical mass of investment, which now serves as a magnet for further activity. Examples include car parts in Thailand and electronics in Malaysia.

Across all these regions, the globalization of cost structures is gaining pace. Underlying this movement is the simple fact that companies that are smart about incorporating LCCs into their value chains can gain huge competitive advantage.

Mexico and Eastern Europe will play continuing roles as "backyard" suppliers to developed countries.

Mapping the Sources of Global Advantage

Global advantage is composed of three basic elements: a cost advantage, a market access advantage, and a capabilities advantage. Although the cost advantage remains the key driver of globalization, in recent years it has been reinforced—and in some cases overshadowed—by two other major factors. First, LCC internal markets have matured into attractive, fast-growing markets, providing a powerful incentive for companies to invest locally. Second, capabilities in LCCs have greatly improved, fueled by sound government policies there and by the swiftly accelerating transfer of knowledge from multinational companies.

The Cost Advantage

The primary driver of the move to LCC sourcing remains the very large—and sustainable—cost advantage that companies can achieve. In our experience, companies that globalize their cost structures to include LCCs can realize savings of 20 to 40 percent in the landed costs of their products. (See Exhibit 5.)

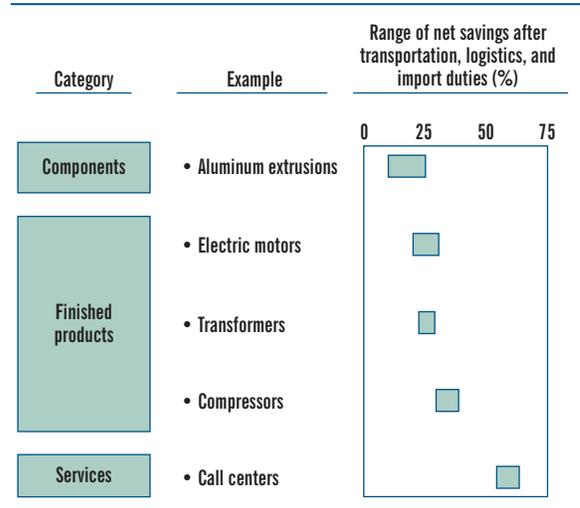
Where the cost advantage comes from. The cost advantage derives from several sources: lower labor costs, lower capital-investment costs, lower domestic sourcing costs, larger economies of scale, and government incentives. (See Exhibit 6.)

Lower labor costs. As one would expect, the overwhelming driver of the advantage is the difference in labor cost. A factory worker in the United States or Europe costs \$15 to \$30 or more per hour, depending on whether the factory is unionized, where it is located, and the extent of benefits provided. In contrast, a Chinese factory worker earns well below \$1 per hour—a twentyfold cost advantage. Wages in Mexico and Eastern Europe are two to eight times the level in China, though still an order of magnitude below U.S. and Western European wages. Actual costs vary widely around these averages, but the magnitude of the difference between the West and China—a ratio of 20 to 1—

EXHIBIT 5

LCCs CAN BRING DOWN THE COST OF PRODUCTS BY AS MUCH AS 40 PERCENT AND THE COST OF SERVICES BY AS MUCH AS 60 PERCENT

U.S. Example



SOURCE: BCG analysis.

cannot be ignored. It is worth noting that some labor savings are hidden—for example, in overhead, repair, and maintenance costs.

For services, the sustainable cost advantage to be gained by outsourcing to India, for example, is 50 to 60 percent. Outsourcing the same services to an Eastern European vendor would mean achieving savings in the 30-to-40-percent range. In absolute terms, typical fully loaded costs for an overhead process employee—for example, in accounting—are \$26 to \$30 per hour in the United States, \$10 to \$12 per hour in India, and \$15 to \$18 per hour in Eastern Europe.

Lower capital-investment costs. Another important—and often overlooked—source of advantage is lower capital-investment requirements. Whereas the lower labor costs benefit the P&L, lower capital investments can mean saving significant amounts of cash on the balance sheet. In an analysis of total return on capital, we observed that the combina-

tion of lower product cost and lower capital investment can have a dramatic impact on profitability. Capital investment requirements are lower for two main reasons: lower factor costs and a higher proportion of manual labor.

Some factor costs can be lower in LCCs. Machines and tooling—when they are produced locally—benefit from the lower cost environment. Often they cost at least 50 percent less than in the West. We have observed significant discounts for stamping presses, CNC machines, and power tools. While the equipment often has a different design from equipment used in HCCs, it provides essentially the same functionality across the range of products on which it is used. Government incentives also lower the cost of investment—for instance, in land.

LCCs also offer the opportunity to use a higher proportion of manual labor. Experienced companies redesign the way their products are manufactured to reduce automation and increase labor. This lowers capital investment significantly. For example, a leading consumer-durables company has elimi-

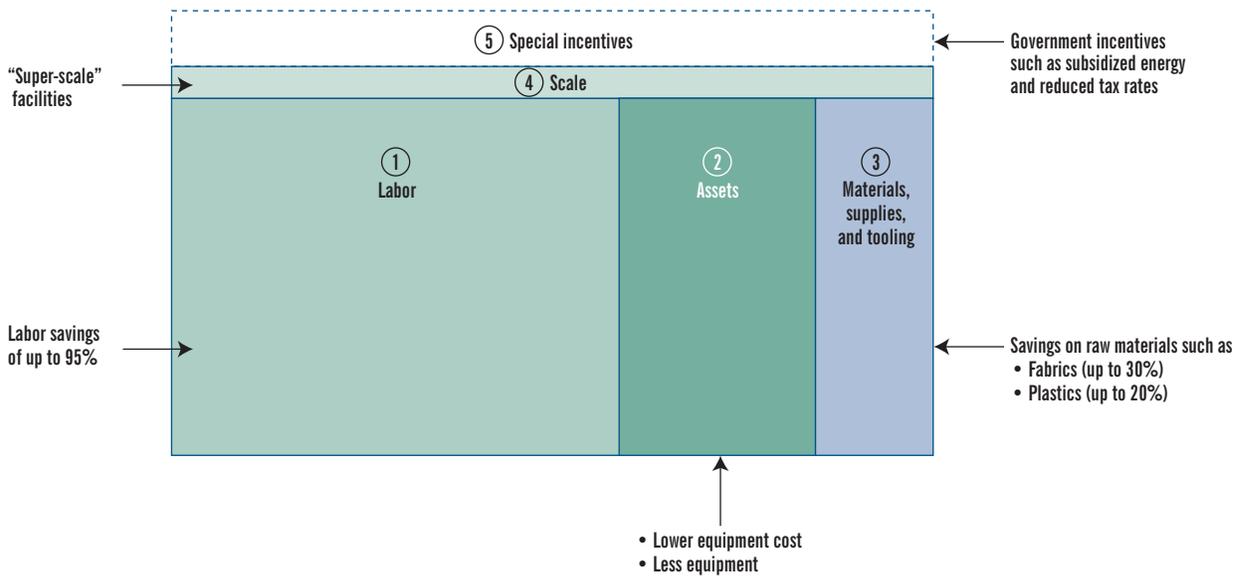
nated all conveyor belts in its Chinese factories. This reduction in automation does not entail any loss of quality. The company achieves world-class quality in its Chinese operations, equivalent to the quality it achieves in its Western plants.

Companies that have been operating in China report that, in the aggregate, they can drive their investment requirements to as low as 30 to 40 percent of what would be required in their home countries.

Lower domestic sourcing costs. Also fueling cost advantage is the fact that many LCC suppliers are willing to accept relatively low profits in the short to medium term in return for strong growth. This is a rational strategy on their part because they can create more wealth by focusing on explosive growth than by seeking short-term profits. In addition, some industries benefit from lower materials costs in LCCs, though this advantage varies widely in terms of both industries and countries. For example, some companies save up to 30 percent on fabric and 20 percent on plastics by buying raw materials locally.

EXHIBIT 6
SAVINGS ACHIEVED IN LCC MANUFACTURING DERIVE FROM SEVERAL SOURCES

Typical Composition of Savings



SOURCE: BCG analysis.

Larger economies of scale. LCCs are building production facilities of unprecedented dimensions. Newly built capacity will benefit from substantial volume advantages. In sectors as diverse as TV sets and aluminum extrusions, Chinese plants, for example, are becoming huge production hubs in order to serve both as global “super-scale” export bases and as sources for a rapidly growing—and potentially massive—domestic market. By combining the volumes for domestic and global export sales, these facilities are destined to set world standards in their respective categories.

Government incentives. Beneficial government policies deeply influence the cost advantage. China in particular has become very adept at stimulating growth. Besides providing tax incentives and lowering import duties, the central Chinese government has set up more than 500 special economic zones to attract foreign investment. Local governments have followed suit and created several thousand zones of their own. One BCG client claims that it received so many incentives for one of its factories that its construction was virtually free of charge.

India, for its part, does not tax the export revenues of BPO firms. In addition, state governments in India provide land at subsidized rates in “IT parks,” where BPO firms can set up shop at relatively low cost. China and India represent a general trend among LCCs toward increasing sophistication in offering a range of incentives to attract foreign capital.

Why the cost advantage will persist. Many observers have suggested that the LCC cost advantage will evaporate in the foreseeable future (variously defined as the next 5, 10, or 20 years). They argue that while LCC factor costs are currently low, they will increase much faster than costs in developed countries, thereby narrowing the cost gap. We maintain, in contrast, that the cost gap not only is unlikely to close within the next 20 years but in some cases may actually increase, for several reasons.

First, and perhaps most important, leading companies operating in some LCC markets have consistently been able to lower their purchase costs over time, achieving annual cost reductions that signifi-

cantly exceed what can normally be achieved in the West. For instance, 10 percent improvements in cost per year are not uncommon for products newly relocated to China. Notably, this annual performance improvement comes on top of the initial 20-to-40-percent savings that companies typically achieve by moving operations to China. The subsequent annual improvements stem from expanded scale, deepening relationships with suppliers, and a very competitive environment. Obviously, such continuous improvements in cost positions constitute a growing advantage for companies that make the move early.

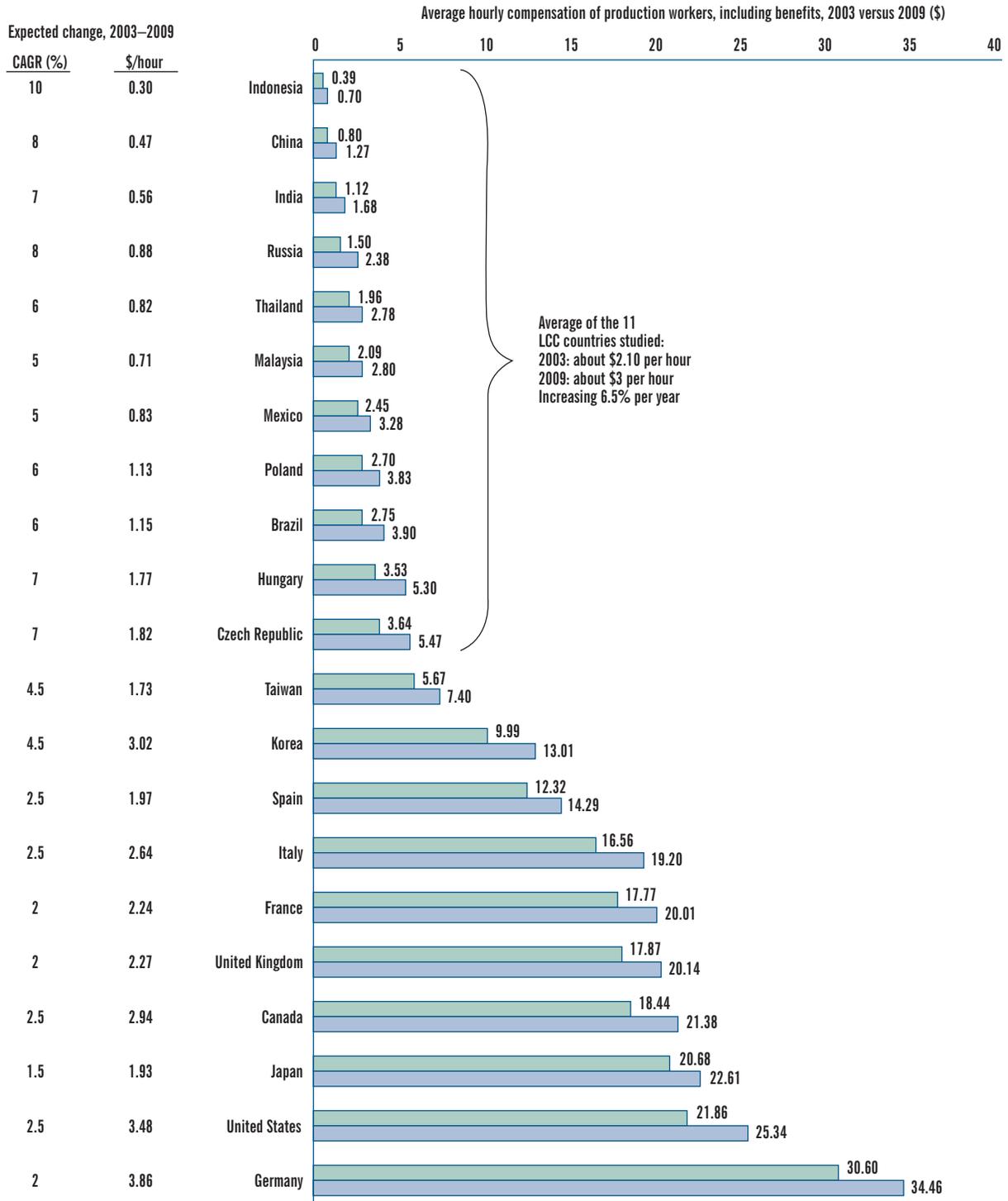
Second, the growth of wages in China and India will be limited because of the enormous reservoir of underemployed people in these countries. China still has more than 800 million people—some 12 percent of the world’s population—living in the countryside. They are expected to exert very strong downward pressure on wages for low-skilled positions over the next few decades. Although there will be more pressure on higher-skilled positions, the supply of candidates for such positions is also very large. For example, several million engineers graduate from Chinese universities each year. On the other hand, China currently has a severe shortage of experienced managers, which is driving salaries up and creating a war for talent—especially for managers with at least ten years of experience. This is an important challenge that companies must actively address. India, for its part, has a pool of 25 million highly educated English-speaking workers, expanding by a million every year. So the rapid growth of IT and BPO services has had a negligible impact on wage rates. Moreover, India is one of the few countries in which the working-age population is projected to grow for the next 40 years or so, keeping wages low.

