assets. The most efficient suppliers are located in countries with currencies that many foreign exchange analysts expect to appreciate substantially over the next decade. What are the pros and cons of *(a)* manufacturing the component in-house and *(b)* outsourcing manufacturing to an independent supplier? Which option would you recommend? Why?

4. Reread the Management Focus on Philips in China, then answer the following questions:
   a. What are the benefits to Philips of shifting so much of its global production to China?
   b. What are the risks associated with a heavy concentration of manufacturing assets in China?
   c. What strategies might Philips adopt to maximize the benefits and mitigate the risks associated with moving so much production capacity offshore?
5. Explain how an efficient logistics function can help an international business compete more effectively in the global marketplace.

global

Global Production, Outsourcing, and Logistics

Use the globalEDGE™ site to complete the following exercises:

Exercise 1

The globalization of production makes many people more aware of the differences in manufacturing costs worldwide. The U.S. Department of Labor's Bureau of International Labor Affairs publishes a *Chartbook of International Labor Comparisons*. Locate the latest edition of this report and identify the hourly compensation costs for manufacturing workers in the United States, Italy, Mexico, New Zealand, Norway, and Singapore.

Exercise 2

The internationalization of manufacturing has become much more predominant in recent years. In fact, *Industry Week* magazine ranks the world's largest manufacturing companies by sales revenue. Identify the largest Indian and Japanese manufacturing companies as provided in the most recent ranking by paying special attention to the industries in which these companies operate.

Building the Boeing 787

Boeing's newest commercial jet aircraft, the wide-bodied 787 jet, is a bold bet on the future of both airline travel and plane making. Designed to fly long-haul point-to-point routes, the 250-seat 787 is made largely out of composite materials, such as carbon fibers, rather than traditional materials such as aluminum. In total, some 80 percent of the 787 by volume is composite materials, making the plane 20 percent lighter than a traditional aircraft of the same size, which translates into a big saving in jet fuel consumption and costs. The 787 is also packed full of other design innovations, including larger windows, greater headroom, and state-of-the-art electronics on the flight deck and in the passenger compartment.

To reduce the risks associated with this technological gamble, Boeing decided to outsource an unprecedented 70 percent of the content of the 787 to other manufacturers, most of them based in other nations. In contrast, 50 percent of the Boeing 777 was outsourced, 30 percent of the 767 and only 5 percent of the 707. The idea was that in return for a share of the work, partners would contribute towards the estimated $8 billion in development costs for the 787. In addition, by outsourcing, Boeing felt that it could tap into the expertise of the most efficient producers, wherever in the world they might be located, thereby driving down the costs of making the plane. Furthermore, Boeing believed that outsourcing some work to foreign countries would help it to garner sales in those countries. Boeing's role in the entire process was to design the plane, market and sell it, and undertake final assembly in its Everett plant in Washington state. Boeing also believed that by outsourcing the

design of so many components, it could cut down the time to develop this aircraft to four years from the six that is normal in the industry.

Some 17 partners in 10 countries produce major parts of the aircraft. Vought Aircraft Industries in South Carolina makes the rear fuselage, and Alenia Aeronautical of Italy produces the middle fuselage sections and horizontal tailpieces. Three Japanese companies, Fuji, Kawasaki, and Mitsubishi, produce the plane's wings. Toronto-based Onex Corporation makes the nose section. All of these bulky pieces are shipped to Everett for final assembly aboard a fleet of three modified Boeing 747 freighters called "Dreamlifters."

Until late 2007, the strategy seemed to be working remarkably well. Boeing had booked orders for over 770 aircraft, worth more than $100 billion, making the 787 the most successful aircraft launch in the history of commercial aviation. But behind the scenes, cracks were appearing in Boeing's globally dispersed supply chain. In mid 2007, Boeing admitted that the 787 might be a few months late due to problems with the supply of special fasteners for the fuselage. As it turned out, the problems were much more serious. By early 2008, Boeing was admitting to a delay of up to 12 months in the delivery of the first 787 and an additional $2 billion in development costs, and it was facing the possibility of having to pay millions in penalty clause payments for late delivery to its leading customers.

The core issue was that several key partners had not been able to meets Boeing's delivery schedules. To make composite parts, for example, Italy's Alenia had to build a new factory, but the site that it chose was a 300-year-old olive grove. It faced months of haggling with local authorities over the property and had to agree to replant the trees elsewhere before it could break ground. To compound problems, its first fuselage sections delivered to Boeing did not meet the required quality standards. Then when parts did arrive at Everett, Boeing found that many components had not been installed in the fuselages (as required), and that assembly instructions were only available in Italian. Other problems arose because several partners themselves outsourced mission-critical design work to other enterprises. Vought, for example, outsourced the design and building of floor pieces for which it was responsible to an Israeli company. In turn, the Israeli company had trouble meeting Boeing's exacting quality standards, but because it was reporting to Vought, not Boeing, executives at Boeing did not learn of this problem until it had already become a serious bottleneck. Upon learning of the issue, Boeing rapidly dispatched engineers to Israel to work with the company, but by then several months had been lost.

Despite all of these issues, Boeing remains committed to its outsourcing program. What the company has learnt, however, is that if it is going to outsource work to foreign suppliers, much closer management oversight and coordination is required to make it work.[33]

Case Discussion Questions

1. What are the benefits to Boeing of outsourcing so much work on the 787 to foreign suppliers? What are the potential risks? Do the benefits outweigh the risk?
2. In 2007 and 2008 Boeing ran into several well-publicized issues with regard to its management of a globally dispersed supply chain. What are the causes of these problems? What can a company like Boeing do to make sure such problems do not occur in the future?
3. Some critics have claimed that by outsourcing so much work, Boeing has been exporting American jobs overseas. Is this criticism fair? How should the company respond to such criticisms?

Notes

1. E. Bellman, "India Cranks Out Small Cars for Export," *The Wall Street Journal*, October 6, 2008, p. A1; N, Lakshman, "India's Car Market Offers No Relief for Automakers," *BusinessWeek Online*, December 23, 2008; M. Fackler, "In India, a New Detroit," *The New York Times*, June 26, 2008, pp. C1, C4.
2. B. C. Arntzen, G. G. Brown, T. P. Harrison, and L. L. Trafton, "Global Supply Chain Management at Digital Equipment Corporation," *Interfaces* 25 (1995), pp. 69–93, and Diana Farrell, "Beyond Offshoring," *Harvard Business Review*, December 2004, pp. 1–8.
3. D. A. Garvin, "What Does Product Quality Really Mean," *Sloan Management Review* 26 (Fall 1984), pp. 25–44.
4. See the articles published in the special issue of the *Academy of Management Review on Total Quality Management* 19, no. 3 (1994). The following article provides a good overview of many of the issues involved from an academic perspective: J. W. Dean and D. E. Bowen, "Management Theory and Total Quality," *Academy of Management Review* 19 (1994), pp. 392–418. Also see T. C. Powell, "Total Quality Management as Competitive Advantage," *Strategic Management Journal* 16 (1995), pp. 15–37; And