Preface

The global economy is changing and the face of operations is changing along with it. Reduced barriers to trade are allowing smoother flow of goods, services, capital, and labor across geographic boundaries and thus more efficient allocation of resources globally. Technological advancements, particularly in information technology, are creating new opportunities for companies to compete in different ways. Reduced transportation and communication costs are facilitating placement of operations activities around the world to access required resources and cost structures. In this highly complex global environment, countries compete on the basis of both macroeconomic factors—institutions, infrastructure, health and primary education, higher education and training, and market efficiency—and microeconomic factors—technological readiness, business sophistication, and innovation.[1]

Operations strategy, the topic of this book, addresses both questions of how a company should structure itself to compete in the complex global economy and of how it can develop the capabilities that underlie technological readiness, business sophistication, and innovation. It addresses major capital decisions such as whether and how much to vertically integrate, what types of process technologies to employ, how much capacity to carry and where to locate facilities. It also addresses adoption of information technology, development of a strong supply base and the supply chain that supports it, design of production and service delivery processes, and nurturing of the talent to design and deliver sophisticated products and services. The aptitude of a company to make these types of decisions, and thus plan and execute its operations effectively, is critical to both its competitiveness and to the competitiveness of the countries in which it operates. National competitiveness—for any country—depends upon improving productivity. Operations—manufacturing and service—are at the heart of the productivity improvement effort.

We define operations to include both manufacturing activities and service operations. Manufacturing activities range from one-of-a-kind shipbuilding to high volume production of consumer products like shampoo or laundry detergent to continuous flow operations such as those at oil refineries. Service operations include healthcare management, business and leisure travel, fast food delivery, and the back-office operations at financial institutions. Service operations often accompany production operations in the form, for example, of supply chain services such as retailing and transportation. Advanced economies tend to focus more of their resources in service operations, while developing economies focus more on agriculture or manufacturing.

The evolution of the U.S. economy is illustrative. In the 1800s, agriculture and food production dominated the U.S. economy. Since that time, significant improvements in productivity were made as farms were consolidated to achieve economies of scale, investments were made in equipment and technology, and those working in the farming sector became more knowledgeable and skilled. As the United States became more productive in agriculture and food production, the standard of living in the United States rose, even as

[1] See http://www.weforum.org/pdf/Global_Competitiveness_Reports/Reports/gcr_2006/chapter_1_1.pdf, 11/25/06.

these sectors declined as a fraction of the overall economy. The resources freed were applied to the development of manufacturing-based businesses, which commenced to improve productivity of their operations in turn. Today, the U.S. standard of living still depends on productivity improvements in agriculture and manufacturing, even as the freed resources are being applied to service operations.

According to the World Bank (1995), high-income economies like the United States' devote only 4 percent of their working population to agriculture, while low-income economies devote 62 percent of theirs. Exhibit 1 shows employment figures for different levels of economic development. Low-income economies, for example, employ only 23 percent of their working population in services, while high-income economies employ 66 percent in services. The more advanced the economy, the fewer resources are typically devoted to agriculture and industry. It is difficult for a society, however, to devote the majority of its resources to services unless it has already become productive in agriculture and manufacturing. Thus, the evolution that the United States has gone through is followed by most developing economies around the world.

EXHIBIT 1 **Percentage of Working Popu-lation Employed by Sector**

Source: World Bank, 1995.

Percentage of the Working Population Employed in:	High-Income Economies	Middle-Income Economies	Low-Income Economies
Agriculture	4%	31%	62%
Industry (manufacturing)	30%	27%	15%
Services	66%	42%	23%

The advancement of an economy through these stages affects the development and deployment of operations throughout the rest of the world, resulting in frequent and significant changes in global production and distribution patterns. When a country initially industrializes, advancing from an agriculturally based economy to an industrially based one, it starts by taking advantage of its low labor costs to compete in global markets with low cost products. Typically these are commodity markets, where the basis of competition is cost rather than quality, availability, features and innovativeness, or environmental performance. Over time, however, as investments are made to improve productivity, labor costs rise (and concurrently the standard of living), eventually making the country uncompetitive on the basis of cost alone. To remain competitive it must commence producing value-added goods that compete on something other than cost. When this occurs, production of the low-cost and commodity goods move to a new location where labor costs are still low. The cycle then repeats itself.