Third, the current differential in labor rates is so big that the gap between them will remain substantial for the foreseeable future, even if there are double-digit differences in the rates at which they grow. (See Exhibit 7.) In fact, the gap in real wages will actually increase in absolute value, at least for the next several years, because the bases are so widely different. Typically, a U.S. or Western European fac-

EXHIBIT 7

THE LCC LABOR COST ADVANTAGE WILL NOT SHRINK BUT EXPAND IN THE NEXT SEVERAL YEARS

2003 2009



Sources: The Economist Intelligence Unit; Euromonitor; S&P DRI; U.S. Department of Labor; BCG analysis.

tory worker costs an employer \$15 to \$30 per hour. A Chinese factory worker earns less than \$1 per hour—a gap of \$14 to \$29. If wages increase at an annual rate of 8 percent in China, while in the United States and Germany they increase at annual rates of 2.5 percent and 2 percent, respectively, in 2009 the average hourly wages will be approximately \$1.30 in China, \$25.30 in the United States, and \$34.50 in Germany. So, despite the disparity in growth rates, the gap will have expanded by up to \$4 (assuming that there is no significant change in the relative values of the countries' currencies). Government-mandated labor costs, such as workers' compensation, will further widen this gap.

In contrast, labor costs in the smaller Eastern European countries and Mexico might come under greater pressure. These countries will remain competitive vis-à-vis the United States and Western Europe, but they will likely slip further behind China and India because they start from a relatively high cost base and generally experience substantial annual increases.

The hidden costs of LCC operations. The cost advantage gained through LCC operations, while substantial, can nonetheless be significantly eroded by additional costs if companies don't control them aggressively. Establishing and operating an LCC supply chain entails making a number of initial and ongoing investments that can reduce a company's hoped-for savings. Identifying and quantifying these additional costs are an essential part of assessing the overall economics of alternative options for sourcing. Companies that neglect to explicitly consider these "hidden" costs in their assessments can end up with unrealistic or unsustainable economic expectations—and unpleasant surprises halfway into the effort. The additional costs specific to operating in LCCs typically fall into four categories.

One-time LCC setup costs. These expenses include the typical costs for establishing new businesses: identifying and qualifying suppliers, establishing a reli-

able logistics chain, tooling, and training, among others. Depending on the industry and the complexity of the business, these costs typically add 10 to 40 percent to the cost of goods sold (COGS) in the first year. For companies that have an established LCC business model and supply stream, one-time setup costs in a new LCC location are typically half or less than half of the above range.

On the services side, one-time costs include vendor-identification, internal-process-redesign, infrastructure-redesign (including IT systems, software, and network), vendor-training, process-transition, and pilot costs. Typically, these costs could be 25 to 75 percent of the first year's cost of operations. If redundancy costs are included, the typical payback period from BPO could rise to between two and two and a half years.

Ongoing LCC risk-management and opportunity costs. Companies tend to underestimate the amount and quality of infrastructure required to run a high-volume LCC supply chain on a day-to-day basis. Closely monitoring the quality of domestic suppliers, providing buffer inventories through a longer-than-usual logistics chain, and hedging exchange rate fluctuations in often highly volatile financial markets are just a few examples of risks that can and need to be managed—at a cost. Depending on the degree of economic development of the host country, the geographic distance to the target markets, and the scale of a company's LCC program, these costs typically add another 2 to 5 percent to the COGS.

Exit costs for legacy assets and resources in high-cost countries. In cases where LCCs are being used to replace existing high-cost production or services, companies must take into account the full range of exit costs for those facilities and resources. Removing them from the company's ledgers can present a major execution challenge and financial burden. While, in some cases, economically attractive alternative uses may be available, in most instances exiting marginal capacity means incurring layoffs, asset

Companies that neglect to explicitly consider "hidden" costs can end up with unpleasant surprises.

write-downs, and site cleanup programs, causing ripple effects that can affect customers and related business units. The amount of restructuring required often serves as a major reason not to move production facilities, especially for companies based in Europe. Nonetheless, for many companies it will be necessary—and worthwhile—to pay legacy costs, however painful, in order to take advantage of lower production costs that will allow them to remain competitive. The key here is to arrive at a realistic assessment of legacy costs and to develop a plan to minimize them over time.

Most companies can make fairly reliable estimates of people- and asset-related costs. However, they often underestimate costs in four major areas: senior management time, environmental liabilities, business lost in the migration process, and higher costs relating to the remaining business units, which are burdened with paying for formerly shared services and infrastructure. Exit costs vary widely, driven by the nature of the operation, the average tenure of the work force, and the value, location, and fungibility of assets. Our research indicates that the total legacy-related costs for most moves to LCCs fall in the range of \$25,000 to \$100,000 per transferred full-time employee (FTE). For an industrial operation with 200 FTEs, for example, this would mean a one-time cost of \$5 million to \$20 million. Such costs—together with the difficulty of the shutdown process itself—act as a powerful impediment to the movement of existing product lines to LCCs, as we discuss in the next section.

Long-term “bad will” costs in the home country. Companies planning to move operations to LCCs need to anticipate a range of possible negative reactions in their home countries. These effects could include losses of productivity on the part of disgruntled employees, reduced labor flexibility arising from deterioration of relations with unions, and damaged relationships with home-country governmental agencies. In many cases, of course, companies do not shut down their home-country operations entirely, preferring to operate both globally and locally. Often there are opportunities to maintain the most efficient of the home-country opera-

tions while closing only the least efficient, thus boosting home-country productivity.

All these “hidden” costs must enter into each company’s assessment of the magnitude of the potential cost advantage it stands to gain by including LCCs in its value chain. At the same time, it is important to factor in several other kinds of advantage to be gained. Primary among these, as noted above, are market access and first-rate capabilities.

The Market Access Advantage

While companies have traditionally relocated their manufacturing operations to LCCs primarily to take advantage of lower costs, once they are established in those countries, they are naturally positioned to serve local markets. And as LCC economies mature, their internal markets can develop very fast, allowing the established companies to compound the competitive advantage they originally created through lower costs. In China, for example, the market for machine tools is almost twice the size of the U.S. market—and growing 20 percentage points faster. (See Exhibit 8, page 22.)

GE Medical Systems provides a striking example of the market access advantage. As wealth increased in China, GE Medical Systems decided that it was time to enter the market. It did so by transferring technology to local Chinese R&D centers, which then designed “Chinese” versions of GE’s products, offering roughly 80 percent of the functionality of Western systems at just 50 percent of the price. These systems met local needs so well that GE quickly became the market leader in China. Furthermore, the Chinese product has also proved a hit in some Western countries, where its unique tradeoff between price and functionality appeals to certain market segments. In short, by focusing on the local Chinese market, GE has both built a profitable local market and created a new worldwide segment.

China’s growing role. China is emerging as a very special entity in this respect. For many industrial goods, as well as consumer goods, China is already the world’s largest market—as well as the world’s largest producer. For instance, China is already the

largest market for machine tools, the second-largest market for transmission and distribution equipment, and the fourth-largest market for automobiles (including passenger cars and trucks). And these markets are growing fast. From 2001 to 2002, China's machine-tool market grew by 20 percent while the U.S. market shrank by 36 percent. In many instances, domestic LCC suppliers cannot meet the requirements of LCC customers, opening up significant opportunities for Western companies either to establish themselves as suppliers of choice or to reinforce their existing positions. Metal-cutting tools are a good illustration of this opportunity. While domestic LCC suppliers can meet the lower-

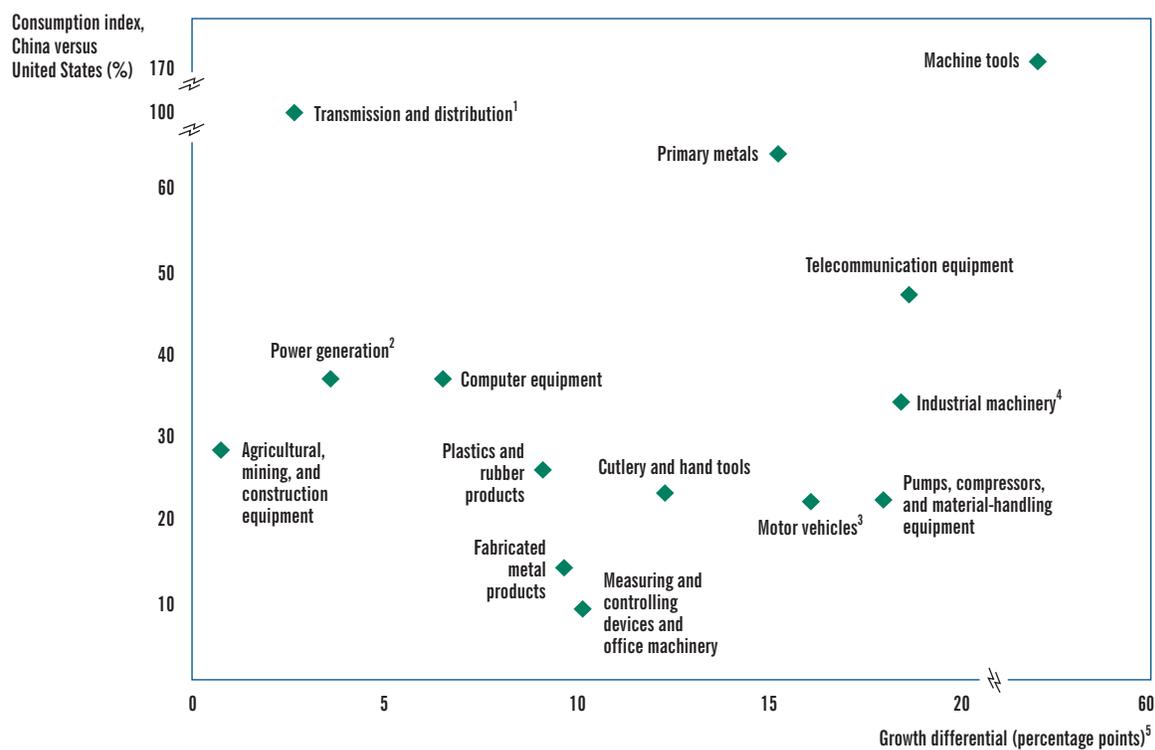
end specs, international brands such as Sandvik and Kennametal are the preferred vendors for the rapidly growing high-end market.

Little wonder, then, that leading companies are starting to generate a large portion of their global sales in China. A specialty metals producer told us that he expects half of his company's global growth to come from China. Similarly, an electrical components manufacturer anticipates that more than 50 percent of new demand in the next 20 years will be in China. ABB, Emerson, Schneider, and Siemens have seen their China sales grow substantially over the years; we estimate that as early as 2005, China

EXHIBIT 8

CHINA OFFERS LARGE, RAPIDLY GROWING DOMESTIC MARKETS

Relative Size and Growth of Chinese Markets Versus U.S. Markets, 2001



SOURCES: U.S. Census Bureau; Gardner Publications; S&P DRI; ABS Energy Research; Dresdner Kleinwort Wasserstein (DrKW) research; China Statistical Yearbook; press search; BCG analysis.

¹Including switching gear, high-voltage insulated cables, power and distribution transformers, overhead lines, insulators, bushings, and fittings.

²Including gas and steam turbines, boilers, and hydroelectric equipment; market growth estimates are based on projected electricity consumption.

³Cars and light trucks.

⁴Machinery for woodworking, plastics and rubber, paper, textiles, and food products.

⁵Annual growth rate in China minus annual growth rate in the United States.

will account for more than 5 percent of their total sales. The global competitive positions these companies are building today will be difficult to overcome for players who choose to sit it out.

The challenge in India. In India, the challenge is marketing to the “bottom of the wealth pyramid”—a reference to the spending power of the huge low-income population in both the urban and the rural sectors. Reaching this market requires new product designs, new pricing strategies, new channel relationships, and new distribution logistics. The rewards for meeting this challenge can be huge. For example, Unilever’s Indian subsidiary, Hindustan Lever, contributes close to 10 percent of its global parent’s bottom line—far more than its organizational equivalents in other regions.

It is worth noting that the market access advantage is not limited to massive countries such as China and India. Thailand, for instance, has been the largest regional market for pickup trucks over the past decade. As a result, several car companies have invested in assembly plants there. Initially, these were small plants, sized to meet local demand. However, as the local industry matured, it attracted additional investment—to the point where Thailand is now a worldwide hub for a whole category of complete platforms for several leading automakers.

The Capabilities Advantage

As one BCG client explained to a BPO vendor in India, “I am not simply looking for labor cost advantage; I am looking for labor skill advantage.” This statement reflects this executive’s understanding of the multiple ways that LCCs can contribute to competitive advantage. The global companies that are leading the LCC charge know that while the LCC-based cost advantage will persist relative to labor in their countries of origin, that advantage will erode as soon as their competitors follow them to the LCCs. So these companies are seeking to build second-order benefits to reinforce the cost advantage.

The noncost advantages that companies are reaping by operating in LCCs include skill, flexibility, quality, productivity, and R&D speed.

Skill. In a recent BCG project in the United States, we repeatedly came across deficiencies in workers’ skills and qualifications as a major challenge to the future competitiveness of manufacturing enterprises. More than 40 percent of the companies we talked with expressed significant concerns about the erosion of skills in the work force. They cited machine operators who are unable to handle specialized equipment properly or to make the transition to new work materials. In contrast, LCCs provide large pools of skilled workers who are eager to apply

their “craftsman” talents. In addition, companies can tap into a large pool of talented, trainable, and loyal workers who are eager to move up the skill ladder. Moreover, skill is available not only in manufacturing but across the board in most service areas, such as engineering and BPO. An excellent example, discussed above, is GE Medical Systems, which has designated India as its center of excellence for a range of products, leveraging not just lower manufacturing costs but also highly sophisticated design and manufacturing skills.

Flexibility. LCCs provide multiple layers of added flexibility and agility for Western companies. Like traditional, home-country outsourcing, outsourcing to LCCs allows companies to make major portions of their cost structures variable. As explained above, companies that invest in LCC production capacity will likely spend less on equipment than they would in a Western country because machinery is generally less expensive and manufacturers use less of it, substituting lower-cost manual labor. The different balance between equipment and labor provides two significant benefits. First, the variable portion of the cost structure increases, making the operation more immune to volume changes, whether seasonal or cyclical. Second, because less dedicated machinery is used, companies can respond more rapidly to sudden changes

The noncost advantages of LCC operations include skill, flexibility, quality, productivity, and R&D speed.

in demand across product lines and can launch new products faster—valuable capabilities in the competition to win customers and boost revenues. In addition, the greater use of skilled flexible labor allows companies to manufacture a greater number of customized products, which is not feasible in a highly automated Western setting. Thus customization done in an LCC can open up higher price niches, provide better competitive differentiation, and boost overall profitability.

Companies looking to move production to LCCs often start with a view that they will achieve the largest savings on their highest-volume products. Our experience shows, however, that frequently the opposite is true. Because of much lower tooling costs and the ability to substitute labor for equipment, smaller-volume products—for which fixed tooling and equipment costs per unit are highest—often realize the greatest advantage.

To fully leverage lower-cost labor, some companies are further reducing their reliance on capital—or, as one executive put it, practicing “decapitation.” As discussed above, they are doing this by redesigning their products to permit more manual assembly without sacrificing quality. The cost advantage created by this reduction in capital investment is then further reinforced by reductions in the time needed to build the tooling—which in turn supports more experimentation with small-volume products. All of these flexibility advantages contribute to overall competitive advantage in terms of cost, product variety, and time to market.

Quality. Another way that LCC capabilities contribute to competitive advantage is in quality. Once the initial supply bugs are worked out, the quality of end products produced in LCCs is equivalent to the quality achieved in HCCs. Companies that source from LCCs, as well as those that establish their own manufacturing or processes there, confirm this observation. Once an LCC plant has moved along its learning curve, it can achieve quality that is equivalent to or even higher than that achieved by the company’s best plants in the West. Obviously, there are occasional exceptions, mainly in sectors in which the LCC supply base is not yet fully developed.

In terms of service quality, we have commonly seen improvements ranging from 30 to 50 percent above the levels specified in the service level agreements (SLAs) signed with vendors. In services, in particular, the quality of labor is an added advantage. Activities that are “back office” for industrial companies are of course very much “front office” for BPO companies, which therefore pay extra attention to the quality of their employees. For example, a call center employee in Western Europe or the United States is typically a high school graduate, whereas in Poland or India he or she would typically be a college graduate. In addition, LCC service providers generally use higher levels of computerization, combined with rules-based process simplification, to eliminate errors.

Productivity. The issue of productivity often clouds the debate about the value of using LCCs. People who are not experienced with LCCs commonly assert that while labor costs in the United States and Europe are much higher than labor costs in LCCs, the higher costs are justified by much higher productivity. In our experience, this claim is often invalid. Part of the problem lies in the definition of productivity. It is true that in LCCs the output per capita is lower. But this is mainly because LCCs use far less capital than do developed countries. In the West, where companies invest heavily in automation, head counts are kept low and output per capita is high. In LCCs, companies can use less capital and more labor. So while per capita productivity is lower, capital productivity is far higher. Any analysis of relative productivity should include both measures.

Companies often look at average country-level productivity data. To be meaningful, the data must be de-averaged to remove distortions caused by, for instance, the many millions of farmers in China or the *xiagang*—workers in state-owned factories who are paid a nominal wage to stay home. To be meaningful, productivity data must be de-averaged to the levels of individual plants and products.

Similarly, country-level productivity data must be de-averaged to permit apples-to-apples comparisons of the level of value added to products. On average,

products in high-cost countries have a higher level of technology and intellectual capital invested per unit of output. This distorts the view of how productive the workers in LCCs actually are.

In fact, the productivity of workers in LCCs is usually high. Here again, most companies we have talked to for this report or worked with directly share a common view, based on their own experience: For manual tasks, the productivity of workers on the factory floor, with proper management and procedures, is equivalent to what they find in the West. For tasks requiring skilled labor, productivity can be even higher in LCCs than in the West, especially for fairly routine tasks. One reason for this differential, according to several multinational companies we spoke with, is that midlevel engineers in LCCs tend to be more motivated than midlevel engineers in the West. In addition, manufacturing companies find it easier to attract top talent in LCCs than in the West. Taken together, these factors often translate into higher average productivity on the part of skilled labor in LCCs.

R&D speed. One of the most intriguing advantages we have come across is faster (and lower-cost) R&D. Because companies that are established in LCCs eliminate a lot of automation and tooling requirements from their operations, they can be much

more responsive to R&D requests. Testing is cheaper because it involves less tooling. It is also much faster, especially for very new products for which no base tooling exists. This flexibility, coupled with the much lower cost of skilled research staff, allows companies to dramatically increase the amount of research they do—often three to five times more than in the West for the same budget. In addition, having team members working in opposite time zones allows companies to advance R&D projects around the clock.

* * *

As all the trends discussed above come together to enhance the attractiveness of a given country, the pace of relocation accelerates, creating a kind of critical mass. Clearly this is now happening in China for manufacturing and in India for services. As more and more companies arrive seeking suppliers, they spur the development of infrastructure, which in turn lures more companies seeking more suppliers. Communication costs drop and formerly scarce resources become more readily available, attracting still more companies. Our research demonstrates that this complex set of interactions plays an important role in explaining why companies that just months ago were “watching and waiting” are now making the move to LCCs.

The Strategic Challenge: What to Relocate Where?

Deciding which elements of a company's value chain to relocate to which LCC is complex. Although general rules of thumb are emerging, they require tailoring to each company's unique situation. It can be extremely helpful to put in place a strict and systematic decision-making process, in which each economic decision is based on a comprehensive analysis of the risks the company faces. Because of the complexity of the multiple factors involved in these strategic analyses, companies should consider all LCC investment decisions time-limited and should revisit them regularly. The basic decisions to be made are which products and services should go to LCCs, which should not go, which LCC or LCCs they should go to, and how to assess the economics involved in each decision.

As a first step, companies should use the LCC Matrix, described above, to generate a systematic look at their own playing field: to identify which products and customers are in motion and, as a consequence, which assets are likely to become liabilities. The LCC Matrix creates clarity for executives for whom the LCC issue is often still a "black box" and whose primary source of information on this issue may be the generic messages of the mass media. It helps managers make discrete, informed decisions, while at the same time providing a communication tool for strategic-planning purposes. In addition, it allows companies to benchmark themselves against industry averages and peer activity. Because most data can easily be updated regularly, the tool enables companies to monitor their markets continuously and spot trends early.

What Should Go?

To relocate any products or services successfully to an LCC, a company must be able to manage the distance disadvantage and still meet delivery requirements in terms of lead-times and flexibility. But even if the company can clear these hurdles, not all

product and service families are created equal. Some are far better candidates than others for relocation to LCCs. These include products and services with high labor content, high growth potential, large LCC markets, developed bases of suppliers in LCCs, and standard manufacturing interfaces or processes. (See Exhibit 9.)

Products and services disadvantaged by high labor content. Not surprisingly, these are the prime candidates for relocation to LCCs. While this statement seems obvious, a remarkable number of companies get this part of the analysis wrong. Part of the problem is that the very measures used to assess the potential benefits of moving often mask those benefits. Time and time again, we have found flawed financial analysis justifying the wrong decisions—usually to keep a product at home. For example, companies sometimes fail to take overhead costs into account in calculating the total cost of home-country manufacturing. Or they may neglect to apply capital charges to product and process costs.

Similarly, many companies overlook the fact that a lot of labor content is hidden in purchased parts and components. Today most modern industrial companies have become engineering and assembly companies, buying most of their components rather than making them. As a consequence, the cost structures of large parts of their value chains are not transparent to them, and the opacity of the parts they cannot see lulls them into a state of false confidence.

For example, a U.S. motor manufacturer had invested heavily in automation, relocated its plant to the southern part of the United States, and outsourced aggressively. Management estimated that labor represented only 10 percent of its costs and on that basis believed that the company was immune from LCC-based competition. In fact, once the company recognized all the labor going into its purchased parts, components, and materials, the

labor content of the motors it produced turned out to be closer to 40 percent of costs—representing considerable vulnerability to LCC-based competition.

In services, the processes most easily relocated to LCCs are those that have few “handoffs,” have well-defined process maps, or are rules based (for example, they have training manuals). Of course, not every backroom process can be outsourced to an LCC vendor. Certain statutory, strategic, and customer-facing processes—such as controller processes, taxes, and legal procedures—generally have less migration potential. Most other processes, however, are candidates for possible relocation. In evaluating the exportability of each process, it is important to take into account factors such as how interconnected the process is to other processes, and whether standard operating procedures and training manuals are available for it. We have found that anywhere from 30 to 40 percent of nonmanufacturing roles can potentially be performed by company employees or vendors in LCCs.

Products with high potential for growth. Such products are easy to relocate to LCCs, while “sunset,” or low-growth, categories are often difficult to shift.