This pattern has manifested itself in numerous countries. In Japan in the 1950s and 1960s labor costs were very low compared both to Japanese labor costs today and to labor costs in the more developed countries at that time. Japanese goods were thus competitive on the basis of cost. As Japanese companies became increasingly productive, Japanese labor costs increased significantly and Japan shifted its focus to compete on quality instead. The global markets sought to source commodities and other low-cost goods elsewhere. The pattern then repeated itself in the "four tigers"—South Korea, Taiwan, Singapore, and Hong Kong.

All started out as sources of low-cost labor and the associated goods, but then evolved to sources of more sophisticated goods.

More recently, Thailand, Malaysia, Indonesia, and Mexico have begun the transition, but the more significant source of development has been China. Like the many countries that preceded it, China started off as a source of low labor costs. China is so large, however, that the entire country is not developing at the same pace. To some, China represents an inexhaustible supply of labor and will remain a low-cost source for many years to come, as production will simply move from region to region within China to achieve lower costs. The coastal regions of China, for example, have already seen increased costs and have changed their basis of competition to higher value-added products, while the inland regions still have labor surpluses that allow them to deliver at low cost.

The patterns that have played themselves out in the production of goods are beginning to play out in services as well. India, for example, started out as a source of low-cost labor for services such as call centers and computer programming. As it has increased its productivity, enhanced the skill sets of its workforce, and improved the efficiency of its processes, it has shifted some portion of its work to higher value-added activities. The global market is likely to start sourcing some of the low-cost or commodity services it has sourced from India elsewhere.

Where do these cycles end? Will products and services that left the United States return in the future? What is the next frontier after services? Some believe that innovation is the only self-sustaining driver of growth for countries that have reached the high-tech frontier.[2] They argue that developing countries can take advantage of existing technologies or incremental change to improve their productivity, but advanced economies must come up with cutting-edge products and processes to maintain a competitive edge. As a result, many advanced economies today, such as Singapore, place innovation policy—to establish an environment that promotes entrepreneurship and innovation—at the very center of their economic policy.

When manufacturing and service operations in advanced economies are uncompetitive, exchange rate adjustments cause costs to come down, and the standard of living is reduced. For less developed societies, investment in manufacturing and service operations provides a mechanism for creating jobs and raising the standard of living. In both cases, proficiency in operations sets the value of factor inputs, particularly the cost of labor and the standard of living. Some argue that advanced economies should outsource their operations to lower cost locations and focus their efforts on gaining competitive advantage through branding or marketing. Others (e.g., Cohen and Zysman 1987 and, more recently, Fingleton—2004), debate and question this notion and continue to emphasize the importance of operations to a national economy.

There is no doubt that the ability of a country to manage its operations—manufacturing or service—and to improve their productivity over time is critical to the competitiveness of that country. The evolution over time from agriculture to services and from low-cost provider to high-value-added provider is achieved only through continuous improvement of productivity. Operations strategy and management are at the core of that ability. The role of operations in the evolution of the global economy is not to be taken lightly. As companies

[2] http://www.weforum.org/pdf/Global_Competitiveness_Reports/Reports/gcr_2006/chapter_1_1.pdf, 11/25/06.

shift operations around the world to access lower costs, better skills, or required technologies, people in their home markets are displaced. This raises a number of social, ethical, and political issues as companies and countries together determine how to move people to new careers and jobs and how to keep people current in such fluid environments. Globalization and the evolution we have described are inevitable. It is left to operations managers worldwide to deal gracefully and constructively with them.

Perhaps notions of national competitiveness are too abstract and not a good enough reason to believe that operations matter. If so, consider the simple list of benefits customers seek when procuring a product or a service. They examine the cost, quality, availability, features, innovativeness, and increasingly, environmental performance of the product or service. Operations plays a critical role in delivering against each of these dimensions. Certainly the design or development organization sets the parameters for the production of a product or delivery of a service, and certainly marketing ensures that the product or service is properly presented to the customer. But, in the end, operations delivers the product or service. If operations is not capable, does not work closely with design or development in the creation of the product or service, or does not coordinate with marketing about promises made to the customer, customer satisfaction is extremely hard to achieve.

Operations, service and manufacturing, are thus core to national competitiveness as well as to simply satisfying customers. Decisions about operations must thus be made in a rigorous, thoughtful, and systematic manner. This book describes the important decisions that operations strategists must make and provides a number of methods for making them. We hope that it is helpful to all those prospective managers and executives who hold the future health of the global economy in their hands.

References

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