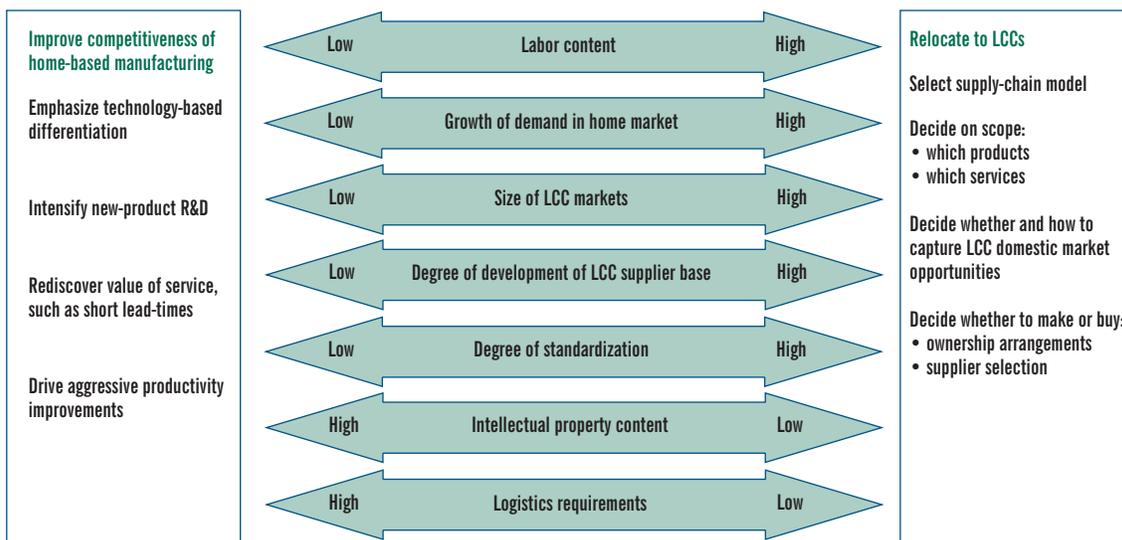
This important point may appear counterintuitive: one might expect that the cost advantage of moving to LCCs would be all the more important in less dynamic categories, where the competitive battle is based on price only and therefore on costs. However, there are strong economic drawbacks to moving products in such categories.

Relocating purchasing or production to LCCs requires an initial investment of both cash and resources that sunset product lines often cannot afford. This investment includes, for instance, the costs of closing home production facilities, building a plant in the LCC, and developing a network of LCC suppliers. Product categories that generate low margins will find it difficult to fund such efforts.

The head of Chinese manufacturing for a large industrial company uses a product’s potential for growth as one of his main criteria when discussing potential product relocations with his internal clients. The company has an “internal market” for production, whereby operating units bid out their production to several potential internal and external suppliers. Time and time again, the head of Chinese manufacturing has found that for low-

EXHIBIT 9

SEVEN KEY CRITERIA CAN HELP COMPANIES DETERMINE WHICH PRODUCTS TO OUTSOURCE TO LCCs AND WHICH TO KEEP AT HOME



SOURCE: BCG analysis.

growth products, a full cost analysis has ended with production staying in the home country. He now sees bidding for products of this type as a waste of his group's time and money.

Perhaps the most persuasive reason to move growth items to LCCs is to build your strongest position in your best products, not your worst ones. Moving sunset categories to LCCs while leaving the “company jewels” in a high-cost environment does not make a lot of strategic sense. Experienced companies find other ways to deal with sunset product categories—including, when the time is right, pruning them from their portfolios.

Finally, it is much easier to convince labor unions of the merits of shifting additional or new jobs to LCCs, rather than existing jobs. Many companies have taken this approach to outsourcing processes, focusing first on processes that are resource constrained. For example, an executive at one company we worked with, facing a cap on his R&D budget and an ever growing pipeline of new projects, decided to outsource parts of the company's R&D processes—including 3-D modeling, simulation, and component testing—to an LCC. He then offered these LCC-based services to his R&D team at zero cost, as an incentive for the team to use them.

Products with large LCC markets. As discussed above, LCC markets are becoming an integral part of global strategy. Product families that have large actual or potential markets in LCCs are obvious candidates for relocation. In this respect, China's emergence has rewritten the basic calculus of relocation. In the past, many companies tended to consider LCC markets as a mere footnote to their overall strategies—if that. The vast majority of both their sales and their prospects for growth were invariably in developed economies. Today China has turned this logic on its head. Especially for upstream industrial companies—those active in metals, machine tools, and automation equipment, for instance—the growth of China's domestic consumption is compounded by the massive relocation

of industrial companies to China, creating markets so huge and fast growing that companies cannot afford not to serve them.

Products and services with developed LCC supplier bases. Clearly, products and services for which well-developed supplier bases exist in an LCC are likely to be easier to transfer than those for which suppliers must be developed. Outsourced services in India—whether entire processes or call centers—are a good example. Over the last few years, India has built a critical mass of skills and infrastructure in this area. The existing supply base attracts new business in a virtual circle: a large number of entrepreneurs offer these facilities,

attracting an inflow of skilled people and the development of telecom infrastructure (fast becoming world class), which in turn attracts more business and new entrepreneurs.

Auto components in Thailand have followed the same pattern. From a small base ten years ago, the gradual establishment of manufacturing facilities in Rayong, south of Bangkok, has led to the development of a base of suppliers, facilitating the entry of new players. A similar pattern developed in Malaysia for electronics, allowing Malaysia to build a 20 percent share of total LCC exports of electronics to the United States—quite a feat for this relatively small economy.

Products with standard manufacturing interfaces, and services with standard processes. Products with these manufacturing characteristics will be fairly easy to relocate to LCCs because they do not require specialized human resources for routine production. It is important to note that these characteristics are independent of the technological complexity of the products in question. Electronics, for instance, moved early and aggressively to LCCs. Plans have been announced to construct some 70 wafer-fabrication plants in China, at a total estimated cost of well over \$100 billion. Intel has built R&D labs in China, and Sony has taken its laptop PC assembly there. AMP, one of the world's leading

China's domestic markets are so huge and fast growing that companies cannot afford not to serve them.

manufacturers of electrical and electronic connectors and interconnection systems, is moving much of its production to China, including even its highly proprietary plating operation, which must be done in-line.

On the services side, Capital One, Citibank, and Providian have all shifted their telemarketing functions to India. Since telemarketing focuses on outbound calling, it requires little interaction with other functions; moreover, it is largely script based, making it easy to relocate.

What Should Not Go?

Some products and services are intrinsically less suitable for LCC sourcing. These include industrial products that are not disadvantaged by labor cost, as well as products that require production customization, such as high-end machine tools and specialized drilling equipment. Similarly, services requiring considerable interaction and decision making—such as gathering market intelligence and doing product planning—are less likely to be sourced from LCCs. While there are exceptions to every rule, products and services that should stay at home generally include those for which protection of intellectual property is critical, those with extreme logistics requirements, those with very high technology content or performance requirements, and those for which customers are highly sensitive to the location of production.

Products and services for which protection of intellectual property is critical. Concern about potential violations of intellectual property (IP) is a major issue in most LCCs, and especially in China. This concern is based on the difficult experiences of early movers, the often unclear laws governing intellectual property in some LCCs, and the reluctance or inability of some LCC legal systems to provide timely redress. Many companies simply do not believe that they can deploy strategically important processes or technology in this context. However, this attitude is changing quite rapidly; as more and more companies develop their own operations in LCCs, they feel more confident that they can maintain better control over their IP.

In addition, it is important to note that approaches to IP protection vary widely among LCCs. India, for example, has intellectual property laws based on the Anglo-Saxon system familiar to most Western companies. Though the Indian legal system moves slowly, the protection of intellectual property is an established practice. Microsoft, for example, has noted that India has the lowest piracy rate among the “BRIC” countries—Brazil, Russia, India, and China. In addition, for companies seeking to outsource services, IP concerns may suggest setting up captive offshore service centers, rather than outsourcing to vendors—or not outsourcing at all.

Products with extreme logistics requirements. Some products must meet very short lead-time cycles, as in just-in-time production in the automotive industry. Most LCC supply chains have three- to eight-week order-to-delivery times. Therefore, they would not meet these stringent requirements—or would require prohibitively expensive logistics infrastructures, such as significant safety stocks on both the sending and the receiving ends of the process, which would reduce working capital productivity. In other cases, extreme volatility in demand might aggravate the lead-time issue. For example, in the building and construction industry, weather conditions often drive purchasing up or down significantly beyond original order forecasts. Responding to these sudden short-term changes, when response is even possible, would require such substantial investment in logistics infrastructure that the LCC cost advantage could be obliterated.

Products and services with very high technology content or performance requirements. These categories sometimes cannot initially be moved to LCCs, simply because necessary resources are lacking. Advanced technologies—including both tools and the human resources trained to use them—often are just not available in LCCs at this stage. And although it is physically possible to import or relocate the necessary resources, the cost of doing so would far outweigh the advantages to be gained in the LCC. However, this technological or performance boundary is an ever moving target. Investments by the LCCs themselves and by early-mover companies are rapidly changing the rules of

the game. An example is GE's nanotechnology research in India.

It is essential to explore this issue relative to each industry in each LCC location. For instance, it is common wisdom today that certain metals—for example, high-grade specialty steel—cannot be sourced from China. This is especially true in the fast-growing categories needed for appliances and cars. However, this gap is closing fast, thanks to massive investments by both global and local producers. In fact, many product categories may face an oversupply situation in the next several years.

Plastic parts are another example. Companies in this industry started working in China by producing low-tech, commodity-material injected parts, using imported resins and molds. Clusters of activities grew around Guangzhou and Ningbo. Then companies started to make their own molds locally. At first they had to use poor materials that didn't last long. As profits accrued, they could afford high-carbon steel for better molds, which led to improved domestic resins.

In evaluating LCC capabilities in this respect, Western companies need to keep very open minds, resisting the natural tendency of their technical centers at home to produce conservative assessments of the capabilities of LCCs. Companies need to perform frequent and exhaustive scans of the environment.

Products for which customers are highly sensitive to the location of production. In some cases, such as certain military contracts, stringent local-content requirements prevent companies from sourcing from LCCs, at least for the time being. In other cases, customers may have strong feelings about various qualities—perceived or real—associated with specific production locations. All else being equal, most customers would choose home production at LCC prices. The key is to understand the tradeoffs they are willing to make.

In industrial sectors, this concern can be manifested as an issue of transition management. Companies sometimes find that when they relocate production to an LCC, their customers require

them to undergo a full requalification process—even if they relocate only a single key component. Although the process can be expensive and complicated, if the company can provide high quality at low cost, the orders continue flowing. Nevertheless, customer sensitivity can be a major issue in relocating sourcing to LCCs.

How to Decide Where to Go?

Now, more than ever, choosing where to source or produce goods and services is a complex issue, involving multiple location options, multiple parameters, and multiple decision makers—all of whom are likely to have differing perspectives on the locations and parameters to be considered. The complexity of the issue can be daunting.

A framework for reducing complexity and clarifying the options. In making these decisions, companies face a virtually infinite array of possible combinations. We have found it helpful to think of supply chains as falling into five basic models, ranging from internal optimization to truly global production. (See Exhibit 10.) Referring to this range of models, companies can create a manageable number—generally four to seven—of supply chain options that combine various locations and sourcing and assembly configurations.

They can then analyze the economic, strategic, and operational pros, cons, and risks associated with each option. In this way, companies can make decisions that are both creative and pragmatic. The process can also serve to get the many decision makers across the company to buy into the ultimate decision.

Critical parameters for making the decision. Essential parameters to be considered in deciding where to go include proximity to the company's home base or to markets, a critical mass of industry activities, the locations of the company's existing investments, the availability of talent, and government policies in the various LCCs under consideration.

Proximity to the company's home base or to markets. Naturally, some products benefit from proximity to their destinations—because they are very heavy or

bulky to ship or because they are best sourced from “backyard” countries. For companies in the United States, that means sourcing from Latin America (especially Mexico), whereas for companies in Europe it means sourcing from Eastern Europe (for example, Hungary, Poland, or the Czech Republic).

Other products that currently benefit from being sourced from Mexico or Eastern Europe, rather than China or India, are those with unpredictable demand. This is especially true if these products also have short lead-times. However, our research has revealed an evolving pattern in the sourcing of these products. First, as companies grow more confident in their supply chains, they tend to shift a greater range of products to faraway places. Second, recognizing that their investment decisions have long half-lives, companies that are advanced in their use of LCCs are paying more attention to the long-run competitiveness of various LCCs. China’s long-term cost advantage and growing sophistication are prompting companies to move some products from Mexico, despite the issues of longer supply chains.

Some companies are experimenting with a combination approach, locating base production in China and a “burst” capacity in Mexico or Eastern Europe to handle peak demand. At present, results are mixed. The “close to home” facilities are often subscale and expensive. Moreover, companies cannot develop local supplier networks for these facilities effectively because of lack of volume. So they must often import key components from elsewhere (typically from the main plant in China).

Critical industry mass. An important criterion in choosing an LCC is whether there is a critical mass of companies, in the industry in question and in related industries, that are already doing business there. Clearly, LCCs that have highly developed infrastructures, including relevant suppliers, can offer more compelling advantages than lower-cost locations that don’t have such infrastructures. As mentioned above, the automotive industry enjoys such critical mass in Thailand, for example, as does the electronics industry in Malaysia. China is now emerging as such a locus for industrial goods as a whole, as India is for services.

EXHIBIT 10

COMPANIES NEED TO CHOOSE THEIR OPTIMAL SUPPLY-CHAIN MODEL

Supply Chain Model	Option Description
Optimization of existing plants	Fully implementing lean manufacturing Achieving reductions in the cost of materials
Selective sourcing	<p>Option A Single-SKU sourcing: sourcing a limited volume of low-priced parts for tactical use</p> <p>Option B Single-line sourcing: sourcing 100 percent of a core line on a direct import basis</p> <p>Option C Base-line sourcing: sourcing base-line, peak-season demand of top SKUs</p>
Low-cost production	Producing 100 percent of core lines in low-cost countries
Domestic assembly	Assembling to order, in the home country, components sourced from low-cost countries
Global production	Assembling to order, in a low-cost country, components sourced from other low-cost countries

Source: BCG analysis.

Locations of existing investments. A company's existing investments in one or more LCCs can have a major bearing on its decisions about sourcing other products or services. On the one hand, this factor works in favor of countries where a company is already invested. When a company establishes a base in an LCC, it tends to expand in that country, particularly in the same product category. On the other hand, many companies look to diversify their portfolios of locations in order to manage their exposure to any given country.

Companies for which a single plant can efficiently serve global markets—and there are many—do not have the luxury of managing portfolios of plants. They need to make an all-or-nothing decision to choose one LCC. Over the past several years, many companies have located single-sourced factories for global products in LCCs. For example, GE put its medical-imaging facilities in China and its call centers in India. American Express, British Airways, Citibank, Standard Chartered, and Siemens are examples of companies that set up back offices in India early on and have since expanded those operations significantly.

Availability of talent. Talent of the right kind is a key issue in choosing a location. Language, industry knowledge, and cultural compatibility are among the parameters that define desirable talent—and affect location decisions. For example, because it is difficult to find many people who speak French or German in China or India, French and German companies tend to favor outsourcing locations in Eastern Europe and North Africa. Similarly, human resources services such as investment advice are not easily handled out of LCCs, given the lack of local knowledge about Western financial markets. Contact centers established in India spend a fair amount of time training their teams on the cultural nuances of the regions from which they receive calls, to avoid faux pas.

Government policies. Government policies are often a major determinant in the choice of a particular

LCC, since they can significantly affect the economics of an investment. Beyond incentives, discussed above, overall policies toward trade and international relations can be a significant factor for companies. For instance, China's economic openness has been increasingly attractive to companies, in contrast to the relative lack of openness that prevails in India.

Not India versus China, but India and China. Ultimately, companies that are testing the waters of LCC sourcing—or cautiously expanding their cur-

rent levels of sourcing—must choose which product families to source from which LCCs on the basis of their own criteria and priorities. For example, if they decide to

source, say, castings and call center services, they should evaluate and compare the LCCs to decide which locations offer the greatest advantage. However, leading companies are not simply selecting a particular product-country combination but proactively developing the LCC value chain into a network of products and services. For example, a leading retail chain in the United States has its soft toys designed in India and manufactured in China, with the vendors tightly linked in the company's global supply chain.

GE, which operates four BPO centers in India and one each in China, Mexico, and Hungary, has outsourced more than \$35 billion of purchase orders to these centers. GE's global "work tools" for operating these LCC-networked processes are so robust that a single purchase order from the United States might be processed in more than one center.

Successful companies keep the choices simple. Some simplify the equation to one of a few select locations. Often this will boil down to Mexico and China for companies in the United States or to Poland and China for companies in Europe. The key here is not to reinvent the wheel. China should be a default on everyone's list. Mexico and Eastern Europe should also make the list in the United States and Europe, respectively. Other countries

Leading companies are proactively developing the LCC value chain into a network of products and services.

where a company has invested in the past (if any) could also be included, and India should be considered for processes. When companies attempt to go much beyond this framework, they often fall into analysis paralysis.

Setting the Scope and Speed of Low-Cost-Country Strategy Rollout

Industrial companies are at different stages with respect to deriving advantage from LCC sourcing and manufacturing. In our experience, companies tend to be at one of five levels. (See Exhibit 11.)

Level 1: Testing the Water. Many companies today still have not undertaken any formal initiatives in LCCs, although some may be sourcing basic commodities on a trial basis. In our view, there is little competitive advantage to moving so cautiously. One small benefit

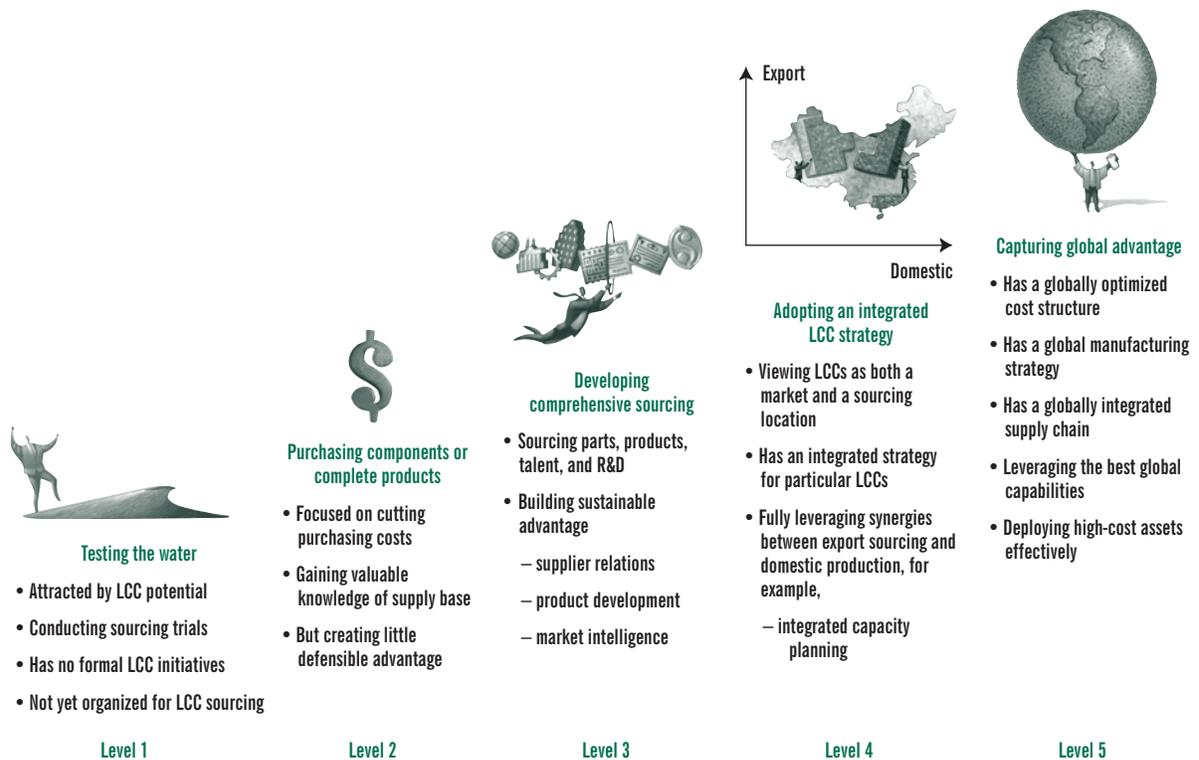
may be the chance to learn from the mistakes and successes of other companies. But that learning certainly does not outweigh the opportunity cost.

Level 2: Purchasing Components or Complete Products. Most large companies active in LCCs are essentially buying or manufacturing basic products and components that meet their standards at the lowest possible cost. The advantage they gain is a lower cost structure than their less aggressive competitors enjoy, as well as the knowledge gained from working with particular suppliers and a greater understanding of the overall supply base. Valuable as these advantages are, they can be quickly wiped out as competitors rush to achieve the same savings and insight.

Level 3: Developing Comprehensive Sourcing. Motorola intends to have \$10 billion in accumu-

EXHIBIT 11

COMPANIES ARE AT DIFFERENT LEVELS IN CAPTURING GLOBAL ADVANTAGE



SOURCE: BCG analysis.

lated purchase volume from China and to be producing \$10 billion a year in goods there by 2006. It also intends by then to have made investments in China that total \$10 billion, including building a global R&D center in Beijing and hiring almost 5,000 researchers. This type of sourcing strategy goes well beyond procuring simple commodities and components to include services and talent such as product design and engineering. Because other companies can't easily replicate the close relationships with key suppliers or attract the best designers and engineers, comprehensive sourcing locks in a competitive edge, reducing dependence on imports from high-cost countries. There are also potential time-based advantages, such as accelerating product-development cycles.

Level 4: Adopting an Integrated LCC Strategy.

Increasingly, global automotive OEMs operating in LCCs, as well as their suppliers, see LCCs not just as an important market or as a principal supply base for goods to be sold elsewhere, but as both. For these players and others, operating in LCCs demands an integrated strategy. Each business line must be designed to outsource components for products that will be sold both abroad and to the local market. Although the Chinese market is uniquely vast in scale, the same logic applies to other LCCs with healthy and growing domestic markets. An integrated strategy offers additional synergies due to scale, boosting potential savings. Also, capacity planning is integrated: plants are sized to realize full economies of scale and configured to meet both local and global requirements.

Level 5: Capturing Global Advantage. Although many companies talk about integrating LCC sourcing into a business model that is truly managed across many countries, only a few are close to achieving that goal. For example, Toyota, with its closely coordinated manufacturing and supply operations across regions, successfully sources sub-assemblies from all over Asia, enabling the company to optimize manufacturing costs and just-in-time delivery.

The five levels of advantage are not a ladder: a company doesn't necessarily move from Level 1 to Level

2 to Level 3, and so on. Companies sometimes shift quickly from, say, a cost-focused strategy for basic components to an ambitious integrated strategy. Similarly, many companies that have been selling in China for some time are now, in a sense, backing into sourcing, and they are also beginning to manufacture for export. Examples include Siemens, GE Appliances, and several global automotive OEMs.

Considering the speed with which cost structures are globalizing, specific windows of opportunity are opening and closing, and many competitors are putting stakes in the LCC ground, companies should aim high and act fast. For most companies, Level 4—adopting an integrated LCC strategy—should be the prime target. For a few companies, a pure Level 2 or Level 3 play will provide sufficient advantage in the medium to long term. Players that master Level 4 will reap the vast range of LCC benefits, whether through sourcing, selling in the new, fast-growing markets, or both. Developing a broad set of experiences will enable them eventually to move to Level 5, which provides the maximum benefits of global advantage.

One word of caution: in many cases, the scope and speed of a company's LCC rollout will depend as much on the management team's ability to implement a comprehensive LCC strategy as on the benefits of such a strategy. A key aspect of managing the move is understanding the economics involved.

Getting the Economics Right

Many companies, as they approach decisions about sourcing or manufacturing in LCCs, make fundamental miscalculations of one kind or another. To avoid such mistakes, it is critically important to model the right elements of both advantage and cost. (See Exhibit 12.)

Your calculations should cover not only the initial investments involved but also ongoing costs and savings—including anticipated productivity improvements. The most effective way to determine the net attractiveness of multiple sourcing or relocation alternatives, as for many other types of investments, is by performing a net present value (NPV) calcula-

tion. This calculation forecasts the expected savings stream of a particular investment based on the incremental LCC-specific costs to be incurred over the investment period—typically five to ten years. The NPV assessment model is a comprehensive, number-based decision-support framework. Notably, it enables a company to “stress-test” the economics of the potential investment under various positive and negative scenarios. Understanding the impact of sudden changes in factor costs such as labor, energy, or materials, as well as exchange rates or duty rates, is absolutely vital. So is a comparative analysis of investments across competing countries. In our experience, the exercise of formulating the right set of what-if scenarios is a valuable part of best-practice LCC planning routines. Such simulations can provide critical information on the risk profiles of competing options relative to the risk appetite of a specific investor.

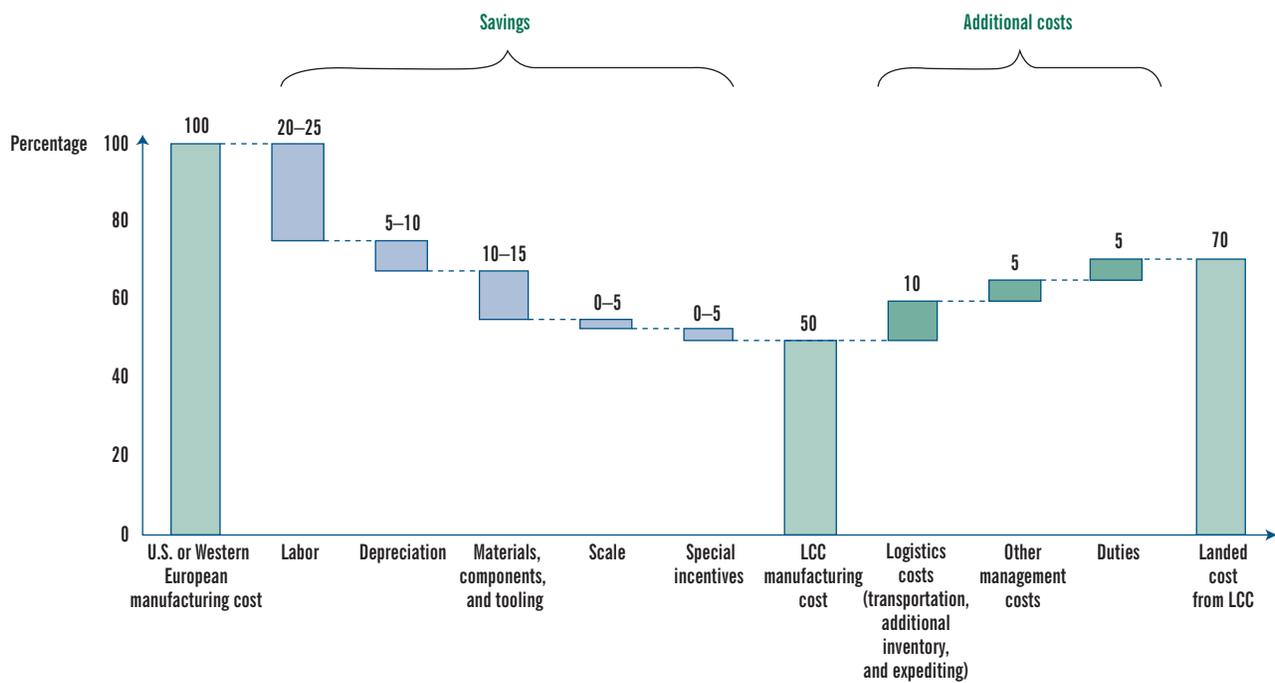
In doing this kind of modeling, it is important to adapt your products and services to the conditions of the LCC. The capital-intensive product designs of the West are not directly applicable to LCC conditions. Companies that aim merely to source existing parts, without putting any investment into developing suppliers or local production, may see only modest cost improvements—on the order of 10 percent. In this case, why bother going?

Similarly, it is important not to underestimate the initial investments involved. Developing a supply base can be quite expensive and difficult. For example, Carrier, a major manufacturer of air-conditioning equipment with deep expertise in sourcing in China, obtained 1,600 quotes before making its first order in its first year of operation. In addition, restructuring existing facilities in the West can take many years and cost huge amounts. Estimating the

EXHIBIT 12

IT IS IMPORTANT TO MODEL ALL THE ELEMENTS OF BOTH LCC SAVINGS AND ADDITIONAL COSTS

Modeled Economics for a Typical Industrial Product Sourced from an LCC



Source: BCG case experience.

setup costs for outsourcing a process, including senior management time, is not a trivial exercise; most companies get it wrong.

On the positive side, be sure to factor in significant ongoing productivity improvements. Improvements of 10 to 15 percent per year are routine for well-established players in China. Often, players that are not established in China shy away from building these expectations into their cost analyses (although they happily include anticipated year-on-year improvements in their home-country costs).

Finally, do not overdo the analysis. Many companies become completely overloaded with analysis—and paralyzed by it. Get the basic numbers you need to compare several solid options, and then make a decision.

Identifying and Mitigating the Risks

Clearly, concern about various kinds of risk—including delivery execution risk, competitiveness risk, transition risk, risk to intellectual property, price erosion risk, and several kinds of country-related risk—can be a major impediment to moving to LCCs. Although these risks are real, experience has shown that they can be managed—and that there may be greater risk in failing to make the move.

Delivery execution risk. This form of risk should not be underestimated, particularly in long supply chains such as those from Asia to the United States or Europe. These risks have multiple sources. Some, such as shipping delays, unavailability of shipping capacity, and customs issues, are related to the physical transport of goods. Others are linked to procurement issues. Examples include high numbers of rejects, inability of vendors to scale up, and disruption in delivery schedules. Another large problem is the risk of being unable to access the local market because of distribution challenges.

Loss of cost competitiveness. LCCs can lose part of their competitive edge over time through unex-

pectedly steep increases in factor costs and drastic exchange-rate movements. The exposure can be significant. In our experience, however, companies tend to be overly concerned about labor rates. Though rate hikes of 10 percent and higher are likely to occur in many LCCs, those raises are on very small bases. Moreover, they are often more than offset by productivity improvements.

Energy costs are another major concern. In many LCCs, electricity generation is reaching its limits, driving market prices up until new power-plant capacity comes online.

The most important issue may be LCC exchange rates. A 30 percent revaluation of the Chinese yuan, for ex-

ample, could erode a major portion of the cost advantage. We expect that, in reaction, Chinese companies would substantially accelerate productivity enhancements that could compensate for a major part of the currency disadvantage. Nevertheless, it would be hard to capture the full original advantage. Currency hedging can be a (costly) short-term answer, but it is not an option for companies investing for the next decade. The currency game can also result in significant unexpected gains, such as in the case of Thailand after the 1997 Asian crisis, when sourcing costs dropped by 40 percent almost overnight. There is no magic formula to protect against currency swings. In our experience, building a portfolio of assets and suppliers across a range of LCCs is one of the most effective approaches.

Transition risk. This includes the risk of customer defections because of the move to foreign production. Initially, as many as 5 to 10 percent of customers may be disaffected, though over the long run the impact is usually limited.

Intellectual property risk. As discussed above, the protection of intellectual property has a very poor track record in many LCCs. A company might have spent millions to develop a patented process or technology, only to see it reverse-engineered in an

Productivity improvements of 10 to 15 percent per year are routine for well-established players in China.

LCC. While it is unlikely that a producer using stolen technology would be able to export it, the theft could seriously undermine the ability of the legitimate technology owner to sell in the local market. Although there is no foolproof method of protecting intellectual property, our experience suggests that the best approach combines several elements:

- Keeping the most sensitive products and processes in-house, even if they are produced in LCCs
- Keeping some critical elements out of LCCs, so that the product or subassembly cannot be copied
- Leveraging contracts to the full extent, including stringent enforcement
- Investing in supplier qualification, training, reward programs, contracts, and enforcement
- Investing in employee retention programs
- Lobbying LCC governments—alone or in cooperation with industry groups—to continually raise the bar on the protection of intellectual property

Price erosion risk. In all likelihood, LCC-based competition will ultimately lead to some degree of price deflation. To stave off this eventuality as long as possible, companies must vigorously maintain their original standards for product quality and service. On the service side, it is absolutely critical to provide the same lead-times and delivery performance that the company offered before going to the LCC. Meeting these customer expectations usually means incurring higher costs for buffer inventories along the LCC supply chain, as well as making occasional “emergency” shipments. Companies making the transition to alternative sources have found that a proactive customer-communication program, explaining what will change and what will remain the same, is one of the most effective ways to maintain customer satisfaction and pricing.

In cases where LCC sourcing will initially not meet the original service standards, companies should consider introducing a two-tiered pricing structure with a dedicated slightly lower price for the LCC product. In semifinished metal products, for example, the price differential should be based on the additional cost a metal service center will incur to maintain additional inventories to compensate for the increased variability in lead-time and delivery performance. In parallel, the franchise of a strong industrial brand will play an increasingly important role, regardless of origin. The automobile industry provides several compelling examples of premium products manufactured in LCCs without sacrificing price point: the Volkswagen Touareg SUV is made in VW’s Bratislava plant in Slovakia, while Audi’s TT sports car is made in Győr, Hungary.

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General country risk. This type of risk includes a whole range of social issues, such as education, health care, union militancy, and government corruption. Political risk is also much on investors’ minds. The instability in Southeast Asia in recent years has caused considerable concern. Economic risk also looms large. Some companies will have an intrinsic advantage in managing such risks. For example, a South African investor in Mozambique should be able to better manage the various aspects of local country risk because of strong bilateral government relationships, better country intelligence driven by geographic proximity, and greater familiarity with local business practices.

* * *

The careful analysis of relative advantage, cost, and risk under various scenarios is not a calculation to be made just once. Because the components of competitive advantage are constantly evolving, substantial shifts in risk are possible. Savvy companies frequently reexamine their assumptions, revisit their analyses, and keep their contingency plans up to date. They also boost the odds in favor of success by paying meticulous attention to the day-to-day business of managing their global operations.

The Operational Challenge: Making It Work

The economics driving the globalization of cost structures and business models will persist indefinitely. The competitive advantage of a truly global business, which leverages the lowest costs and the best capabilities, is structural in terms of both scale and locked-in relationships. Moreover, because it is based on capabilities, it is very difficult for competitors to replicate. It is also very difficult to achieve. Often the biggest hurdles are organizational barriers.

Overcoming Organizational Barriers

Regardless of where a company is in the process of relocating procurement, production, or other operations to LCCs, establishing the new operations and then managing them from day to day can be highly challenging, both in the LCC and back in the home country. For example, a recent BCG benchmarking study revealed that five global engineering companies have had very different experiences establishing engineering centers in India. While the most successful of the companies has grown from fewer than 50 engineers to more than 1,400 in just four years and has filed for more than 20 U.S. patents during the period, the least successful has grown to only a few hundred engineers—despite having been in India for more than six years. What made the difference between the front-runner and the much less successful company? The former was able to surmount the organizational hurdles and sustain momentum, while the latter was not.

Most relocation efforts start off with a great deal of fanfare. Either the chairman sets ambitious targets or there is a grass-roots bootstrap effort led by a few people, typically purchasing managers under serious cost pressure. In either case, the team in charge of the effort is brimming with ambition. After a few months, however, the team finds its momentum flagging. The volumes of products or service orders transferred to the LCC are smaller than expected, so the savings are lower. Back home, meanwhile, many business units, product lines, and functions

are delaying their promised participation in the project. Initial quality problems emerge, further compounding the problem. The overall effort gets stuck and is difficult to restart. How can companies avoid this trap?

In our experience, companies can do a number of things to ensure that their LCC initiatives are successful. These include leading from the top, setting aggressive targets and links to personal incentives, establishing ambitious productivity-improvement targets in the home country, fine-tuning individuals' incentives, defining appropriate structural linkages and mechanisms, putting one person in charge of LCC operations companywide, separating local operations from global efforts, seeking vendors that manage risk meticulously, and communicating early and often.

Leading from the top. This is the single most important element in taking advantage of LCC opportunities. Every successful company we have worked with and every executive we have interviewed positioned this element as the foremost success factor. Companies that do not benefit from active leadership from the very top often fail to get their operations off the ground. Companies that have leadership from the top often achieve excellent results. Why is senior-level leadership so important?

First, LCC operations are by their nature a cross-departmental issue. Whether an organization is structured regionally, by customer segments, by technologies, or as a matrix, LCC operations will cut across the existing departments. It will thus force one or more parts of the organization to assume some level of cost or risk for a potential benefit that will accrue to another part or parts.

How does this play out in practice? The head of Chinese operations needs to support an effort that will be reflected in the P&L of his or her European or U.S. colleagues. The head of technical activities in Germany must qualify suppliers in Poland, knowing that the move will increase the chances of his or

her department being downsized in the near future. The head of logistics must support a process that will by definition increase lead-times and inventory costs (because of the longer supply chains involved in LCC sourcing) when his or her incentives (and bonus) are based on reducing both measures.

How do you overcome these conflicts of interest? What does leadership from the top mean? First of all, the company's chairman or CEO must get directly involved. The leader's involvement often takes the form of internal sponsorship of the project: holding regular meetings and updates, celebrating key successes, regularly tracking agreed-upon measures. Increasingly, we also find CEOs using externally set targets as a means of getting results. For example, they flag this topic with analysts, thus making the success or failure of the effort their own problem.

Beyond this CEO engagement, one or more senior managers must drive the effort. For instance, the head of global purchasing for a major industrial company chaired a meeting at 5 a.m. every Thursday over several years. He chose the early hour in order to allow teams across the globe to participate by means of several dozen video links. This forum made it possible to resolve issues on the spot, in real time. Moreover, the evident dedication of the senior manager made it clear to all concerned that the effort must not fail.

The stability of the senior sponsors of LCC operations is crucial. In companies that fail to sustain and grow their LCC efforts, we often see a pattern in which the project is assigned to various executives in succession over a period of a few years. None of them really get their hands around the issues sufficiently to become effective advocates. At GE, truly effective advocates are called zealots, and unless there is a zealot sponsoring a BPO project, it does not get launched.

Setting aggressive targets and links to personal incentives. We have found that companies that are

successful in relocating operations to LCCs generally ask different questions of their organizations than companies that are not successful. Successful companies change the paradigm. They ask themselves, "What must I keep at home?" rather than "What can I shift to LCCs?" Their question is not "Why outsource to LCCs?" but "Why not?" This apparently subtle distinction reflects a fundamental difference in attitude and goals. The burden of proof shifts from the LCC sponsors to the existing organization, which now needs to prove—and improve—its own competitiveness.

Successful companies ask themselves, "What must I keep at home?" rather than "What can I shift to LCCs?"

Companies that operate this way start from the premise that everything is probably better produced in LCCs. They then work backward to identify what

needs to be kept at home, for the various reasons discussed above. The decision process is very different, and the outcome is always more aggressively in favor of LCC operations.

GE had a very simple rule to push executives to source more IT services from India: the rule of 70-70-70. That is, 70 percent of IT developed should be outsourced, 70 percent of that work should go to GE's Global Development Centers, and 70 percent of this should be outsourced to LCCs. Performance was measured against this rule at every operations-review meeting. GE also set an ambitious target of \$1 billion in sourcing from China, starting from zero in 2002. The key is to set targets of this kind—very clear, very visible targets, with teeth that are big enough to cause disruptive behavior.

Establishing ambitious productivity-improvement targets in the home country. Most companies base their cost-reduction targets for their LCC operations on levels of reduction that have been possible historically in the home country. In the West, this approach most often leads to targets of 3-to-5-percent improvement per year—or even less. What is wrong with this approach?

A productivity improvement target of 3 to 5 percent is simply too low to give a company an incentive to look into LCCs. Most companies can meet this tar-

get with current suppliers and current operations, through production process reengineering, investments in technology, and reduced costs at suppliers. Managers will very likely say, “If I need to hit a 4 percent improvement target, I know I can do it with my current guys. But it will require a lot of hard work. I don’t want to put this effort in jeopardy by diverting a lot of time and effort to the more risky LCC alternative. If I achieve more than the 4 percent savings, I won’t get anything for it anyhow.” This attitude is widespread in companies that are finding it difficult to achieve momentum.

Companies with experience in LCCs set ambitious improvement targets of 10 to 15 percent per year—levels that can be achieved only through a massive relocation of sourcing, production, or other operations to LCCs. One head of purchasing told us that raising the improvement target to this level was the most important change he made in mobilizing his organization behind the effort.

In business processes, our study revealed that few companies have detailed performance metrics that they monitor regularly. One of the benefits of outsourcing is that it forces a company to set up the metrics for each outsourced process and then to set ambitious targets for the vendor.

Beyond the productivity improvement targets defined in percentage terms, it is also crucial to have ambitious absolute targets for LCC operations. Companies that have succeeded in China have generally set stretch targets and communicated them very clearly. GE is again an excellent case in point, with its Chinese-slogan-style 5-5-5 program: \$5 billion in sourcing, \$5 billion in sales, by 2005.

Fine-tuning individuals’ incentives. Like incentives in general, individual incentives can be potential barriers if not addressed. Most departments and individual staff members don’t have direct incentives to support LCC operations, let alone actively promote them. Often they even have disincentives. The head of product development will not benefit

directly from a reduction in cost, but he or she needs to work hard to make the move to the LCC happen. The head of logistics is typically rewarded for reducing freight and inventory costs—both of which will increase with sourcing from LCCs. Buyers will lose local volume and therefore leverage with their existing suppliers. The head of China may be asked to fund a global-sourcing office from his or her own budget for several years. And everyone faces the risk of transition.

Defining appropriate structural linkages and mechanisms. The first principle here is to build linkages among all the departments involved. LCC sourcing, for example, can’t be done by the purchasing or manufacturing

function alone; it requires cooperation from every department in the organization, including legal, R&D, human resources, finance, and logistics. Linking mechanisms include, for instance, processes and conference calls to coordinate cross-functional, cross-regional, and cross-business-unit inputs; decision-making meetings to drive sourcing decisions; global e-rooms to share relevant data; and numerous coordinating schedules and tracking tools. Whether the company has an internal mechanism to make these functions work together or not is critical to its success in LCCs.

Second, it’s important to build linkages between LCCs and home countries. A number of the companies that have set up global-sourcing offices in China have adopted a “baseball” model: there is a “pitcher” in the home market who manages the links with the home organizations and a “catcher” in the LCC who coordinates with the business units locally. The catcher also works with buyers (usually organized by commodities). The key is constant communication.

In another model, highly successful BPO firms or in-house centers located in LCCs often station a “front end” team in the LCC office that consumes this service. This team builds linkages, troubleshoots, and also does evangelical marketing on behalf of the LCC team.

LCC sourcing requires cooperation from legal, R&D, human resources, finance, and logistics departments.

Putting one person in charge of LCC operations companywide. This person must have execution authority, because splitting this authority among several people, one in each unit, leads to ineffectual decision making. Typically, U.S. units of global companies might consider LCCs to mean only Mexico, while European units might look only at Eastern Europe, even though the company overall could gain much bigger advantage from China. It is difficult to manage these issues across organizational boundaries unless one person heads up the activity companywide and looks at opportunities globally.

In addition, it is important to identify your starting point and construct balancing mechanisms. In our experience, companies that are organized regionally often face the greatest barriers. If your company is organized regionally, set up a council at the very top level to ensure that someone is pursuing nonregional and transregional opportunities. If your organization is focused on business units—as is often the case in industrial groups—establish a special task force under CEO direction to create the scale required to look into LCCs.

Separating local operations from global efforts. These activities are too different in nature to coexist comfortably in one start-up operation. The local operations function in day-to-day operational mode, focusing on the commodities required for their factories. In general, the people hired to manage those operations are skilled in that activity and know only that market. They are not trained to interface with Western counterparts. Certainly, global and local operations in the same LCC can realize synergies through various coordinating mechanisms, but they should not risk losing their respective focuses by becoming entirely integrated.

In the global operations office, in addition to the people who manage the global links and the local business units, technical resources are needed to qualify suppliers, inspect parts, and ensure quality. Supply chain managers complete the office. While the size and type of office naturally depend on the size and complexity of the operations being managed, such offices usually have at least 20 to 30 peo-

ple and can have as many as several hundred. They are typically located close to or within the LCC where the company has its largest operation. In Asia this tends to mean Hong Kong or, increasingly, China itself.

Seeking vendors that manage risk meticulously. As volumes have increased and supplier bases matured, LCC-based supplier companies have learned to deploy robust risk-management approaches to address most of the kinds of risk discussed above. For example, to address country risk, a BPO vendor would have multiple sites and would cross-train agents. To manage performance and pricing risks, a vendor might install switchable bandwidth, set up real-time data mirroring in another country, write tightly defined SLAs with early-warning signals, buy insurance from an international insurance firm, and agree to arbitration in a client's home country rather than in the LCC.

Communicating early and often. Effective communication—both internal and external—has become particularly important recently, given the widespread concern about the impact of outsourcing on jobs in home countries. On the one hand, analysts are looking for more aggressive LCC strategies; on the other hand, the popular press and politicians are targeting companies that have been aggressive on this front. Several companies have responded by demonstrating persuasively how their LCC strategies are linked to their long-term vision to create shareholder value. It is also critical not just to address risks but also to communicate throughout the organization, explaining how the various risks have been addressed, so that concern about them doesn't remain a barrier.

Getting Your Low-Cost-Country Operations Right

While each LCC operation necessarily faces unique circumstances, there are a number of critical elements common to all of them. Management can go a long way toward ensuring success by designing processes and products to address LCC issues, investing in good government relations, building the local organization quickly, getting products flowing to markets fast, building a process that

spans LCCs and the home country, aggressively managing suppliers, using modern tools effectively, and exiting marginal assets in high-cost countries efficiently.

Designing processes and products to address LCC issues. For example, companies may need to establish human rights policies. In some LCCs, production labor is often required to work prolonged hours under conditions that would not be acceptable in other countries. Many companies define human rights policies before selecting suppliers and then monitor compliance carefully, ensuring, for example, that basic working conditions meet acceptable standards, especially with respect to safety.

Processes may also need to be redesigned to protect intellectual property. Many companies avoid locating sensitive technology in LCCs. When there is no choice, they take extreme steps to protect it. For example, in China, AMP has its key process performed in a secret, enclosed bay, using U.S. materials and technicians; the workers are under a special high-reward/high-penalty contract. Other ways to encourage integrity among employees include job rotation, education, training, and the incorporation of integrity assessments into performance reviews.

Products should be engineered to suit LCCs. This may require simplifying the product so that it can be produced with more manual operations or changing the material specifications so that local materials can be used. It could also involve reconfiguring the product so that subassemblies can be unbundled or rebundled to further optimize sourcing and assembly in various locations and using various suppliers. This task requires skills that need to be developed locally; often it requires investing in technical resources that have experience in LCC manufacturing.

Investing in good government relations. Companies must dedicate significant resources to establishing and maintaining good government relations, especially in China. For example, Kodak has a unit of 15 people led by a senior vice president responsible for government relations; Motorola has a unit of 10. Specialized firms can also help in this regard.

Former officials are often useful because of their government connections. Senior company managers must be actively involved in the relationship-building process. Typically, companies fund these activities at the headquarters level in order to benefit all the business units, but they manage them on three levels: global, national, and provincial.

Building the local organization quickly. The parent company should not automatically assign the project to the current managers of the local sales operation in the LCC (if any). Their main focus has been to develop the local market, and they are unlikely to have the time—and may not have the experience—to take on the additional challenge of a complex interface role. Experience is at a premium in this process. It is invaluable to hire someone who has been through this before with another organization and who knows the country. While it is important to build for the long term regarding people, management, and HR, it is also important to put in an infrastructure fast, investing ahead of the curve. At the same time, it's a good idea to create a truly "value added" role for the country organization in order to attract good local staff members.

Getting products flowing to markets—fast. To do this, you will need to build up your technical resources aggressively. Generally speaking, the scarcest resources are the technical people required to qualify suppliers and parts. Companies must choose whether to move these people to the LCC or keep them in the home country. Many companies begin by moving expatriates to LCCs while at the same time aggressively hiring local staff members who can be trained for the necessary positions. More experienced companies hire local staff members well in advance and send them to the home country for 6 to 12 months of training, so that they can build personal contacts and credibility with colleagues at headquarters. Organizational trust is an important success factor.

Building a process that spans LCCs and the home country. Cooperation between the LCC and the home country spans a wide range of processes and requires building tailored support tools. For

instance, a process that companies typically need to develop early in their outsourcing experience is on-site assessment of suppliers. Often, the company's LCC operation initially does not have the staff or the credibility to perform this complex task, which requires technical experience, familiarity with the particular commercial situation in question, and mastery of the company's approach to supplier management. Over time, this competency can be developed, along with mutual trust between the LCC operation and home-country functions.

Managing the request-for-qualifications process is also a challenge. In LCCs, the RFQ is often a price discovery process. There is extreme price variability in the answers received, and one needs to be able to qualify the relevance of the extremes quickly. This task often requires a detailed evaluation and comparison of different suppliers. To support these various processes, companies need basic tools, which they must often build from scratch. These include quote-tracking databases, RFQ forms, and site inspection forms. In addition, they must build the IT infrastructure to facilitate communication across departments and countries within the global organization.

Aggressively managing suppliers. LCC operating environments are generally less stable than the environments that companies are used to in the West. Lead-times, delivery performance, and product quality can vary widely. In some instances, suppliers may not be able to meet their original price quotes over the long term. LCC suppliers often quote very low prices initially to attract business; in addition, their costing systems are generally not very sophisticated, so they frequently make substantial errors when providing first-time quotes. Buyers must be prepared for several rounds of price renegotiations. For instance, in one recent BCG project in China, quotes obtained for auto parts varied widely among suppliers—by as much as 80 percent for some products—compared with variations of 2 to 5 percent for similar parts in the United States. Capacity may also become an issue. In China in

recent years, many suppliers have had difficulty keeping pace with the requirements of rapid economic growth and increasing product demand. To handle these issues and qualify suppliers for long-term, sustainable performance, companies need to institute stringent purchasing practices, such as early audits of supplier operations and costs. Putting such practices in place often requires transferring seasoned purchasing professionals to LCC locations early in the migration process.

Using modern tools effectively. Several of the more experienced companies we talked to in China process all their purchases through online auctions—an approach that they do not take in their home countries. In

many sectors, auctions have become a way of life. They allow companies to put a lot of pressure on the market. Several companies told us that auctions were the prime tool that had allowed them to get productivity improvement of more than 10 percent from their existing supplier base in China (on top of the initial savings achieved by moving to China).

Auctions are also a cheap and effective way of finding suppliers. One company routinely takes this approach. It sets no prequalifications for suppliers (although, of course, it systematically checks the references of low-bidding suppliers). This company reports that the suppliers it has found in this way have generally met its quality standards and have passed the subsequent qualification process. The size and scale of China must be kept in mind in this context. Without the Internet, a systematic search is impractical; with it, the process is fairly straightforward. In this area, LCCs are quite sophisticated.

Moreover, the auction process is not restricted to simple commodity-like products. One company gave us an example of a product category with 1,900 drawings that it had successfully bid on the Internet in China. The company worked with an engineer to segment and organize the product category into ten lots. (In the process, they eliminated one small-volume category that in itself accounted

Companies need to institute stringent purchasing practices, such as early audits of supplier operations and costs.

for 900 drawings.) The auction was very well attended and resulted in an average savings of 15 percent.

Exiting marginal assets in high-cost countries efficiently. Exiting legacy assets and processes in high-cost countries can be very expensive and complicated. As noted earlier, many companies acknowledge that although they could increase profits by moving to LCCs, they nonetheless keep their plants in HCCs because the costs of exiting HCC assets are too high or the process is too complex and painful. Companies must learn to exit their legacy assets efficiently so that those assets do not become a barrier to growth and competitiveness.

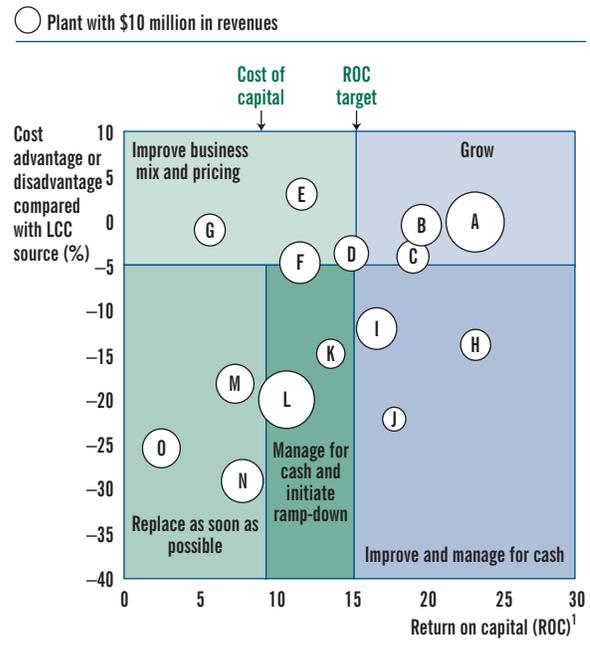
A fundamental first step for corporate management is to develop a long-term asset-management strategy for its portfolio of plants and play an active role in overseeing that portfolio. Management should continually monitor each of its plants' performance on two dimensions: its cost advantage or disadvantage in comparison with alternative sources, and its financial performance, such as return on capital. (See Exhibit 13.)

Such an assessment will allow management to set the right priorities, identifying which plants to replace within the next 12 months, which to ramp down slowly for future exit, and which to invest in.

Corporations should plan their plant exit strategies years in advance to minimize costs, reduce the impact on the work force, and maximize revenues.

EXHIBIT 13

COMPANIES SHOULD REGULARLY ASSESS THE LCC COMPETITIVENESS OF THEIR ASSET PORTFOLIOS



SOURCE: BCG analysis.

¹Or another measure of financial performance.

Managing staff repositioning and attrition early in the process can substantially reduce personnel-restructuring costs. Another reason to start early is to avoid the penalties that are commonly included in long-term contracts with suppliers and customers. Corporations that plan early enough can avoid renewing such contracts for the year of exit, and thus avoid penalties.

An Agenda for Industrial Companies —and for Governments

The globalization of cost structures and business models will continue relentlessly. The deconstruction and reintegration of business systems everywhere is already happening faster than forecasted, in ways that were not expected, with results more profound than were ever anticipated. The early movers are creating competitive advantage by locking up sources, building relationships, developing organizational capabilities, and learning, learning, learning.

Within their respective industries, leading companies are pulling even further out in front by exploiting the powerful synergies arising from lower costs, better efficiencies, and pioneering access to large and fast-growing markets. They will push others into a “doom loop” of steeper costs, lower efficiencies, smaller or stagnant markets, and higher hurdles to leap.

Many U.S. and Western European companies are surprised when their customers move their operations to LCCs. Other companies see their own performance surpassed as their competitors roll out extensive LCC programs. Still others are trapped in the web of complexity created by LCC strategies that try to tackle everything at once. Our experience with industrial companies worldwide indicates that many organizations are not thinking about LCC operations in terms of both risks and opportunities for improving competitive positions, and therefore are not adequately preparing both offensive and defensive strategies. In most cases, companies could have avoided unpleasant—and costly—surprises by identifying industry trends and setting business priorities early.

Far too few management teams are carefully thinking through how their cost structures, business models, and current competitive positions could change as globalization rewrites the “established” rules of competition in their industries. Fewer still are taking strategic action now to create long-term

advantage for their stakeholders. Why are so many hesitating?

- Some are misjudging the pace of change in the business infrastructure
- Some are misled by their current “international” revenue into thinking that they are already operating globally
- Some are postponing tough decisions around legacy assets and liabilities
- Some are taking a static view of their cost structures rather than a dynamic one
- Some are still operating from outdated perspectives gained from decades-old experiments
- Some are thinking about markets rather than about systems
- Some are operating with a false sense of security based on weak alliances and nascent positions
- Some are sticking to old aspirations and measures of success in a new world

Many companies will be blind-sided—perhaps not all at once, but in bits and pieces, as competitors carve out advantage in terms of factor costs, asset footprints, trade flows, business models, supply chains, human capital demographics, and management processes. Whether this process occurs all at once or takes the form of “death by a thousand cuts,” the cumulative effects will be crippling to competitive position.

Implications for Management

Whether a company is already operating in LCCs or just beginning to test the waters, its management team should be continually examining the dynamics of global advantage—in each piece of the business and for the business as a whole. At a minimum,

every company should perform an initial assessment of LCC opportunities and potential threats. To our surprise, few companies have a solid grasp of the inroads globalization is making into their businesses. Even fewer actually pursue a systematic approach to evaluating their business portfolios for LCC threats and opportunities. The LCC Matrix, introduced on page 10, can be a valuable way for a management team to achieve clarity and shared understanding about the magnitude and pace of the threat. It offers an excellent first step in a baseline evaluation of a company's current position.

In conducting such an evaluation, a company needs to ask itself some fundamental questions.

Which products are in motion? Determine how fast your industry is migrating offshore. What is the trend by product line? Be sure to consider not only your current products but also the new ones still in development. How much of the import volume within each product line originates from current domestic competitors now producing or sourcing abroad? Who are the new competitors? Is the domestic industry maintaining or losing share within those imported volumes? How much of the product volume is now lost to assemblies also produced offshore? Then analyze, for each product line, the economics and efficiencies driving that trend (such as growing cost advantages in LCCs, improved availability of qualified suppliers, shorter transportation chains, and the migration of customers to LCCs), as well as its likely rate of acceleration.

Which customers are in motion? Which of your company's customer industries are moving their operations abroad? How much and how fast? Are your customers winning or losing the globalization drive? Which of your customers are likely to maintain significant operations in the high-cost country? How can you improve your value proposition so that they will choose your company for their domestic supplies? And how will you serve the customers that are likely to move?

Which assets will become liabilities? In light of the likely migration patterns of products and customers, identify the physical assets, current invest-

ments, and people that might be affected by migration to LCCs. Plan today for the eventual impact. Which facilities must be repositioned, restructured, or ultimately closed? What actions can you undertake now to reduce obligations and minimize eventual shutdown costs? Which employees are at risk, and what can you do to reposition them so that they can contribute to new sources of value? Which supplier partners must also be prepared to move capacity offshore?

Thinking systematically about your business portfolio in terms of the LCC Matrix and arriving at initial answers to the above questions will be valuable first steps in the design of LCC strategies. Companies that take these steps will have a base line to help them in planning product, customer, and asset portfolios that integrate LCCs, and in making decisions about which operations to strengthen domestically in the high-cost country, which to divest, and which to relocate to LCCs.

With this information in place, the team can imagine a "what's best" global business built on lowest global cost, best global capabilities (whether in Bangalore, Boise, or Böblingen), largest and fastest-growing markets, and most promising customer connections. Once you have that business firmly in sight, you can score the P&L, balance sheet, and organization accordingly, face the inevitable gaps, hedge the risks, and reset your company's priorities, strategies, and organization to ride the wave of globalization.

Implications for Governments

It is not just companies in high-cost countries that need to develop strategies to address the challenges of globalization; governments, too, must do so. The migration of operations to LCCs is already dramatically reshaping the industrial-manufacturing base in developed countries, where some 15 to 20 percent of manufacturing jobs will be at risk over the next ten years, together with additional jobs in supporting service sectors.

Clearly, this development poses a significant public-policy challenge for governments in North America

and Western Europe. The traditional governmental response to threats of this kind has been to impose tariffs and quotas on imports—a tactic that has rarely achieved the desired results. Instead, governments should focus on promoting economic development in advantaged sectors while supporting the inevitable transition to global production in the other sectors. Specifically, they should invest in areas in which their local industries have strong, sustainable competitive advantage, reshaping public policy to support those industries. For example:

- Investments in productivity-enhancing technologies can create or extend competitive advantage
- Many countries urgently need long-term reforms to their health-care systems in order to lower the excessive health-care costs borne by companies
- In the United States, investments in education and training are needed immediately to stem and reverse the continuous degradation of skills in the work force

In short, for industries to flourish in high-cost countries, governments need to foster an internationally competitive business environment at home. A key part of that process is finding ways to mitigate the social impact caused by the restructuring of uncompetitive legacy assets. Dying assets are a far bigger and more costly problem than most govern-

ments have fully appreciated. Although the process is irreversible, it can be partly mitigated through a combination of public and private initiatives to revitalize brownfield sites and local economies. For instance, governments could encourage the private sector to offer its finances, capacity, and expertise. In the United States, for example, there are only two national private-equity firms that focus solely on brownfield redevelopment. Governments could also create economic development plans for industries that will be hardest hit. The public sector should offer supplemental funding and the removal of environmental liabilities.

Although the movement of industrial operations to LCCs cannot be reversed or stopped, governments can still take action, in concert with the private sector, to safeguard the health of much of their remaining domestic manufacturing economies. And companies can take action to avoid the risks this movement poses and capture the advantages it offers.

* * *

Companies that continue to hesitate do so at their peril. Globalizing your company's cost structure and business model, with China and India as first-pass options, is rapidly becoming not merely a strategic alternative but a competitive imperative.

The Boston Consulting Group publishes other reports and articles that may be of interest to industrial executives. Recent examples include:

“What Is Globalization Doing to Your Business?”

Opportunities for Action in Industrial Goods, February 2004
(This publication summarizes a section of the present report.)

“Made in China: Why Industrial Goods Are Going Next”

Opportunities for Action in Industrial Goods, November 2003

“Rethinking Automotive Purchasing: From Price Pressure to Partnership”

Opportunities for Action in the Automotive Industry, November 2003

“Innovation to Cash: Orchestrating the Process”

Opportunities for Action in Industrial Goods, September 2003

“Boosting Innovation Productivity”

Opportunities for Action in Industrial Goods, April 2003

“Asset Productivity: A Potent Lever for Competitive Advantage”

Opportunities for Action in Industrial Goods, March 2003

“Competing to Win in China’s Fast-Growing Automotive Market”

Opportunities for Action in the Automotive Industry, December 2002

“Rethinking ‘Made in China’ Cars and Parts”

Opportunities for Action in the Automotive Industry, December 2002

Breaking the Stalemate: Value Creation Strategies for the Global Steel Industry

A report by The Boston Consulting Group, July 2002

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